IN THE ENVIRONMENT COURT
I MUA I TE KOOTI TAIAO O AOTEAROA

UNDER	of the Resource Management Act 1991
IN THE MATTER	of appeals under Clause 14 of the First Schedule of the Act
BETWEEN	**TRANSPOWER NEW ZEALAND LIMITED** (ENV-2018-CHC-26)
	FONTERRA CO-OPERATIVE GROUP LIMITED (ENV-2018-CHC-27)
	HORTICULTURE NEW ZEALAND (ENV-2018-CHC-28)
	ARATIATIA LIVESTOCK LIMITED (ENV-2018-CHC-29)

WILL SAY STATEMENT OF JUSTIN ALLAN KITTO ON BEHALF OF THE DAIRY INTEREST PARTIES

5 November 2021

Solicitor acting:
Katherine Forward
Duncan Cotterill
PO Box 5, Christchurch
Phone +64 3 379 2430
Fax +64 3 379 7097

katherine.forward@duncancotterill.com

WILKINS FARMING CO

(ENV-2018-CHC-30)

GORE DISTRICT COUNCIL, SOUTHLAND DISTRICT COUNCIL & INVERCARGILL DISTRICT COUNCIL

(ENV-2018-CHC-31)

DAIRYNZ LIMITED

(ENV-2018-CHC-32)

H W RICHARDSON GROUP

(ENV-2018-CHC-33)

BEEF + LAMB NEW ZEALAND

(ENV-2018-CHC-34 & 35)

DIRECTOR-GENERAL OF CONSERVATION

(ENV-2018-CHC-36)

SOUTHLAND FISH AND GAME COUNCIL

(ENV-2018-CHC-37)

MERIDIAN ENERGY LIMITED

(ENV-2018-CHC-38)

ALLIANCE GROUP LIMITED

(ENV-2018-CHC-39)

FEDERATED FARMERS OF NEW ZEALAND

(ENV-2018-CHC-40)

HERITAGE NEW ZEALAND POUHERE TAONGA

(ENV-2018-CHC-41)

STONY CREEK STATION LIMITED

(ENV-2018-CHC-42)

THE TERRACES LIMITED

(ENV-2018-CHC-43)

CAMBELL'S BLOCK LIMTED

(ENV-2018-CHC-44)

ROBERT GRANT

(ENV-2018-CHC-45)

SOUTHWOOD EXPORT LIMITED, KODANSHA TREEFARM NEW ZEALAND LIMITED, SOUTHLAND PLANTATION FOREST COMPANY OF NEW ZEALAND

(ENV-2018-CHC-46)

TE RUNANGA O NGĀI TAHU, HOKONUI RUNAKA, WAIHOPAI RUNAKA, TE RUNANGA O AWARUA & TE RUNANGA O ORAKA APARIMA

(ENV-2018-CHC-47)

RAYONIER NEW ZEALAND LIMITED

(ENV-2018-CHC-49)

ROYAL FOREST AND BIRD PROTECTION SOCIETY OF NEW ZEALAND
(ENV-2018-CHC-50)

Appellants

AND **SOUTHLAND REGIONAL COUNCIL**

Respondent

Introduction

1 My full name is Justin Allan Kitto.

2 I hold a Master of Environmental Science (Freshwater Ecology) (Hons) from the University of Canterbury. I have practised as an environmental scientist for the last 12 years for regional government and industry good organisations. In both roles I have been involved in providing technical advice to support policy development, policy submissions as well as supporting farmers and catchment groups to make practice change.

3 I am employed by Dairy NZ as a Senior Solutions and Development Specialist – Environment. In this role I advise DairyNZ and dairy farmers of the impacts of farming on water quality as well as working in projects that develop solutions to support dairy farmers to reduce their environmental footprint.

4 I have been involved in the proposed Southland Water and Land Plan (**pSWLP**) process as an expert witness in the Topic A hearings and have also attended the series of expert conferences relating to the Topic A hearings. I am a signatory to the resulting Joint Witness Statements (**JWS**) prepared.

5 The contents of this Will Say Statement is in support of the relief sought by DairyNZ Limited and Fonterra Co-operative Group (**the Dairy Interest parties**) and considers some of the solutions proposed in the tracked change relief provided by the Dairy Interest parties expert planner, Mr Gerard Willis dated Friday 29 October 2021.

Code of Conduct

6 I have read and am familiar with the Code of Conduct for expert witnesses in the 2014 Environment Court Practice Note. I agree to comply with this Code of Conduct when participating in the conferencing. Except where I state that I am relying on the specified evidence of another person, my evidence in this statement is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions which I express.

7 I acknowledge that I am an employee of DairyNZ and I may not be considered to be independent simply because of that employee status. Notwithstanding that, I can confirm that I have prepared and present this Will Say statement as an independent expert and in compliance with the Code of Conduct.

Scope

8 I have been asked to provide my expert comments and opinion on the matters relating to:

8.1 Ephemeral rivers, and in particular the difficulties in distinguishing these from critical source areas, overland flow paths, and intermittent rivers.

8.2 The River Environment Classification (REC) and implications for ephemeral flow paths;

8.3 Ecological value of ephemeral flow paths;

8.4 The identification of degraded catchments and outstanding matters to be resolved following the Joint Witness Statement(s);

8.5 Setbacks and water quality outcomes; and

8.6 Proposed Appendix X – identification of catchments that are degraded.

Ephemeral rivers

9 Ephemeral rivers have been defined in the pSWLP as "Rivers which only contain flowing or standing water following rainfall events or extended periods of above average rainfall". While the definition uses the word "river" these landscape features often do not look like or act like rivers in terms of having a defined riverbed and a distinct transition between a riverbed and the terrestrial landscape that would be evident in an intermittent or perennial river. Often what the pSLWP refers to as ephemeral rivers have no clear distinction from a paddock until there is excess rainfall that ends up converging and running off the terrestrial landscape.

10 In contrast, intermittent and perennial rivers will have clear features that distinguish them from the rest of the landscape. These features include a defined and active bed as well as having permanent flow (perennial) or periods of no flow (intermittent).

11 Hansen (2001)[1] has recommended the use of several 'field indicators' to help differentiate stream types. Of these criteria (identified in Table 1), the presence of a defined channel was the primary indicator used to separate a perennial and intermittent channel from an ephemeral channel. A defined channel was also described as 'entrenched into the landscape' or having an 'active water path that noticeably scoured, sorted, or settled materials'.

Table 1: Field criteria used by Hansen (2001)[2] to identify different stream types.

Field criteria used by Hansen (2001) to determine stream type.

Criteria	Stream type		
	Perennial	Intermittent	Ephemeral
Channel	Defined	Defined	Not defined
Flow duration (estimated)	Almost always	Extended, but interrupted	Stormflow only
Bed water level	Above channel	Near channel surface	Below channel
Aquatic insects	Present	Few, if any	None
Material movement	Present	Present, less obvious	Lacking or limited
Channel materials	No organic buildup	Lacks organic buildup	Mostly soil materials Organic buildup

12 The solution proposed in Mr Willis' Will Say statement is to refer to these low areas of the landscape which do not have a defined bed and only carry water in the event of heavy rainfall events, as 'ephemeral flow paths'. I support this and consider it will promote consistency and is aligned with the Hansen field criteria above.

REC and implications for ephemeral flow paths

13 Desk top methods to assess the potential location of ephemeral flow paths include the use of digital elevation models (**DEM**) or the river environment classification (**REC**). The concern with using these tools is that while they identify flow paths, they are unable to identify if they are perennial or intermittent rivers or ephemeral flow paths. It is common when the REC is overlaid with aerial imagery for low order streams to be located in paddocks, however on-the-ground, these 'streams' have undistinguishable features from the rest of the paddock. Due to the complexity of identifying ephemeral waterways via desk top analysis, field-based classification using criteria like Hansen (2001)[3] would be more effective if there is a need to manage ephemeral flow paths.

Ecological value of ephemeral flow paths

1 William F. Hansen, *Identifying stream types and management implications* (Forest Ecology and Management, 2001) vol. 143 at [39-46].
2 Ibid.
3 Ibid.

14 In highly productive catchments (excluding forestry) ephemeral flow paths (landform depressions with no defined or active bed) will largely comprise pasture or crops and offer minimal natural value, especially habitat for aquatic fauna. Hansen (2001) (Table 1)[4] notes that ephemeral streams do not support aquatic invertebrates. This view is also supported by (Dieterich, 1992[5]; Bonada et al., 2007[6]).

Degraded catchments

15 In the JWS for water quality and ecology (rivers and wetlands) thresholds were identified for a range of attributes that defined, in the interim, if a site was degraded. Despite these thresholds being defined, there are still some outstanding matters that were identified in the final JWS (dated 22 November 2019) that need to be resolved. These include:

15.1 The appropriateness of using of the A-band for nitrate toxicity threshold for defining degradation in waterways that display no excessive instream plant growth issues or risk of instream plant growth issues.

15.2 The use of dissolved inorganic nitrogen (DIN) and dissolved reactive phosphorus (DRP) on their own as triggers for assessing a site as degraded. It is my view that where sites exceed the DIN and DRP thresholds and there is biological data to demonstrate that periphyton or macroinvertebrate communities are not degraded, we should rely on the biological data as this is the ultimate evidence of degradation. If there is an absence of biological data, at a site but DIN or DRP are exceeding the thresholds, it is not valid to assume that these sites will necessarily have degraded biological communities.

15.3 The classification of rivers as 'upland' after these rivers start to receive inputs from 'lowland' rivers was an unresolved issue with concern about lowland rivers changing the chemical composition of rivers classified as upland once they reach the Southland Plains.

Setbacks and water quality outcomes

16 There is a range of research that has investigated the effectiveness of grass filter strips which have provided varying efficacies based on contaminant removal relative to buffer width. Efficacy often varies by soil type (especially clay content and particle size), rainfall intensity and duration, slope, slope length, vegetation type (in the buffer) and land cover of the eroding surface.

17 Recent analysis by Zhang et al. (2010)[7] has identified effective buffer widths for sediment (10m), nitrogen (20m) and phosphorus (20m) if the objective is to remove approximately 90% of the contaminant load. However, in applying those research findings the nature of the research methodology and assumptions need to be understood. In addition, there is no requirement for a 90% reduction in contaminant load to be achieved. As I understand it the pSLWP requires meaningful improvement prior to a future limit setting regime.

18 In much of the buffer width literature, buffer effectiveness is assumed when there is uniform flow across a slope. However, runoff is often concentrated into ephemeral flow paths where runoff can become more erosive and effective at entraining contaminants and where grass filter strips can become less effective at trapping contaminants and where less infiltration of water (the

4 Ibid.
5 Martin Dietrich "Insect community composition and physico-chemical processes in summer-dry streams of western Oregon" (Ph. D. thesis, Oregon State University, Corvallis OR, 1992) at [191].
6 Nuria Bonada, Maria Rieradevall and Narcis Prat *Macroinvertebrate community structure and biological traits related to flow permanence in a Mediterranean river network* (Hydrobiologia, 2007) vol 589 at [91-106].
7 Xuyang Zhang, Xingmei Liu, Minghua Zhang, Randy A. Dahlgren and Melissa Eitzel *A Review of Vegetated Buffers and a Meta-analysis of Their Mitigation Efficacy in Reducing Nonpoint Source Pollution* (J.Environ.Qual, 2010) vol 39 at [76-84].

vector for these contaminants) can soak into the soil profile. In other words, the research assumptions do not reflect the reality on farm.

19 In his Will Say Statement and tracked change version of relief, Mr Willis proposes a 5m set back from farming activities, including intensive winter grazing, from the bed of any river (other than a Regionally Significant Wetland or Sensitive Water Body listed in Appendix A, estuary, or the coastal marine area), lake, artificial watercourse (regardless of whether there is any water in it at the time), modified water course or natural wetland. I consider this would result in meaningful improvement. In the case of nitrogen, most is lost through the soil profile via drainage, so increased buffers/setbacks are unlikely to have any significant reduction effect. For phosphorus, based on the above-mentioned research, at a 5m buffer, about 50% would be removed. I am aware there are also other management techniques that could see further reductions.

20 It is my view that some practice changes have already led to an improvement in some attributes in Southland and that continued uptake of other practices that are subject to rules in the pSWLP including the use of Farm Environment Plans to drive uptake of good management practice and to identify and manage critical source areas will result in further reductions in contaminant load to water.

Proposed Appendix X – identification of catchments that are degraded

21 I support the inclusion of a list or map of degraded catchments to the pSWLP as per the

22 solution proposed by Mr Willis. In my opinion this will create greater certainty and enable landowners to make decisions without the need for further expert assessment. Based on my preliminary investigations it would appear that a number of catchments within Southland would meet the degraded criteria identified in the JWS. It will be helpful to discuss this in the expert conferencing to be scheduled as I acknowledge there is still work required to confirm whether a catchment is degraded or not.

Justin Kitto

5 November 2021