

BEFORE THE OTAGO REGIONAL COUNCIL

IN THE MATTER of the Resource Management Act
1991 ("the Act")

AND

IN THE MATTER Proposed Plan Change 5A:
Lindis Integrated Water
Management

**STATEMENT OF SUSAN HELEN McKEAGUE
EVIDENCE ON BEHALF OF THE LINDIS CATCHMENT GROUP LTD**

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INTRODUCTION

QUALIFICATIONS AND EVIDENCE

1. My full name is Susan Helen McKeague
2. I hold a Bachelor of Agricultural Science majoring in Agronomy.
3. I have worked in the agricultural sector with farming families as an adviser, landcare co-ordinator, facilitator, land resource officer, land resource manager and consultant for 25 years. During the 1990's I worked in several farming communities in Western Australia. In 2000 I was employed by the Otago Regional Council firstly as a Land Resource Officer and then for 13 years as the Manager Land Resources. Since October 2013 I have been self employed as a farm consultant.
4. My experience with catchment groups addressing water quantity issues is extensive. While at the Otago Regional Council I assisted groups and farmers across Otago to interpret the Water Plan rules and policies, guided on best management practice and strategic decisions for water quantity.
5. I was involved in the community consultation on the Water Plan Change 1C which was introduced to enable smooth Deemed permit transition.
6. McKeague Consultancy clients include: the Kyeburn Catchment Ltd, (20 irrigators engaged in developing a group managed water regime), Maniototo Irrigation Company, Pigburn irrigators(10 irrigators developing a group managed water regime for consent replacement), North Otago Irrigation Company, Paerau to Waipiata water users(rostering deemed permits during low flow).
7. I have worked with the Lindis Catchment Group as their consultant assisting with the development of group managed water for since July 2014. In my previous role as ORC's Manager Land Resources I worked alongside the Lindis farming community and most other water short catchments in Otago.
8. 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 what I have been told by another person. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.

The current Lindis irrigation water systems and practices:

The Status Quo

9. Irrigation has been an integral part of farming businesses in the Lindis Catchment for over eighty years. The infrastructure developed and maintained, the operational management, the feed produced, and ongoing upgrades demonstrate a clever and efficient use of a shared community resource.

Infrastructure: Races

10. Historically irrigators solely used gravity to transport water between properties and over the land. Open channel races were built by shovels and some still are maintained that way across kilometres of land.
11. High flows are required to effectively transport water via race systems. Therefore where ever possible several farms combine to use the same race system.
12. Irrigation races can be difficult to seal. The Lindis Irrigation Company manages several races, including two long races (Tarras and Ardgour) that start much higher in the catchment than the properties receiving the water to utilise gravity delivery.
13. The water lost to ground via lengthy race systems and over land flow irrigation techniques replenish shallow household groundwater bores and springs, feeding some smaller surface water permits. The big races often flow almost parallel to the Lindis River, but at a gentler rate of fall than the river, for several kilometres before reaching the farms.
14. Lindis River water is applied through the whole natural catchment including the lower terrace areas around the Tarras township subdivided as a separate catchment in PPC5A. The only cost effective water source for many of the farmers the Tarras area is the Lindis water delivered by the Tarras race. Some of the current surface water takes in this area will be impacted detrimentally when this race eventually closes down.

Infrastructure: Operation

15. The three larger races located between Cluden Stream and the Ardgour Bridge are managed by the Lindis Irrigation Company race man. This water is delivered to 37 company members.

16. As the river flow drops, a regime of taking, bywashing and re-taking has been established to make the greatest use of the water available and share the resource.
17. Under status quo irrigators already have to share water every summer during low flows. The 4 larger races lower in the catchment have a regime that ensures all takes are equally sharing the loss.
18. The sharing is done in two ways, firstly some of the flow is left in the river for the other takes and secondly, further flow is returned to the river just above the intake for the next take.
19. Bywashing or returning water back to the river allows for a finer management of the resource. The race man can see what was initially taken and can then deliver more or less to the next take to achieve the nominated rostering regime whether it be 25%, 50% or 75% cutbacks.
20. The Lindis Irrigation Company has two intakes which supply two races, the Tarras and Ardgour races. The Tarras race delivers water to properties on the true right of the river around the Tarras flats and beyond. The Ardgour Race runs along the true left of the Lindis and delivers water to shareholders throughout the Ardgour Valley.

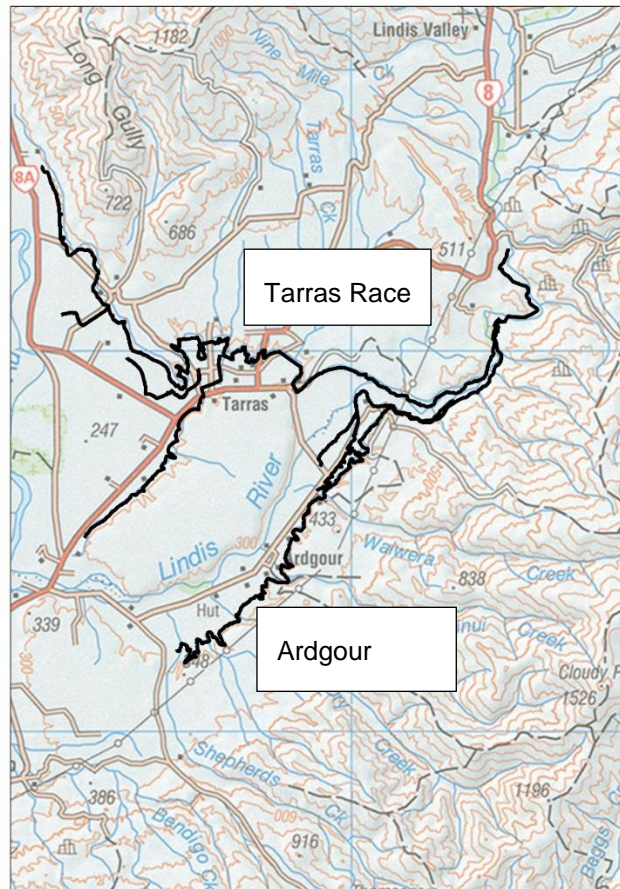


Figure 1: Map showing the Tarras and Ardgour Races in the Lower Lindis Catchment

21. There are two other takes in the Lower Lindis River that are part of this rostering regime, the Rutherford take and the Beggs take (or Beggs Stackpol take). The Tarras take is the most upstream take labelled T on the map below. Next intake is the Ardgour take, labelled A. Then the Rutherford take, labelled R and the Beggs take, labelled B. The Tarras take/race bywashes water back to the river at two locations to supply other takes, at site TA for the Ardgour take and at site TB to supply the Beggs take. The Ardgour take/race bywashes water at site AR to supply the Rutherford take.

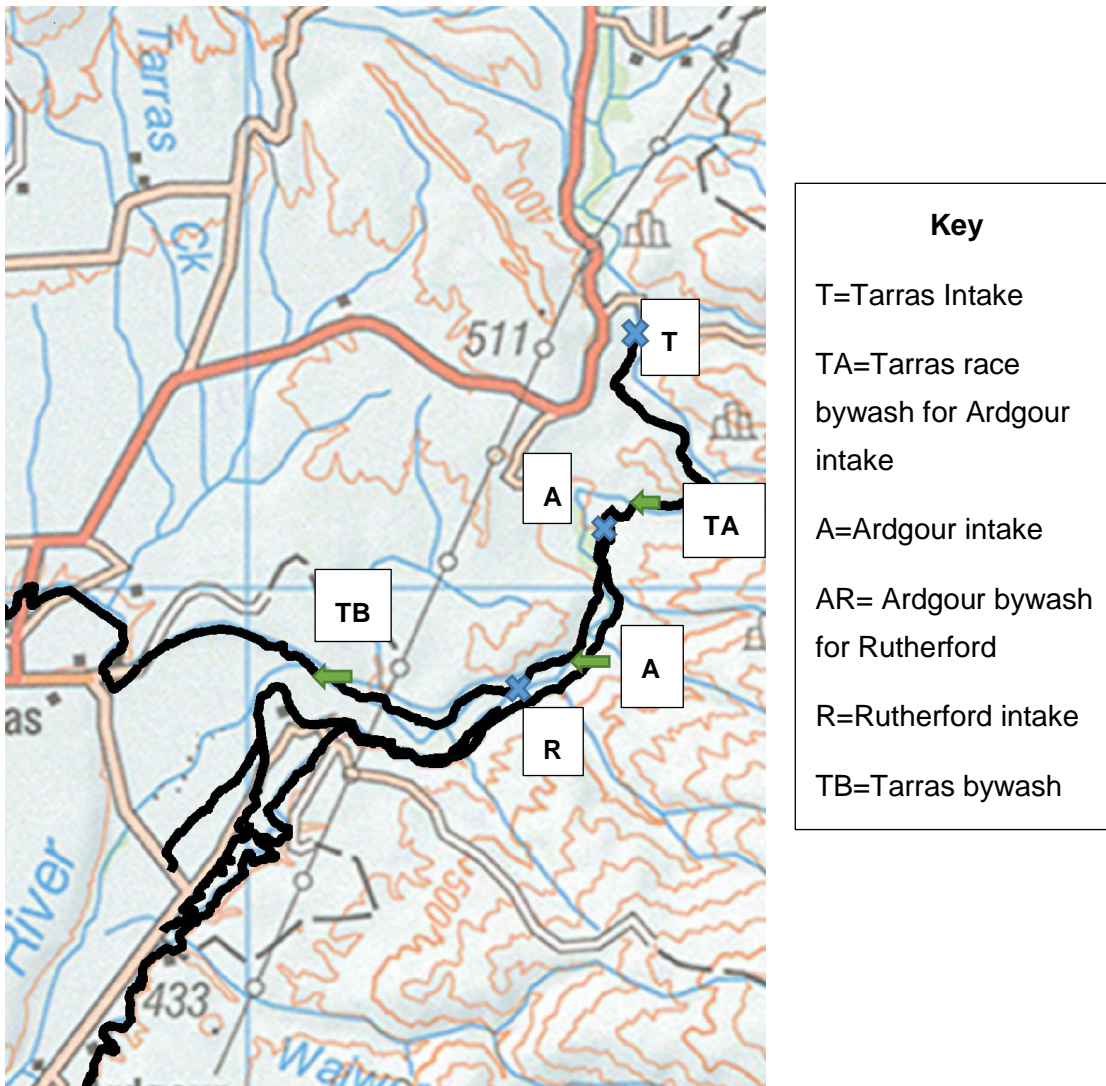


Figure 2: Map showing intake sites and bywash sites in the lower Lindis

22. Other intakes through-out the catchment are managed and maintained by the farmers.

23. The current takes have no minimum flow and result in the river being dry in the lower reach for several kilometres during the summer months.
24. Lower priority takes located further down the river are the first to miss out on river water as the flows drop.

Irrigation methods

25. The existing irrigation practices on farm have evolved to deliver the most cost effective, energy efficient, production responses from the highly volatile water delivery pattern.
26. Initially, contour flooding was the method of application that was superseded on the flatter country by border dykes.
27. Installing border dykes required the levelling of the paddock into terraces with the slightest gradient so the water flowed across the paddock evenly and steadily, balancing between enough time to soak in and move on.
28. Farmers have begun upgrading their irrigation infrastructure and introducing spray application methods for the reliable portion of their water where ever possible. This involves removing borders, installing new pipes, booster pumps and irrigation spray equipment at considerable cost.
29. The water availability pattern for the Lindis irrigators means that utilising more plentiful shoulder season water or flushes from summer storms with relatively low cost gravity delivery and application methods is important for business flexibility. It provides valuable irrigation which may result in an extra cut of lucerne for winter feed, maintain pasture growth for longer to feed mothers and growing calves or lambs.

Water use and efficiency upgrades before 2021

30. Farming businesses are in a continual cycle of development and upgrades. It is a familiar site now for stock yards to have a set of scales for stock finishing weights, or the use of electric fencing for strip grazing. These technologies would not have been common decades ago. The same goes for the irrigation systems being used. Farmers are striving to use their water better and produce more feed from the same amount of water.
31. The Regional Plan Water for Otago encourages farmers to utilise their water better and in Policy 6.4.0A it states that efficiency gains created during the life of a consent can be used to benefit the farmer.

32. In total the abstraction rate from the Lindis is 2300L/sec. Under the RPW this rate of take can be proven by water use records and is the status quo. Therefore for the life of the permits (generally Oct 2021) any efficiencies in water use are able to be used by the irrigators for their benefit.
33. Therefore the potential area that 2300L/sec could service is the figure that must be used for all assessments and subsequent analysis on the impacts of status quo.

Practicality of upgrades

34. Upgrading irrigation delivery, and application methods involves a series of steps. The most important fact that must be known before any upgrade planning is the surety of supply. Until a minimum flow regime is in place full efficiency improvements cannot be planned.
35. Other practical matters that need to be addressed include:
 - a. The availability of electricity nearby to the point of take and paddock is required before upgrades to pumping and spray application can occur.
 - b. Spray application methods need a continual supply of low flow water, while overland application techniques (borders and contour) need intervals of a higher flow rate. This difference in requirements makes it difficult to manage water delivery when farmers sharing the same delivery races upgrade their systems at different times. Any changes must be done in a co-ordinated way.
 - c. Funding providers look for security of investment and unknown water reliability erodes that confidence. The delay in ORC introducing a minimum flow has meant the reliable portion of a farmer's irrigation water has been an unknown.
 - d. Decisions about farm management and land use. Grasses will need to be resown as old pastures under spray systems will not give the return required to pay for the infrastructure. The increased feed must be converted to improved finishing weights, or larger stock numbers or feed stored to pay for the irrigation equipment. Staff numbers, paddock management, fertiliser regimes and farming lifestyle decisions are all required.
36. In addition, the Lindis Catchment has an Irrigation Company that will also need to be unravelled and water takes completely re-arranged. This will be an incredibly complex and difficult process, as described in Bruce Jolly's evidence on behalf of LIC, but will involve:
 - e. The Irrigation Company continuing to meet its current legal responsibilities to its shareholders in the most, fair and equitable way while progressing

changes that will disadvantage current water users (as explained in (f) below) and lead to large costs for upgrades.

- f. The members of the Lindis Irrigation Company have to plan for the new take sites, shared water transport systems, cost arrangement between parties and ongoing management and costs before commencing the change-over. There may well be current shareholders who cannot afford the change or are in a location that means water delivery becomes cost prohibitive. These shareholders must be treated with consideration.

Transition from Deemed permits to RMA consents

37. The changes needed to transition from Deemed permits to group managed water are complex and exhaustive and include the following:
 - a. The finalising of a fair minimum flow.
 - b. Residual flows decided on tributary takes to protect in-stream values.
 - c. The decision by all irrigators, both individual permit holders, and the individuals currently in the Lindis Irrigation Company, to work co-operatively.
 - d. The legal framework for catchment irrigators to all work as a group such as a company or society with a specific constitution.
 - e. A sharing regime between all users that replaces the priority system, shares water during low flow times while maintaining the minimum and residual flows. This will need to be designed and then trialled over a few seasons as irrigators understand how the river responds. Evidence by Mr Hickey (paragraphs 84-86) illustrates the challenging Lindis River hydrology that needs to be understood in a successful sharing regime.
 - f. The assessment (technical, practical, financial, legal) of any alternate sources for groups and individuals.
 - g. The planning, design, funding, and irrigator commitment for the new abstraction sites and delivery of Lindis Irrigation Company water to farms.
 - h. Solutions for farms that are located in areas that become unviable for water delivery. Closing races will create pockets of land that no longer have a water source. These irrigators are shareholders of the existing Lindis Irrigation Company so must be addressed.

- i. Solutions for household bores and irrigation takes reliant on groundwater recharge from leaky races and bywash sites. The changes to the irrigation systems will have an impact across the catchment.
 - j. Deemed permits replaced with RMA Consents. This process needs to be streamlined considering that these thorough minimum flow discussions have been held between all affected parties so close to consent applications.
 - k. On farm and business decisions regarding introducing spray irrigation includes: landscape and farm equipment suitability, human resources(k-lines need to be shifted at least 2 times per day), lifestyle changes as sprinklers need to be moved and production increased to meet financial commitment, pasture species improvement, farm infrastructure changes such as fences, sheds and trees, water quality and nutrient movement assessments.
38. The transition process from individual Deemed permits to group managed water involves an extraordinary amount of work.
39. The Kyeburn catchment has less water users than the Lindis at 20 irrigators, an operative minimum flow and is into their 7th year of progressing towards group managed water. The group are ready to issue shares and adopt their constitution, supply agreement and flow sharing regime. They are yet to lodge their replacement permit application with the ORC.
40. It took over two years for the ORC to process the Sowburn Water Users replacement permit which was issued in late December 2015 (and over 5 years of work to prepare and lodge a replacement application).
41. The ORC provided a document titled "Preparing a resource consent application to take surface water, including a replacing a deemed permit" in response to the request of a Transition Package.
42. This document is a collection of national statements, policies and rules. It provides no useful material for planning and preparing for a smooth transition from the current situation to group managed water.
43. Preparing for group managed water and the process of consent replacement is cumbersome, expensive and time consuming. The inclusion of a Transition Package in the Plan Change will reduce some of the repetition of paperwork and allow a small window of time to complete all the required actions.
44. Negotiating affected party approval on consent replacement is one of the aspects of a Deemed permit replacement that takes considerable time. However in the case of

the Lindis the effects of the water takes on the main stem of the Lindis will have been covered in the recent Plan Change negotiations. This provides a sound basis for streamlining the main stem permit replacement process as the effects have already been debated through a public process and the minimum flow determined.

45. There are over 50 irrigation users including the 37 Lindis Irrigation Company users that will all need to plan and implement a new water abstraction and application regime.
46. Given a reasonable timeframe and enabling rules and policies for irrigation management in the Lindis catchment, the transition from deemed permits to group managed water will result in the following:
 - a. All takes will be managed to the minimum flow and appropriate residual flow on tributaries.
 - b. The large Lindis Irrigation Company takes and races will be decommissioned.
 - c. Many main stem takes will be via pumped and pipe infrastructure delivering water the shortest route to the farms.
 - d. Small groups of irrigators will share take points located in the ribbon aquifer of the Lindis River. Thereby muffling the direct impact of the water abstraction.
 - e. The middle reaches of the Lower Lindis River will no longer be dewatered as take points are located further downstream and abstract at much reduced rates.
 - f. A Catchment Group sharing regime will be in place that will deliver the minimum flow and share remaining available water between users.
 - g. Actual water use will be consented not "paper water".
 - h. All water takes will be measured and managed via telemetry where communication services allow.
 - i. Recreational values (swimming, fishing) will be significantly enhanced as more water will remain in the Lower Lindis River and the minimum flow will only be relevant for the last stretch of the river below the most downstream take.
 - j. All water will be used efficiently.

- k. Some overland flow irrigation methods for shoulder season water will still be in use. As this low cost application method for a few crucial irrigation passes is an efficient use of water.
- l. Spray irrigation infrastructure will be installed through-out the catchment where water reliability allows.

Community collaboration and River management

- 47. The Lindis Think Tank was initiated as a method of sharing ideas and perspectives about the Lindis River. Otago Fish and Game and the Lindis Catchment Group were the two core parties involved while Department of Conservation, Kai Tahu Ki Otago and ORC were also invited and attended the later meeting or meetings.
- 48. The Think Tanks were held through early 2015 with the purpose of seeking a collective understanding of the Lindis values and mutually beneficial outcomes where possible.
- 49. Through this process it was agreed that a Transition Package was required to enable the changes required in the Lindis Catchment. Evidence by Graeme Martin explains this further.
- 50. During a Lindis field tour by the Think Tank Group we all witnessed how much the gravel moves around within the river bed. The Lower Lindis River has gravel that gets moved around in waves and reworked from the banks. There are sections of the bed that are elevated due to extra gravel deposits.
- 51. An adaptive river management option was discussed by the participating parties. There was agreement in principle that it would be advantageous if within agreed parameters any member of the stakeholder group could carry out minor river management activities with more flexibility than the RPW currently allows.
- 52. Primarily for environmental benefit there could be times when a small amount of work would be permitted; such as shifting gravel to deepen a pool near a willow, or deepen the connecting section of surface flow through a gravel wave. The evidence of Ms Dicey includes a permitted activity rule which would allow for such work.

Conclusion.

- 53. There is a large amount of work to be completed by the Lindis Catchment community. The biggest challenge will be in assisting and aligning all irrigators and community members in their acceptance of change and engaging in progressing to practical solutions.

54. The irrigation community have a large amount of work to complete before lodging their applications for replacement permits. To be able to process this group of permits at an efficient rate the ORC also requires assistance by way of a transition package.
55. The catchment has a long history of irrigation and a track record of modernisation. However without a minimum flow regime and a pathway enabling smooth transition in the RPW the move to a Catchment Group managed scenario and an improved Lindis River will be stalled.

Dated this 18 day of March 2016

Susie McKeague