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
Matthew Aaron Hickey

Comments on
EVIDENCE ON BEHALF OF THE LINDIS CATCHMENT GROUP LTD
Presented to hearing panel on 6 April 2016

Thank-you for the opportunity to present my evidence today. My name is Matt Hickey, In the last 13 years I have worked in Otago, 12 years as either a water quantity scientist or Science Manager at ORC responsible for the provision of technical information for minimum flow setting across the region. For the last 12 months I've worked as an independent consultant for individuals, farming businesses, irrigation companies and catchment groups assisting with water management decisions particularly in relation to Regional Council rules and policies.

The Lindis Catchment group approached me to assist with the recommendation of a minimum flow and allocation regime that would balance protection of instream values and out of stream use. It was not to be confined by existing infrastructure but was influenced by the economic impacts.

In reading the Section 32 it became quickly apparent there was a number of issues.

- Ecological benefits or costs not properly attributed to flow Options.
- Attributing outcomes to the wrong flow Option.
- Best use of Science by the NPS as required wasn't made.

Ecological benefits or costs not properly attributed to flow Options.

Where ecological benefits occurred under Option 3 they tended to be overstated such as fish passage. Where the ecological outcome was effectively the same for Options 2 and 3 the outcome was attributed to option 3 but not 2, this is the case for trout spawning. A large focus was spent on the importance of trout but there was no assessment of whether the Upper Clutha or Lake Dunstan fisheries have any recruitment issues, the evidence suggests they don't. Furthermore the S32 report seems to have brought in a Option 4 of "900 l/s or more" for fish habitat. In my view this appears a token flow to ensure ORC's Option 3 looks more favourable even though it offers little more in terms of fish habitat outcomes than Option 3 (Para 41-42).

Attributing outcomes to the wrong flow Option.

In my review of the Section 32 report I found numerous flaws in the ecological and hydrological information particularly where ecological effects were attributed to flows [para 43-62]. Effectively this meant status quo effects were wrongly assumed to continue with a minimum flow of 450l/s. Observations appeared to be taken on face value and not scrutinised against certified flow data to ensure accurate comparisons could be made to other technical work.

Best use of Science – NPS

It was concerning that figures were presented to the community and subsequently used to justify the change in minimum flow position to 750 l/s by ORC. On the 1st of April ORC executive presented the loss figure of 550 l/s to the community, unfortunately this flow data was not certified nor was the method used deemed the best due to the rapidly falling flow when the calculation was made. ORC later reviewed this loss and it was adjusted to 440 l/s, the same loss as reported in the earlier work from 2007 and the same loss the 450 l/s minimum flow was based on. Although corrected the 550 l/s loss figure has continued to appear in the S32 and S42 reports to justify the 750 l/s minimum flow (Para 66).

Although flow and temperature loggers were deployed above the Ardgour Bridge to assess flow losses none of this is discussed in the S32, there is no link to the minimum flows and the outcomes for this reach. The focus was solely below the Lindis Crossing bridge. [para 68]

Temperature impacts are not addressed in the S32 report apart from saying that high water temperature is an ecosystem cost downstream of Lindis Crossing (SH 8 Bridge) for Option 2 but not Option 3 and 4. However ORC's technical report (Dale and Olsen, 2015) shows that for

flows up to 1400 l/s high water temperature is a risk down stream of Lindis By omitting this fact, it leads the reader to think that options 3 and 4 prevent high temperatures below Lindis Crossing which is factually incorrect. This is another example of failure of the Section 32 Report to make use of the best science available at the time it was produced and it is therefore inconsistent with the NPS-FM (2014). [para 69]

LCG Flow Regime Proposal

LCG have realised that to deliver a values based outcome and still remain financially viable more than simply setting a minimum flow is needed. On reviewing the values information, hydrology, losing reaches it became apparent that by shifting takes downstream, splitting them up, potentially taking from the alluvium would have the greatest effect for the longest part of the river.

Table 8 of my evidence provides a summary of the flows that can be achieved with take infrastructure changes. Essentially it would mean the 450 l/s minimum flow would only occur below the last take immediately above the Ardgour recorder and the confluence. It would ensure flows are held well above 750 l/s from Ardgour Bridge upstream even through the losing reach.

Location	Status Quo Flow (l/s)	LCG Proposed Flows (l/s)
Lindis at Cluden Stream confluence (immediately above the existing Tarras and Ardgour races).	1500	1500
Lindis at “The Point”	100	1500
Lindis at Ardgour Bridge	0	600 - 1100 (depending on rate of loss to GW and 400 l/s proposed takes)
Lindis at Ardgour flow Site	200	450
Lindis at SH 8	0	220 – 250
Lindis at Clutha Confluence	0	8 - 98

Conclusion (As Read from evidence)

1. The LCG proposal ensure the ecological values of the Lindis River are maintained and enhanced by providing the following habitat protection levels relative to what would be available at MALF:
    - Trout spawning - Near optimum flow (maximum protection).
    - Juvenile rearing – At least 63% for fry and 67% for yearling habitat retention.
    - Significant presence of Longfin eel - 75% habitat retention.
    - Common and upland bully – 76% and 132% habitat retention respectively. Optimum flow for upland bullies is less than MALF, thus the high percentage.

2. A minimum flow of 450 l/s should prevent the historic fish kills of native fish. A minimum flow of 450 l/s will provide significant habitat for longfin eel (75% habitat retention at MALF) common bully (76% habitat retention at MALF) and upland bully (132% habitat retention at MALF).

3. High water temperatures in the Lindis River downstream of Lindis Crossing shows that neither the ORC proposal nor LCG's proposal will be able to provide for trout in this reach during Summer (Dec – March).

4. Trout spawning will be protected by the winter minimum flow of 1600 l/s which provides near optimum spawning habitat for both brown and rainbow trout based on the IFIM (Jowett and Wilding, 2003).

5. Aesthetically a flow of 450 l/s in combination with the changes in take location proposed by LCG achieves the same as a flow of 750 l/s does (**Error! Reference source not found.**).

6. LCG proposes that for trout the lower river below Lindis Crossing should be managed for ensuring recruitment to the Clutha and Lake Dunstan. By maintaining continuous flows and ensuring freshes can reach the Clutha in combination with less than favourable habitat below immediately above the Clutha confluence for trout will encourage trout to pass through the reach rather than take up residence when flows allow. The temperature signal occurring at much higher flows (beginning at 1400 l/s) should encourage trout to leave the reach well in advance of the minimum flow of 450 l/s being reached.

7. By maintaining connection with the Clutha it ensures that when freshes do occur they will make it through to the Clutha River rather than being lost to ground due to the significant reaches of dry river bed as occurs at present. These freshes are the most likely time for trout to out-migrate from the Lindis to the Clutha if they are still present over summer (Holmes et al. 2014).

8. LCG's intent is to disestablish the existing race configuration and move to screened pump systems from the river below Ardgour Road Bridge. This dramatically improves flows in the Lindis below the Cluden Stream Confluence (**Error! Reference source not found.**). This significant change in take infrastructure will also remove the annual loss of juvenile trout to entrainment in the races and potentially create a further 9 km of adult trout habitat compared to what occurs now.

9. The combination of maintaining at least 63% - 67% juvenile trout retention of habitat at MALF, continuous flow, and removal of the current race infrastructure should dramatically enhance juvenile trout recruitment to the Clutha River and Lake Dunstan.