Notes for Lindis hearing.

(Gavin James)

- My submission is taken as read.
- My submission focuses on recommendations for low flows using habitat modelling for juvenile brown trout.
- Brown trout (and to a lesser extent rainbow trout) use the river for spawning and juvenile rearing, and this is important for the Clutha River and Lake Dunstan fisheries.
- The modelling used is Instream Flow Incremental Methodology (IFIM), a technique first developed in North America and built on substantially by NZ scientists (especially Ian Jowett and John Hayes) over the last 40 years.
- It is widely used but has limitations. Most importantly it only uses three physical habitat measures (water depth and velocity, and substrate size) when we know there are other variables that influence trout abundance. In a recent conversation, John Hayes said to me that when he provides this type of advice for brown trout he now uses data from both NZ and North American sources because the NZ data tend to underestimate flow requirements. So the figures in my submission are likely to be underestimates of the flows required for juvenile brown trout.
- I have the original figure from Jowett and Wilding 2003 to show how habitat requirements are estimated: This is the original figure that Horrell would have based his interpretations on. The top figure shows how the amount of juvenile brown trout habitat varies with flow - it peaks at flows around 1400 l/s, and increasingly declines below this with flow. It is not clear to me that there is an inflection at 750 l/s as suggested by Horrell. I would conclude that the proposed minimum flow of 750 l/s is on the low side, particularly if John Hayes comments above are taken into account. The summer minimum flow should be at least 1000 l/s.
- In addition, because of the substantial losses to groundwater below Ardgour (estimated 440 l/s), flows below Lindis crossing would be much too low at the proposed minimum flow of 750 l/s, and should be set nearer to 1500 l/s to allow for adequate juvenile brown trout rearing and passage downstream into the Clutha.
- Safe passage downstream of juvenile trout could be enhanced by cutting off all abstraction simultaneously for a short period (probably one to two days).