Main Themes – discussions / comments

(Compiled from Workshop #2 and individual feedback)

Purpose of the meeting:

To consult the community on the development of a water management regime that provides for in-stream aquatic environment, the continuation of farming with as little forced land use change as possible, and protect the aesthetic experience of the area.

Discussion topics:

Hydrology

Surface Water

- Several community members mentioned that the Cardrona River has gone dry for generations.
- Research suggests that this may not have been the case. ORC staff has not looked into anecdotic evidence, but flow recorders were installed in various tributaries of the Cardrona. The sum of the inflows recorded on all tributaries usually gives a good indication of the natural flow levels of the main stem of the river. Analysis of the data gathered indicates that it is questionable whether the river bed would dry out under the current circumstances (e.g. current amount of silt deposited in the river bed) and provided no water was abstracted from the river. However, the permeability of a river bed changes overtime.
- Research shows that Bullock Creek emerges as a seep that drains groundwater from the Wanaka–Cardrona aquifer, augmented by irrigation water. It is a relatively new feature and may not have been part of the "natural environment". Workshop participants suspected that the flow levels in Bullock Creek would have increased following Council changing the water supply for Wanaka Township from Bullock Creek to Lake Wanaka.
- ORC have no continuous long term flow recorder data on Bullock Creek, but ORC scientists have noticed little change in the flow levels of the creek in recent years.
- Fish and Game may have continuous flow recorder data.

Groundwater

- ORC has developed a model to calculate aquifer recharge. The model takes into account evaporation, soil characteristics, rainfall, irrigation runoff, land use (including current and future), etc. and has been developed based on information gathered from physical studies have in similar catchments (e.g. similar soil, rainfall, and evaporation properties).
- The model shows that the contribution of riverbed infiltration to aquifer recharge is relatively small compared to recharge by irrigation run-off and infiltration from the races. The importance of aquifer recharge through irrigation runoff and water race infiltration can be explained through:
    - (1) The diversion of irrigation water into races and application across large areas of land;
    - (2) The reduced permeability of the river bed due to silt deposition; and
    - (3) The relatively small effect of increased river flows on the surface area of the wetted bed of the river.

- Study results also show that the river and aquifer are disconnected for most of the basin. The abstraction from the aquifer does not immediately affect river flows. However, below Ballantyne Road, the aquifer is connected and recharges the river.
- Many were surprised by the importance of run-off from traditional irrigation methods for aquifer recharge and the predicted reduction in groundwater recharge if farmers would switch to efficient irrigation and more farmland gets subdivided into lifestyle blocks.

Values of the Cardrona catchment

Socio-economic values (farming and tourism)

- Agriculture is an important source of income for the local community and that water abstraction from the river for irrigation is essential for the viability of farming. This is especially the case in the period December to March/April when the need for irrigation water is the highest.
- Acknowledgement of the role of tourism in the local economy, especially around the top of the Valley. However, some people attending the meeting consider that the economic significance of tourism is often overstated. Others argue that there is limited potential for water based tourism and recreation around the lower reaches river. Still others point at the potential negative impacts from the tourism in the upper catchment.
- Overall, there seems to be a consensus that any form of management of the Valley's water resources should take into account the socio-economic well-being of the wider community and not just that of specific interest groups.

Recreational activities (including fishing)

- Feedback confirms that there is angling in the river, but suggested that the river wasn't currently regarded as an important fishing river. This could change with the construction of dams (to regulate river flows).
- Some did not consider the limited angling opportunities of the river to be a problem because there are good fishing opportunities within a short driving distance.
- Studies show that there is evidence of fish dying, but not as much as in some other rivers. However, anglers do not like to see stream run dry.
- Juvenile recruiting and spawning contributes to the downstream Clutha fishery. More research on this subject is currently being undertaken.
- Habitat for long fin eels will be important.
- There is more fish in the irrigation races than the river.
- Some questioned the (economic) importance of angling and other water-based recreational activities (e.g. swimming, kayaking) compared to the economic value of farming.

Aesthetics

- Recognition that natural character and aesthetics are important for the local community (Image, development of tourism industry).
- Some people point at the high aesthetic value of the Cardrona at the Larches, while others describe the section of river between Larches and SH Bridge as a hostile environment.

Environmental issues in the Cardrona Valley

Low surface flows and groundwater table

- Some people stated that the Larches and Bullock Creek used to get flows of up to 18 heads through summer, but that the river is now very low, even at the top end of the valley. Overall, most people seem to agree that there appears to be less nowadays.
- Local community members acknowledge that the reduced river flows of the Cardrona threaten the local ecology and various values supported by the Cardrona (recreational, fishing, farming, and aesthetics). Some participants stated that rivers should not be sucked dry for irrigation and flow continuity should be maintained as much as possible.
- Some community members confirmed that a number of bores are drying up and that the groundwater table is lower than it used to be. Existing users' access to groundwater, especially domestic and stock water takes might be affected.
- Some point at the role of traditional pastoral farming in maintaining aquifer recharge at a sustainable level. Subdivision and development activity has reduced the area that is being irrigated. Now only about 25% of the land is flood irrigated and the water table has lowered.
- There is some apprehension that attempts to solve one environmental problem could trigger other problems elsewhere (e.g. reducing surface water abstraction for the purpose of maintaining the health of the river could result in increased pressure on the aquifer).

Other environmental problems (land-use changes, pests, gravel extraction)

- Various workshop participants pointed at the effects of changes in land-use and vegetation cover on river flows and vice versa. Unmodified land cover provides better water yield. The upper catchment has lost its capacity to retain water (loss in tussock cover, increased stocking rates, increased number of trees). Farmers need to make better crop choices and create better soil conditions (look at the potential of deep-rooted species, e.g. sun flowers).
- The feedback received suggests that other environmental threats are emerging, including the spread of pest plants (e.g. willow, gorse, hieracium) and pest animals (e.g. rabbits, goats, and pigs). Traditional farming has played an important role in controlling invasive pests. The uptake of high country pasture by DoC has contributed to the spread of pest species.
- Some believe the river is drying up due to wider environmental conditions (global warming and changes in gravel porosity).
- Some point at the adverse effects of gravel extraction causing the river bed to become more permeable and the river to dry up. Farmers have had no input into gravel extraction.
- Gravel extraction and processing also cause issues with dust
- Many participants recognise that the environmental issues described above threaten local ecology and come at an economic cost for the community. Land and River management should be done in an integrated and catchment wide approach.

The minimum flow and water allocation process

- The NPS Freshwater Management 2011 directs local authorities to set environmental flows for all freshwater bodies and maximise the efficient use of allocation of water.
- The process of setting a minimum flow is not necessarily to provide for native fish habitat, nor is it solely about safeguarding the habitat of introduced species. Minimum flows are

established through a community process that, in accordance with RMA principles takes into account environmental, economic and social concerns.

- Preliminary study by ORC suggested that a flow of 800-1200 l/s at the Larches was thought to be sufficient to ensure flow continuity and sustain all instream values.
- Workshop participants argue that the river management regime needs to be future focused, but should also take into account the present situation. The challenge is to develop a water management regime that provides in some way for all values at key times of the year and that reduces the period of time that the river dries up in its lower reaches.
- There seems to be a consensus that water for irrigation, stock and domestic supply is the primary priority, irrespective of whether water comes from the aquifer or the river.
- Various participants want a minimum flow/allocation regime that supports local farming, the local community, and the tourism industry at the top of the valley. Others state the regime needs to allow for the continuation of farming, while improving the environment.
- Short term restrictions on water takes from the river (e.g. minimum flow standard) will not reduce/mitigate the loss of surface water from the river to the Aquifer. The loss of surface water is a physical reality. This is amplified by the groundwater table becoming lower. The aquifer behaves like a sponge and it will take a while before the gravels will be saturated. As a result there will be a considerable delay between the moment you increase the flow in the river by no longer diverting the water from the river into the water races and the moment that you'll see an increase in flow levels further downstream.
- Some are concerned that the benefits from setting a minimum flow are not significant and that it is preferable to maintain the status quo.
- Many expressed a preference for capping water allocation volumes, rather than for setting a minimum flow. There was some discussion about how to cap the allocation (e.g. by current use, or by what would be deemed efficient use).
- Several farmers mentioned that they only used a fraction of their paper allocation.

Increasing efficiencies in irrigation and storage capacity

- Not possible to have flood irrigation without causing run-off. To wet the root zone using flood irrigation, water is needed at a rate and volume that makes it nearly impossible to avoid runoff. The top 5mm irrigated for maximum efficiency.
- Several irrigators considered storage to be a realistic option; and stated that they would be keen to work with stakeholders to make it happen.
- There are opportunities for improving the efficiency of water use through increased use of spray irrigation and improved storage, but some expressed a concern that more efficient irrigation practices may come at a cost:
    - Increased economic cost: Concern about increased energy costs, capital investments, and cost of consenting around soil disturbance, dam construction etc. Farming has to be environmentally AND financially sustainable and the financial cost of changing farming practices to cope with a minimum flow may be prohibitive.
    - Impact on other water users: Runoff from flood or border dyke irrigation is often re-used and forms an important source of aquifer recharge. Increased usage of spray irrigation over more traditional irrigation methods may have an adverse impact on the access of other people to surface and groundwater.

    - Limited environmental benefits: More efficient irrigation practices may not be enough to ensure flow continuity below Larches at all time and may perhaps not be the best approach when considering a broader environmental perspective. For example, the use of spray irrigation requires more energy resources and the capital and operational costs will drive many farmers to intensification.
- Some fear that flow continuity may not be economically feasible, even with increases in efficiency, and that a minimum flow that ensures continuity could damage the farming.
- Different types of consumptive and non-consumptive takes measured. Often these are decided on a case-by-case bases e.g. snowmaking is generally considered a consumptive take.

Need for a better understanding of the following topics:

- The effect of land management, farm practices and vegetation cover/crop choice on water yield and water quality. ("How can we replenish our land and better retain our water")
- Greater knowledge about the natural (state of the) environment in the catchment.
- The impacts of urban development and urban expansion – i.e. Cardrona Village.
- The economic value of tourism in the Cardrona Valley.
- Current allocation volumes
- Impacts of changes in take and use of surface water on the aquifer
    - To what extent can the taking and application of surface water be scaled back before groundwater supplies are threatened (i.e. recharge going down and ground water demand going up)?
    - Will the aquifer hold up if current trends continue, and more irrigators shift from surface water to groundwater up?
- The degree to which groundwater allocation can be varied across the aquifer to reflect the availability of localised recharge sources.