

Cardrona Water Management

Community Workshop 3

Presbyterian Church Community Centre, Wanaka

11 June 2013

Tonight

- Welcome
- Recap/update
 - Aim, process & key concepts
 - Findings from past research/consultation
- Groundwater
 - Presentation management options
 - Q & A
 - Feedback session 1
- Natural hazards
- Surface water
 - Presentation management options
 - Q & A
 - Feedback session 2/Small group discussion
- Conclusion/Where to from here

Our aim.....



Looking after the
Cardrona's water
and community

Why now....

Pressure on communities & environment

- Water short catchment
- Competition between different uses
- Land development & intensification

Legal requirement

- Resource Management Act
- National Policy Statement Freshwater Management 2011

Our toolkit.....

For surface water

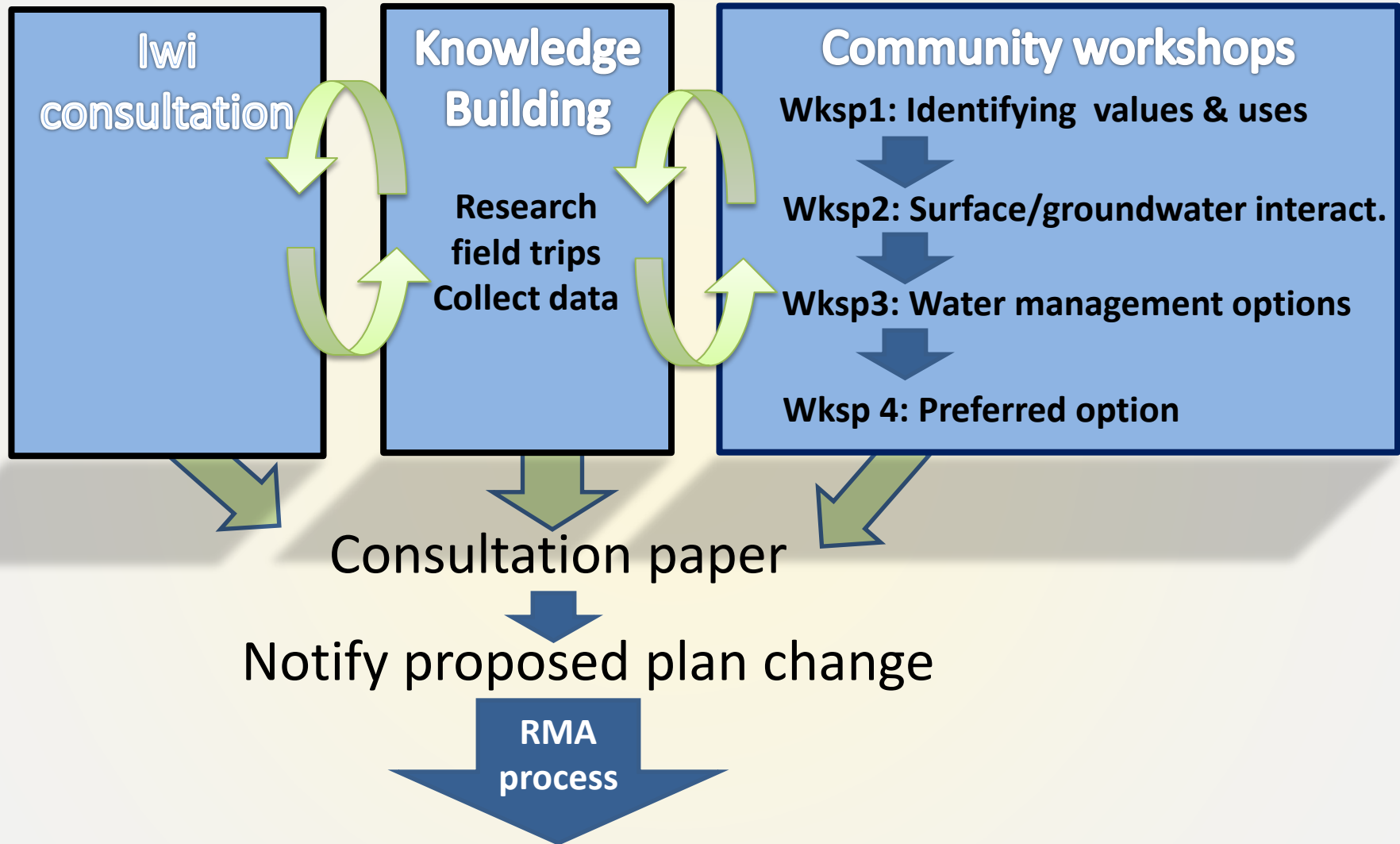
- Allocation limits (Primary/Supplementary)
- Minimum flow
- Residual flow

For groundwater

- Aquifer restriction level
- Maximum allocation



The process.....



Tonight's goals.....

1. Present water management options
2. Gauge level of support for presented options
3. Stimulate discussion and encourage collaboration

What you told us : *values*



What you told us : *Aspirations*

MAINTAINING....

A viable local economy

Aquatic ecosystems

IMPROVING....

Water retention (soils, vegetation)

Riparian habitat

Water quality

Tourism & recreation



Water management options for the Cardrona River and Wanaka-Cardrona aquifer

Matt Dale: Water Resource Scientist
Jens Rekker: Resource Scientist -
Groundwater



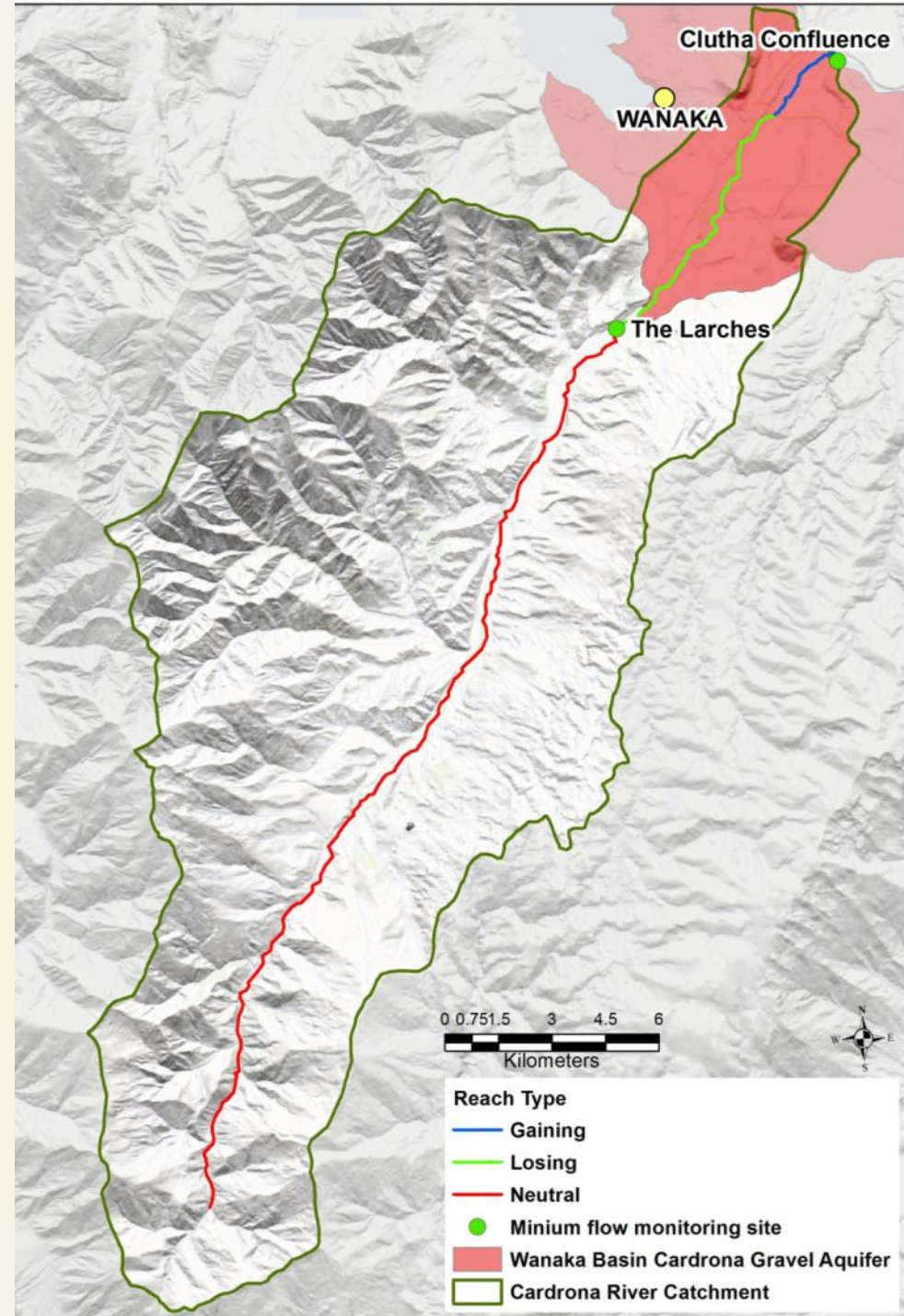
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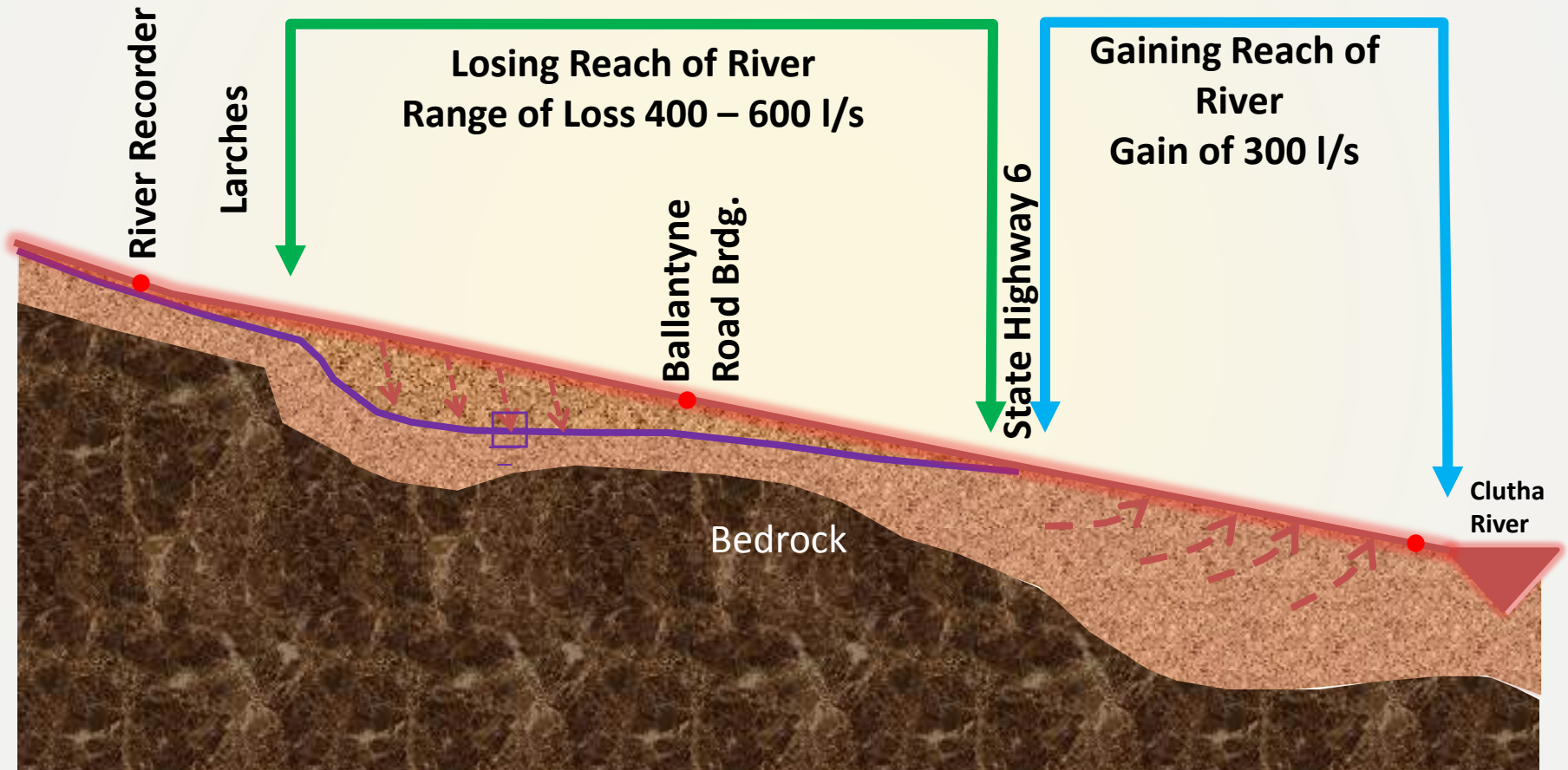
Groundwater update and resource management options

Groundwater/ Surface water interactions in the Cardrona

- Neutral reach – no net loss or gain from groundwater
- Losing reach – up to 600 l/s lost to groundwater
- Gaining reach – 300 l/s gained from groundwater



Cross-section of the lower Cardrona River



Groundwater

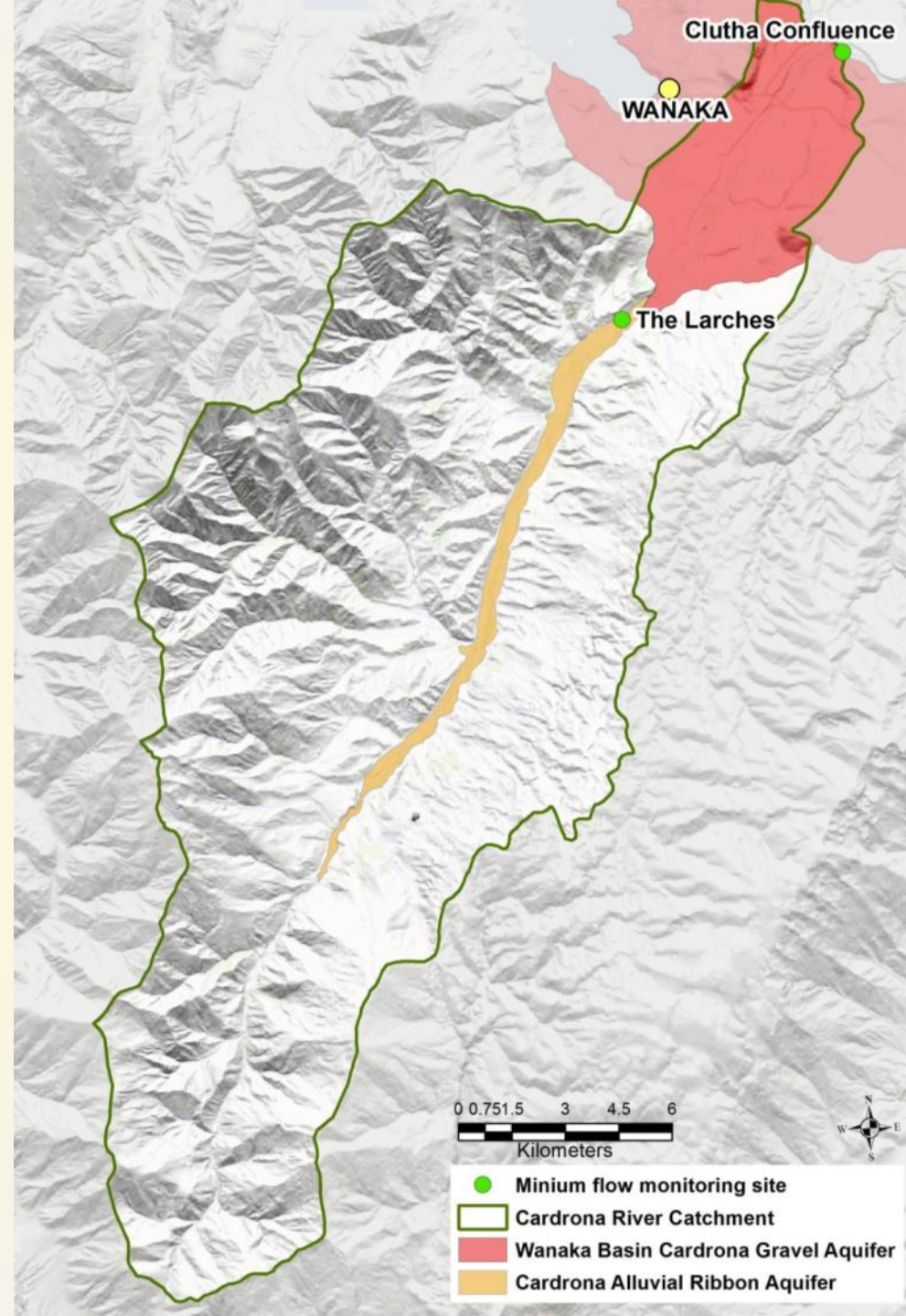
- Groundwater is replenished by Recharge
 - Cardrona River (losing reach)
 - Rainfall surplus through the soil profile
 - Irrigation surplus through the soil
- The Aquifer is drained as follows:
 - Bullock Creek
 - Lower Cardrona River (below SH6)
 - Clutha River
 - Lake Wanaka
 - Bores

Groundwater Resource Management Framework

- ❑ Upper catchment groundwater managed as surface water (alluvial ribbon aquifer)
- ❑ Lower catchment below The Larches requires tailored groundwater management.

Groundwater Management Areas

- Alluvial Ribbon – no net loss or gain, effectively surface water.
- Losing & Gaining reaches over the **Wanaka Basin – Cardrona Gravel Aquifer**
 - Managed as a single aquifer
 - Subject of further discussion



Lower Catchment Groundwater Values

- Bullock Creek flows

- Lower Cardrona flows (below SH6)

- Water Supplies
 - Private domestic water supply
 - Public water supplies
 - Irrigation bore supplies

Most Sensitive Zone

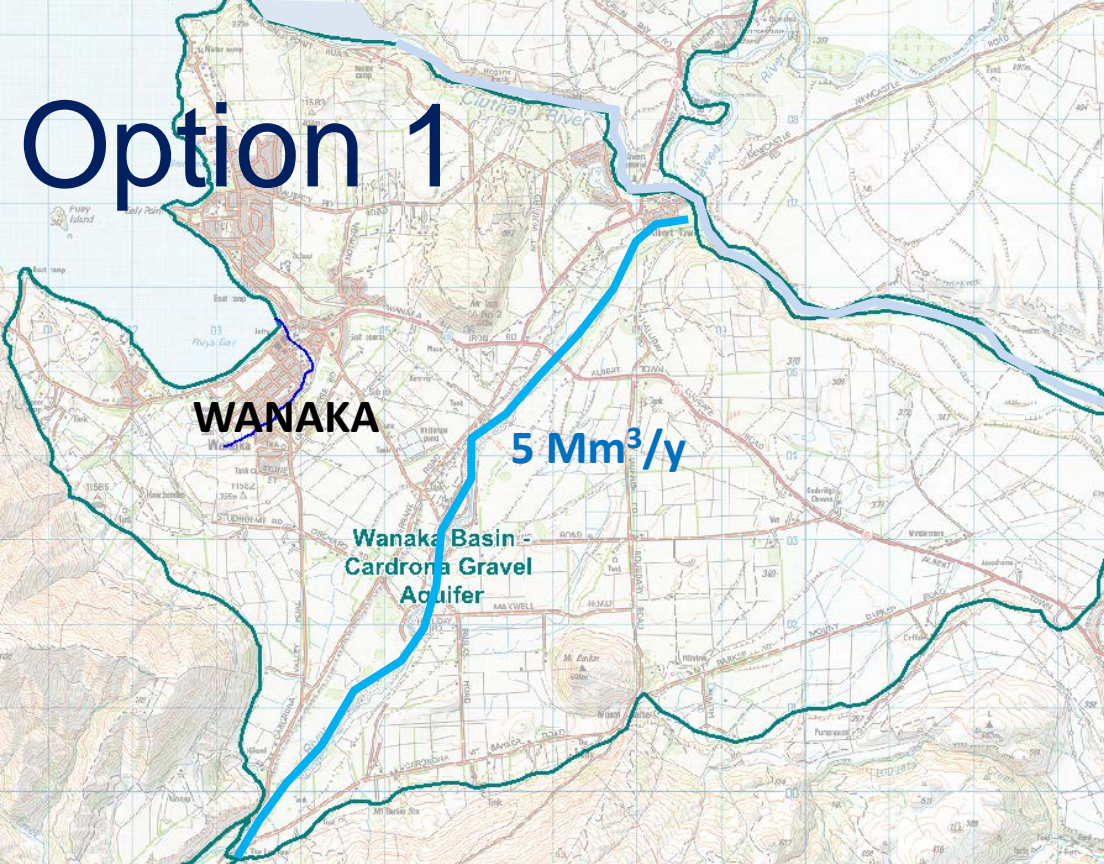
- East of the Boundary-Morris road alignment towards Wanaka Airport
 - Increasing depth to water table
 - Thinning saturated gravel lens
 - Most distant from the main recharge source (Cardrona River)
 - Significant concentration of large takes
 - Highest risk of water table decline.

Groundwater Management Options

- **GW Option 1: Blanket Maximum Allocation Volume**
 - Set MAV to 5 million cubic m per annum (Mm^3/a) across the whole Wanaka Aquifer

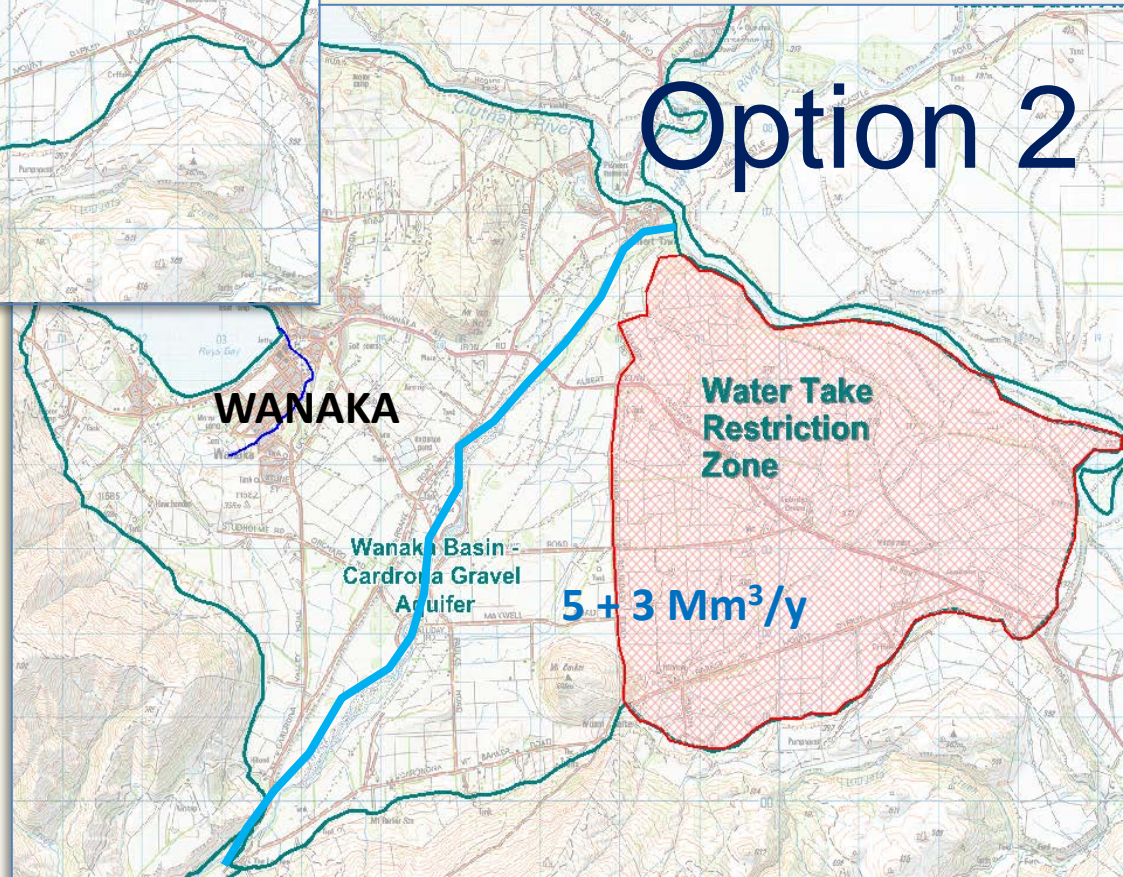
- **GW Option 2: Higher MAV & partial Water Take Restriction Zone**
 - Set MAV to 8 Mm^3/a for whole aquifer
 - Set restrictions on the amount of water table drop in the eastern area of the aquifer

Option 1



Water Take Restriction Zone Options

Option 2



Groundwater consents
can be restricted if
monitored bore water
levels decline to critical
depths.

(Domestic & municipal bores unaffected)



Feedback Session 1

Options for groundwater management

Summary of natural hazards of the Cardrona catchment

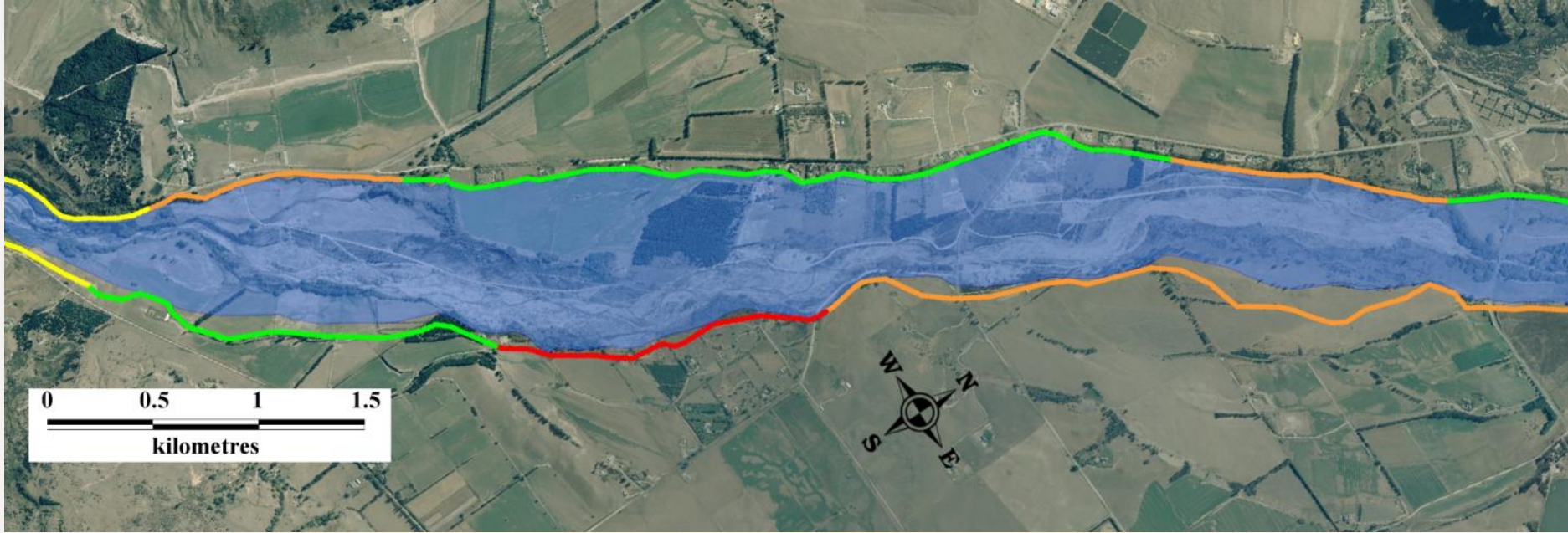
Natural hazards in the Cardrona Valley

NATURAL HAZARDS





Bank erosion, channel migration



Floodplain and erosion hazard mapping



'Low-flow' channel

Channel avulsion, floodplain sedimentation



Inundation of assets (pumps, intakes)



Debris flows in tributaries

The Cardrona River and its values

Ecological values in the Cardrona

Native fish

- Koaro
- Upland bully
- Longfin eel
- Clutha flathead galaxias



Sports fish

- Rainbow trout
- Brown trout



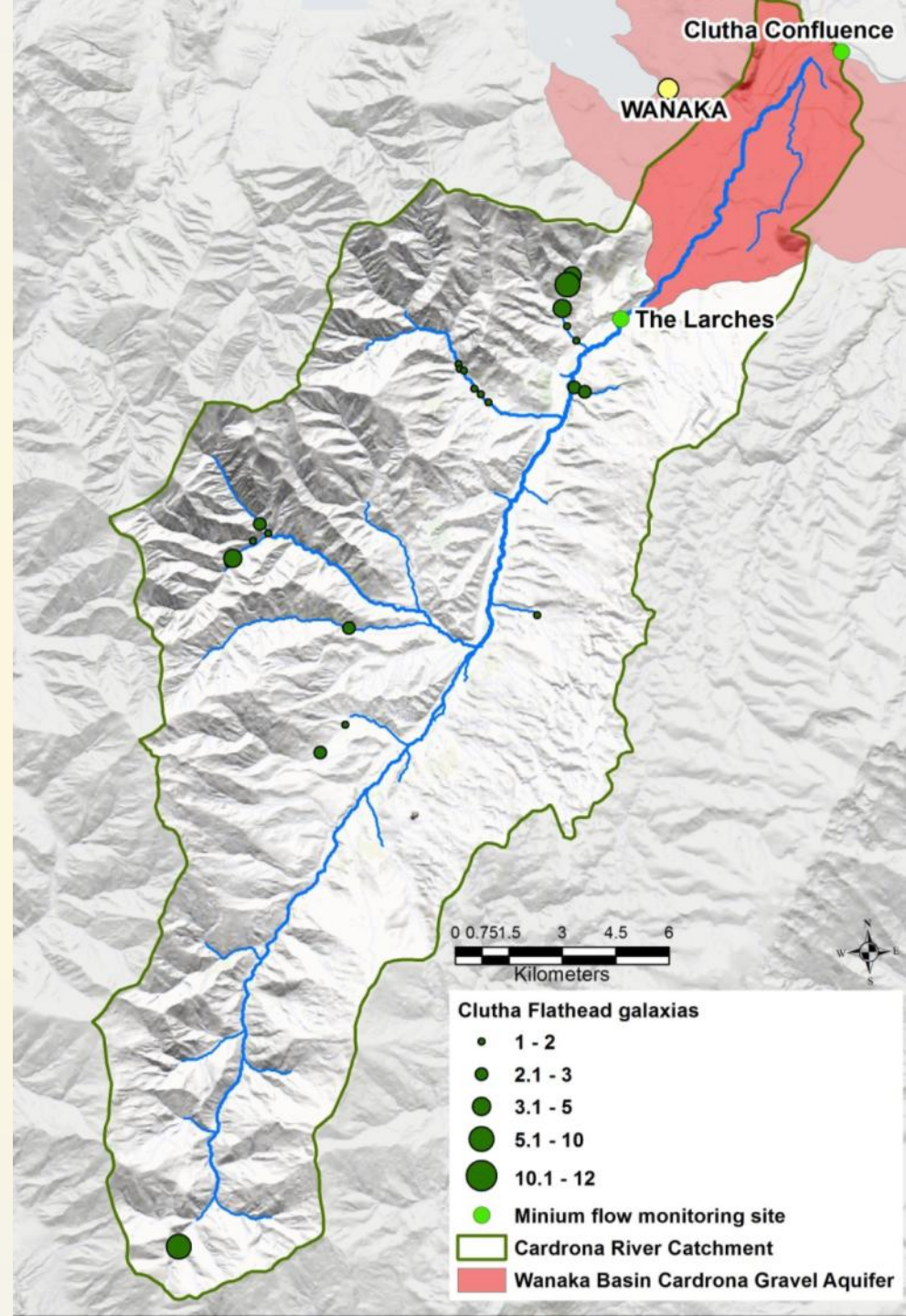
Socio-economic values in the Cardrona

- Irrigation
- Aesthetics
- Tourism
- Recreation
- 4WDing



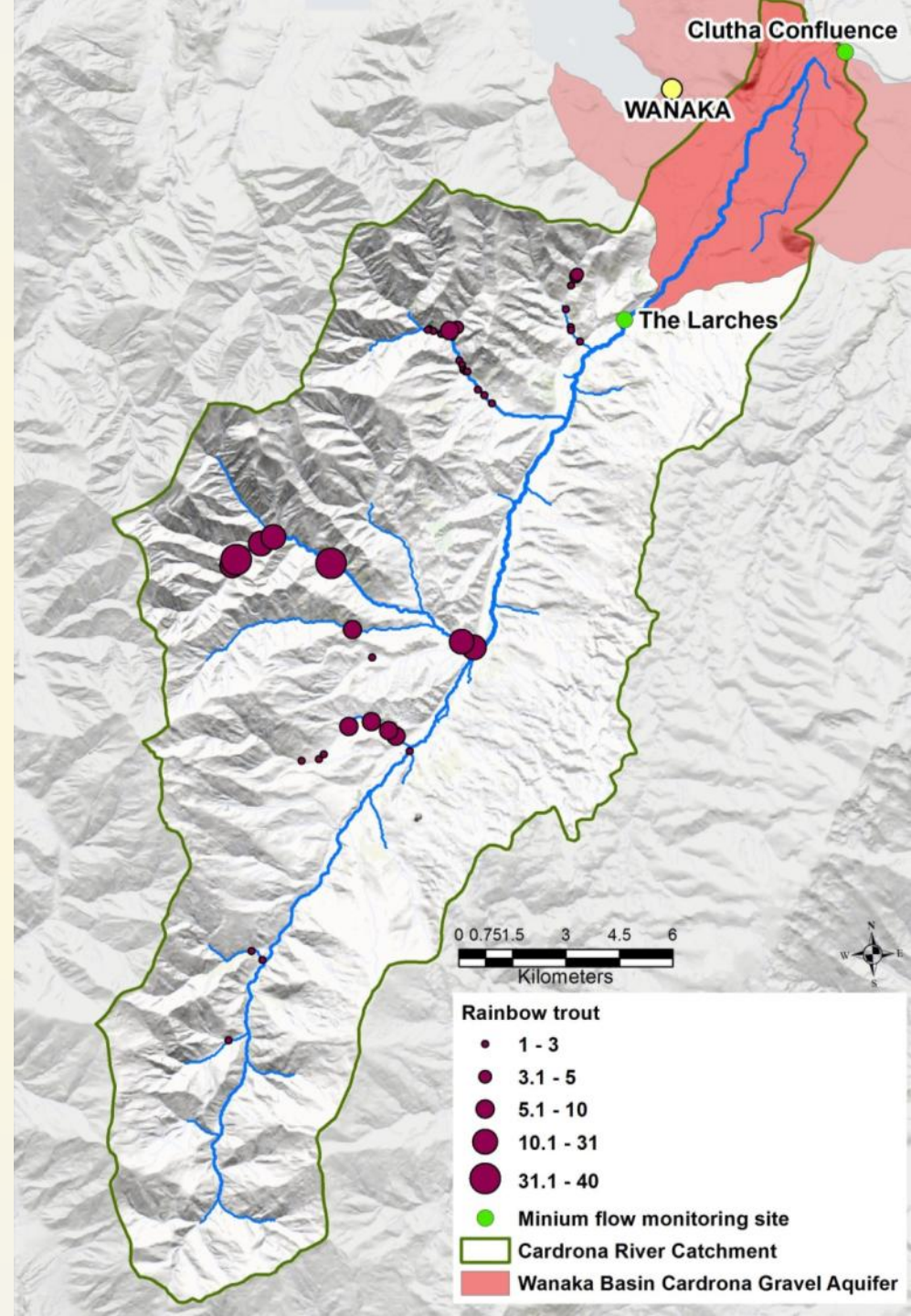
Clutha flathead galaxias

- One of the most endangered fish in NZ
- Are only able to exist where trout are absent or in very low numbers
- Are mainly found in small creeks and will not be affected by any minimum flow



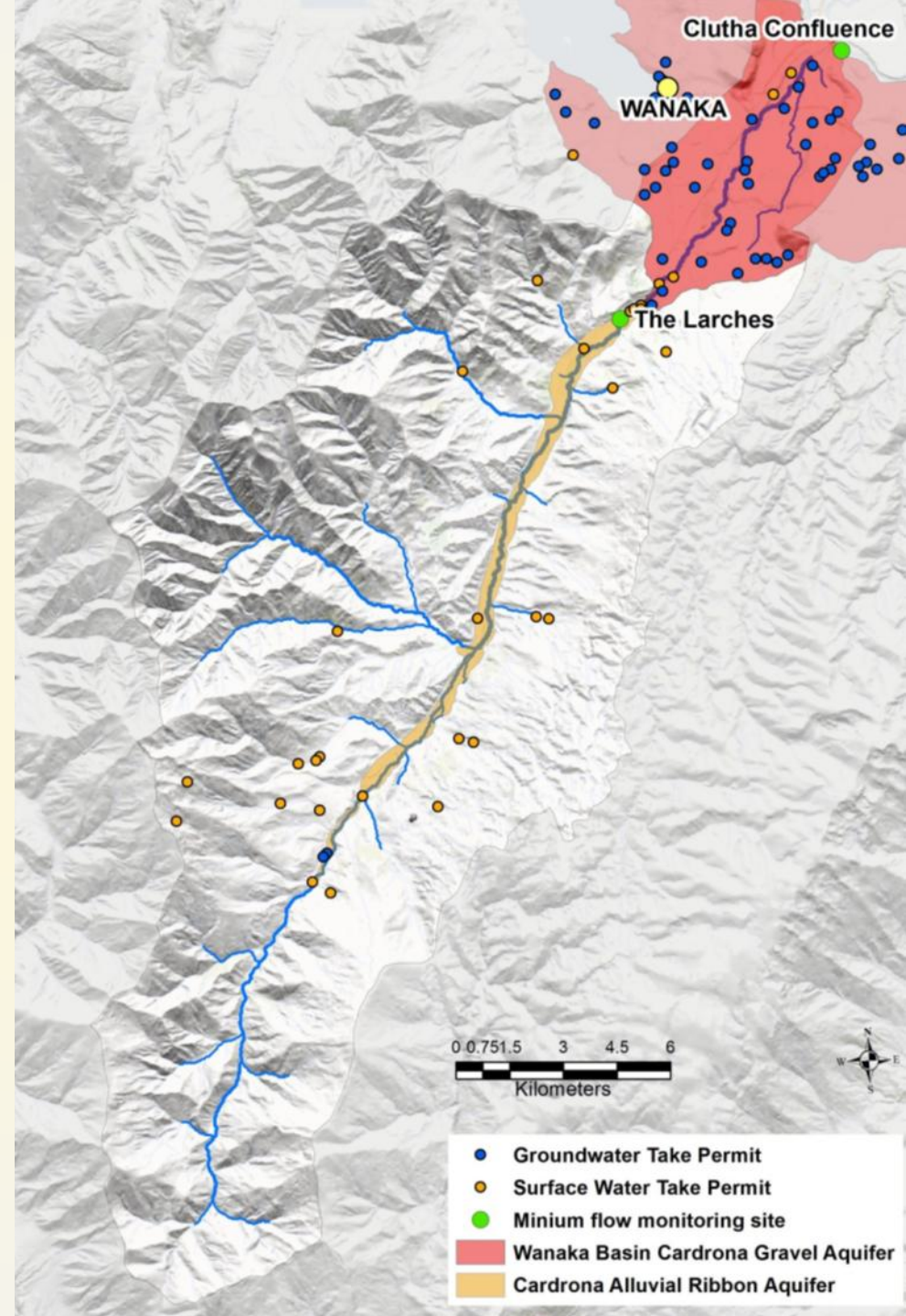
Rainbow trout

- The Cardrona and its tributaries provide important spawning areas for the upper Clutha
- Juvenile trout will stay in tributaries for as long as possible and then be pushed downstream by floods, so minimum flows will have very little effect on them
- Most adult trout leave the Cardrona by the end of November/early

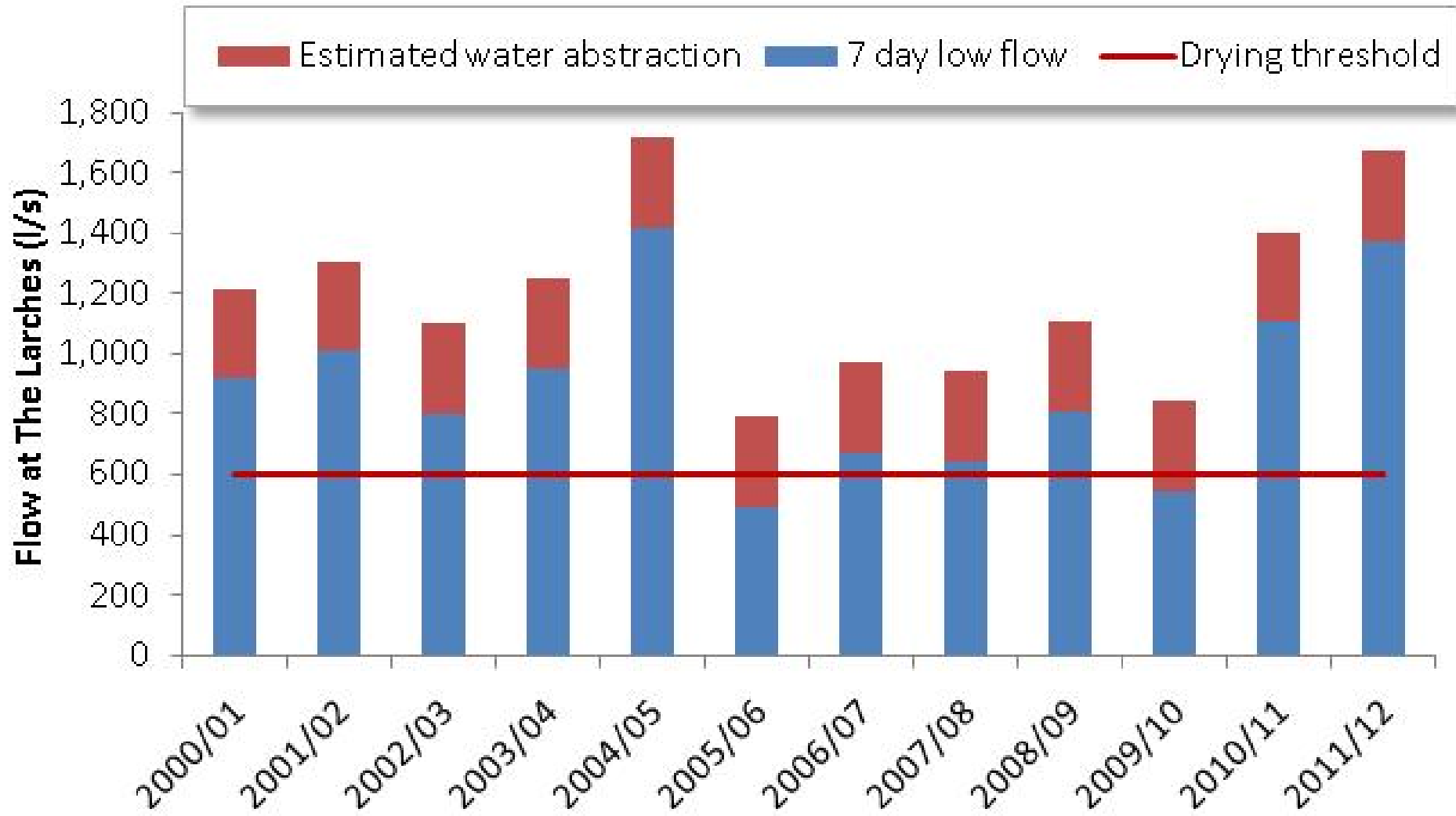


Irrigation

- 2,440 l/s of “paper water” allocated
- Actual peak use 1,160 l/s
 - 620 l/s above The Larches
 - 540 below The Larches
- Total use may drop down as low as 600 l/s in dry year

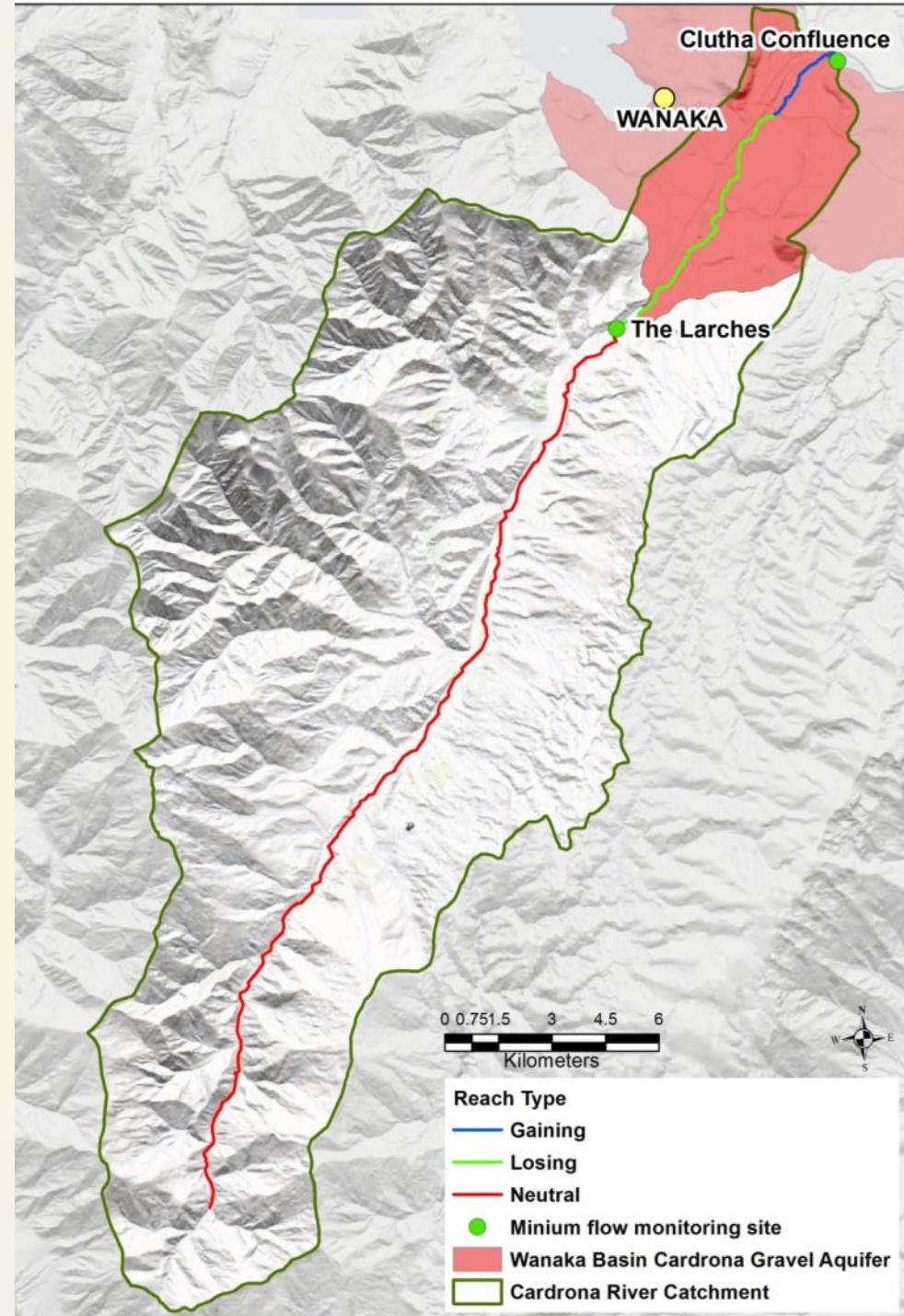


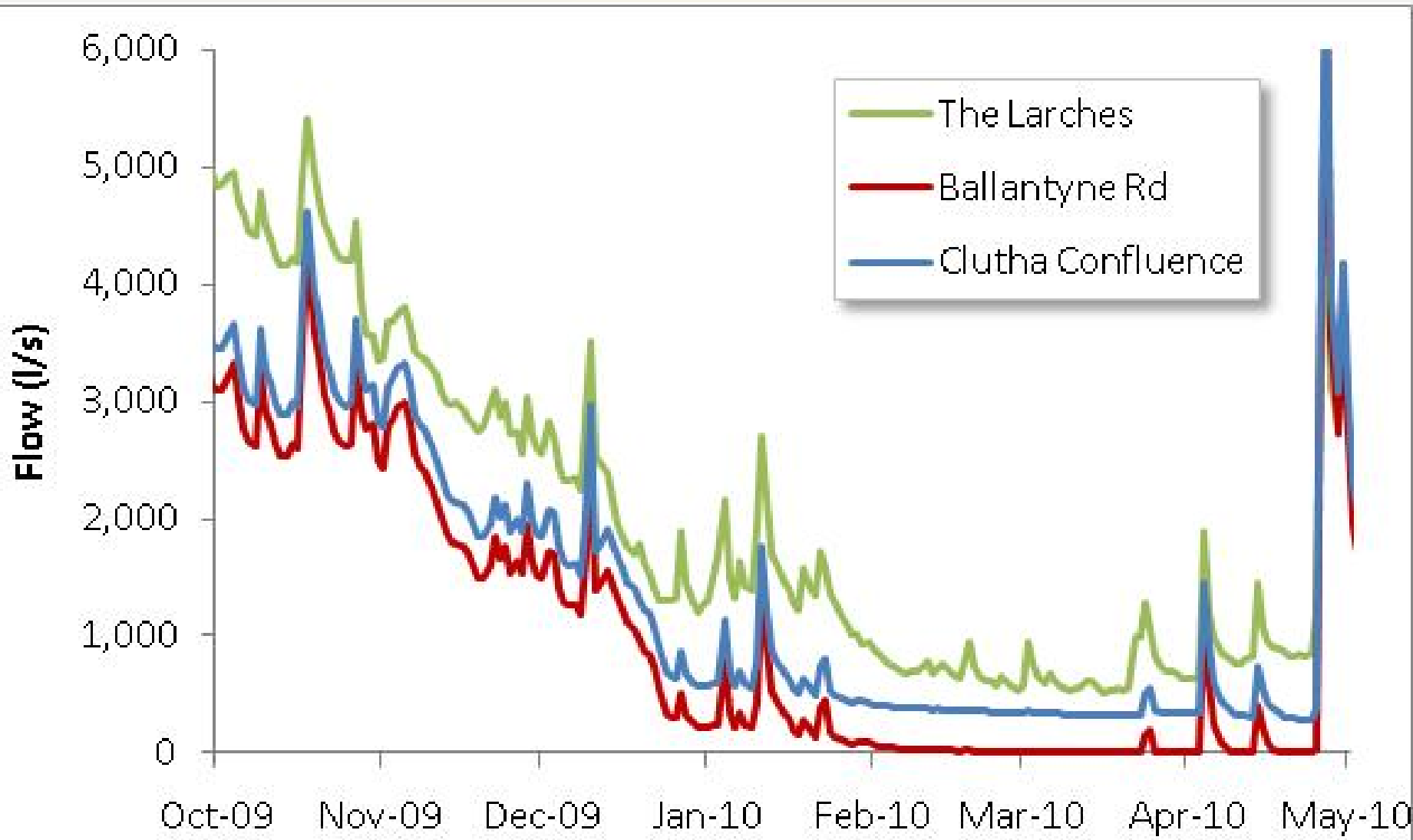
Does the Cardrona naturally run dry?



Hydrology of the Cardrona

- Neutral reach – no net loss or gain from groundwater
- Losing reach – up to 600 l/s lost to groundwater
- Gaining reach – 300 l/s gained from groundwater

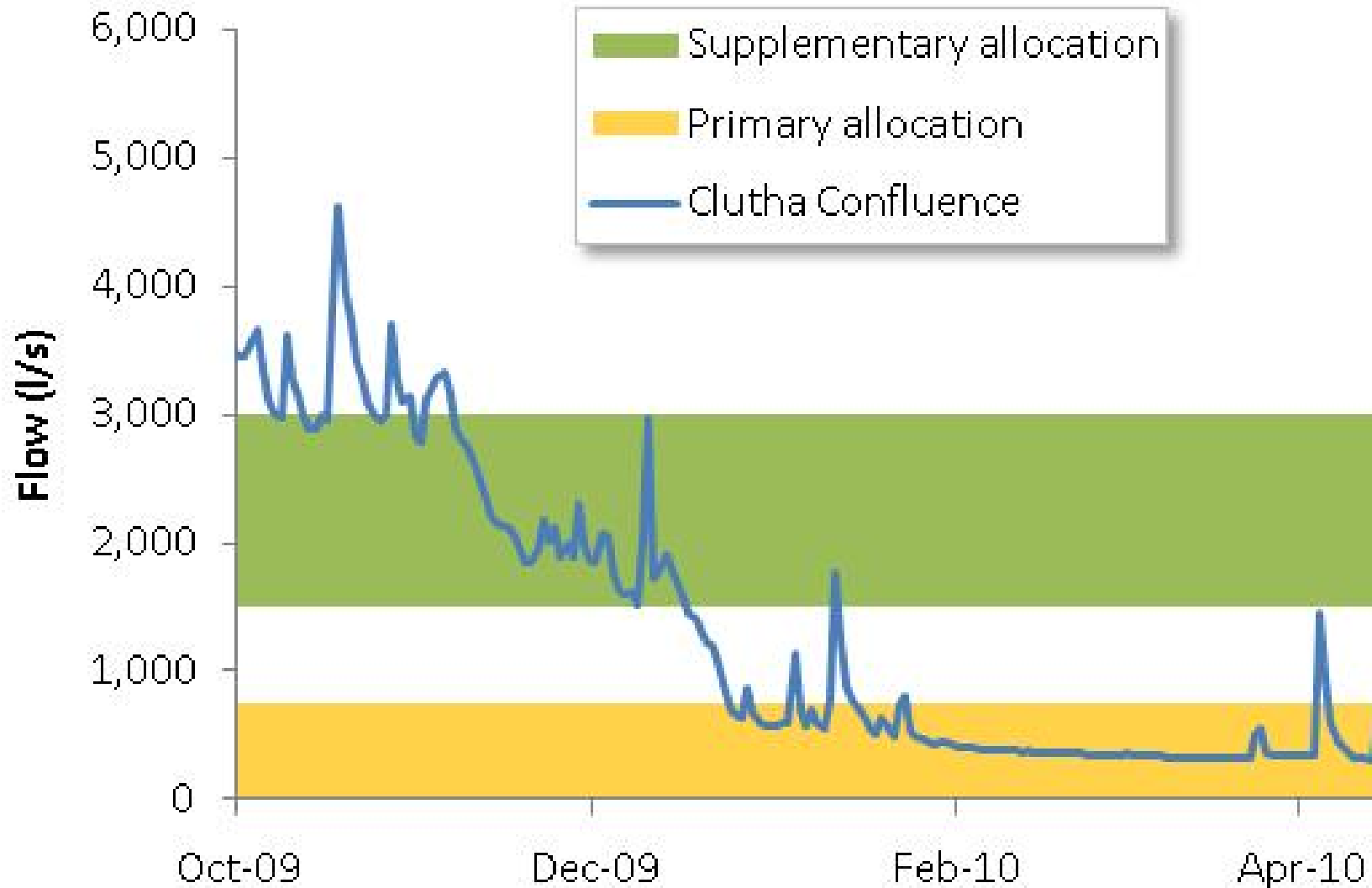




Points to keep in mind

- 400-600 l/s is lost to groundwater below The Larches
- 300 l/s is gained from aquifer downstream of SH6
- If no water is taken, flows at The Larches will be approx 300 l/s more than at the Clutha confluence

Primary and supplementary allocation limits



Primary allocation limit

- The default allocation “target” is 500 l/s
- The current estimated actual take is 1,160 l/s
- We suggest that an allocation limit of between 500 l/s and 1,000 l/s is established.
- This will allow current water users to operate while maintaining or increasing surety of supply, but will also encourage efficient water use

Supplementary allocation

- Current supplementary minimum flow is 2,860 l/s (mean flow) at the Clutha confluence
- We suggest the following supplementary allocation regime

| Supplementary minimum flow @ Clutha confluence (l/s) | Allocation block size (l/s) |
|--|-----------------------------|
| 1,500 | 500 |
| 2,000 | 500 |
| 2,500 | 500 |
| 3,000 | 500 |

Suggested minimum flow options

- 3 different minimum flow options will be suggested
- Each option is designed to maintain the variety of values put forward by the community in the previous workshops

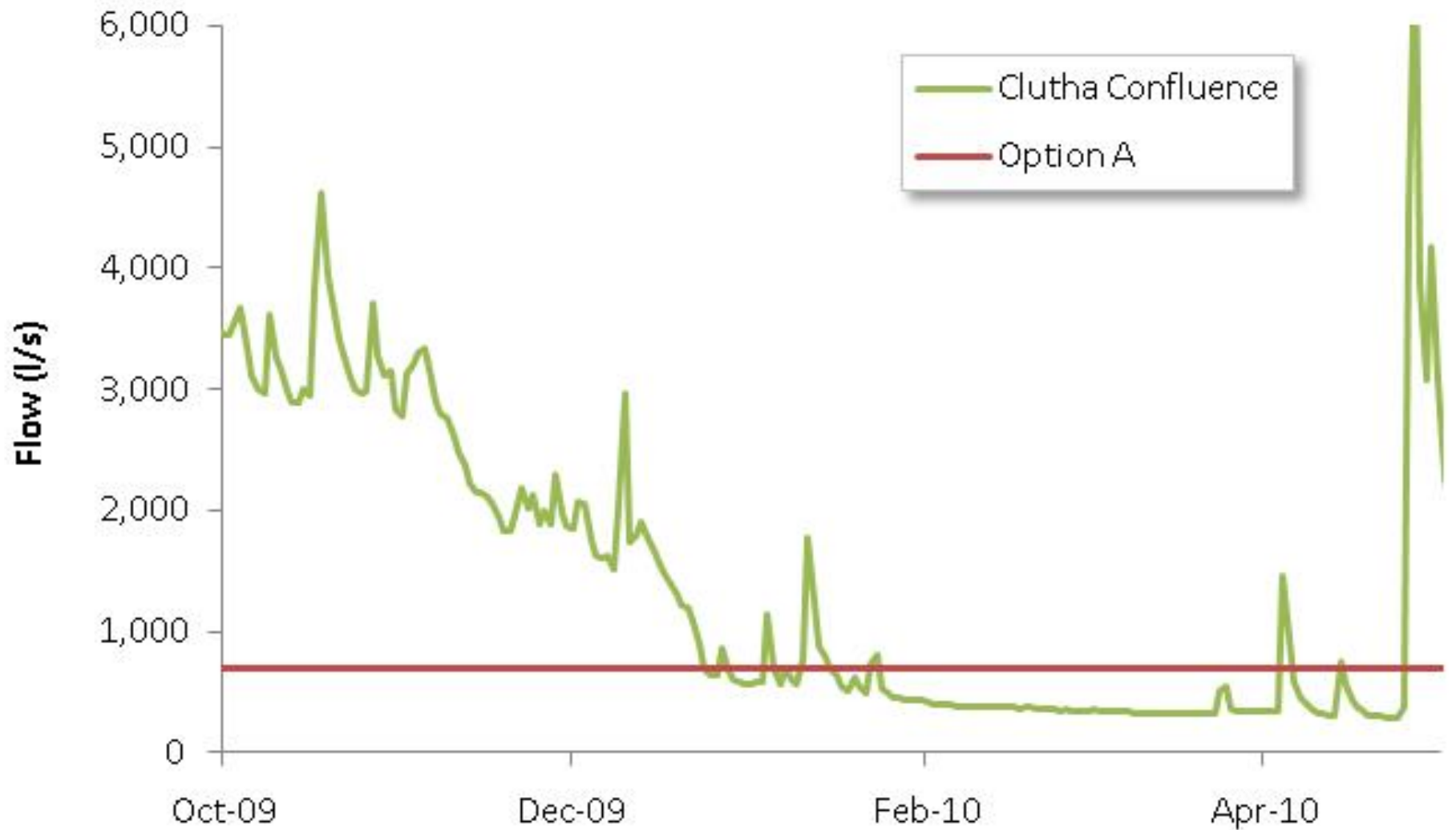
Option A

“Year round flow continuity”

700 l/s all year
at the Clutha confluence

Option A

- Provides year round flow continuity
- Provides flows of approx 1,000 l/s at The Larches (optimum flow for adult and juvenile rainbow trout)
- Provides year round habitat for juvenile trout in the lower reaches of the Cardrona
- Run of the river irrigation will be difficult in an average or dry year



Option B

“Peak holiday season flow”

700 l/s May-Jan
at Clutha confluence

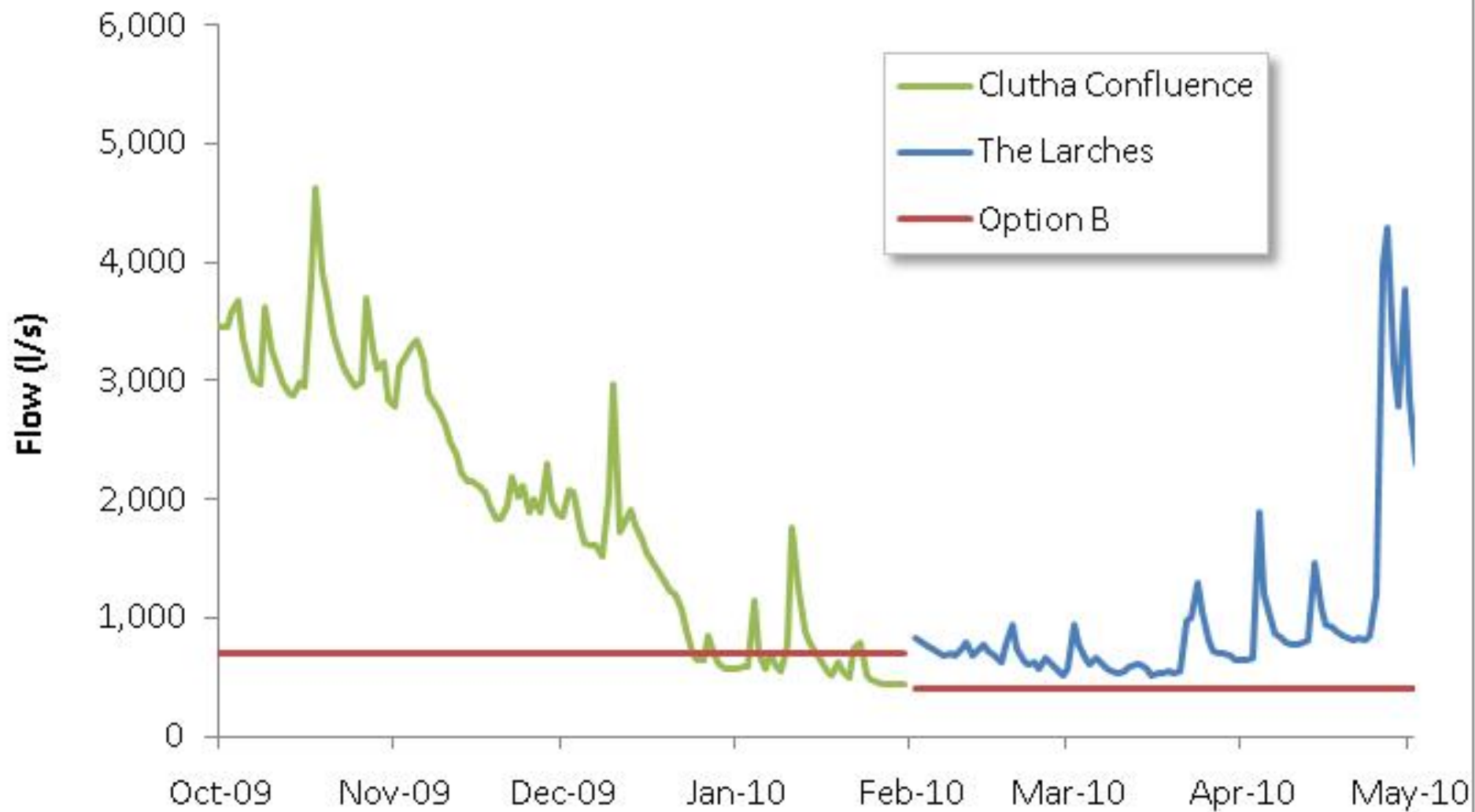
400 l/s Feb-Apr at The Larches

Option B

- May to January (700 l/s at Clutha confluence)
 - Flow continuity from May to January, which includes the peak tourist season
 - Flows of approx 1,000 l/s at The Larches (optimum flow for rainbow trout adult, juvenile & spawning)
 - Allows adult trout to return to the Clutha
 - Moderate irrigation restriction in January

Option B

- Feb to April (400 l/s at The Larches)
 - Allows for irrigation to occur during the driest part of the year
 - Does not provide flow continuity during this period
 - Distributes water resources between “upper” and “lower” water takes



Option C

“Extended low flow”

700 l/s May-Dec at Clutha
confluence

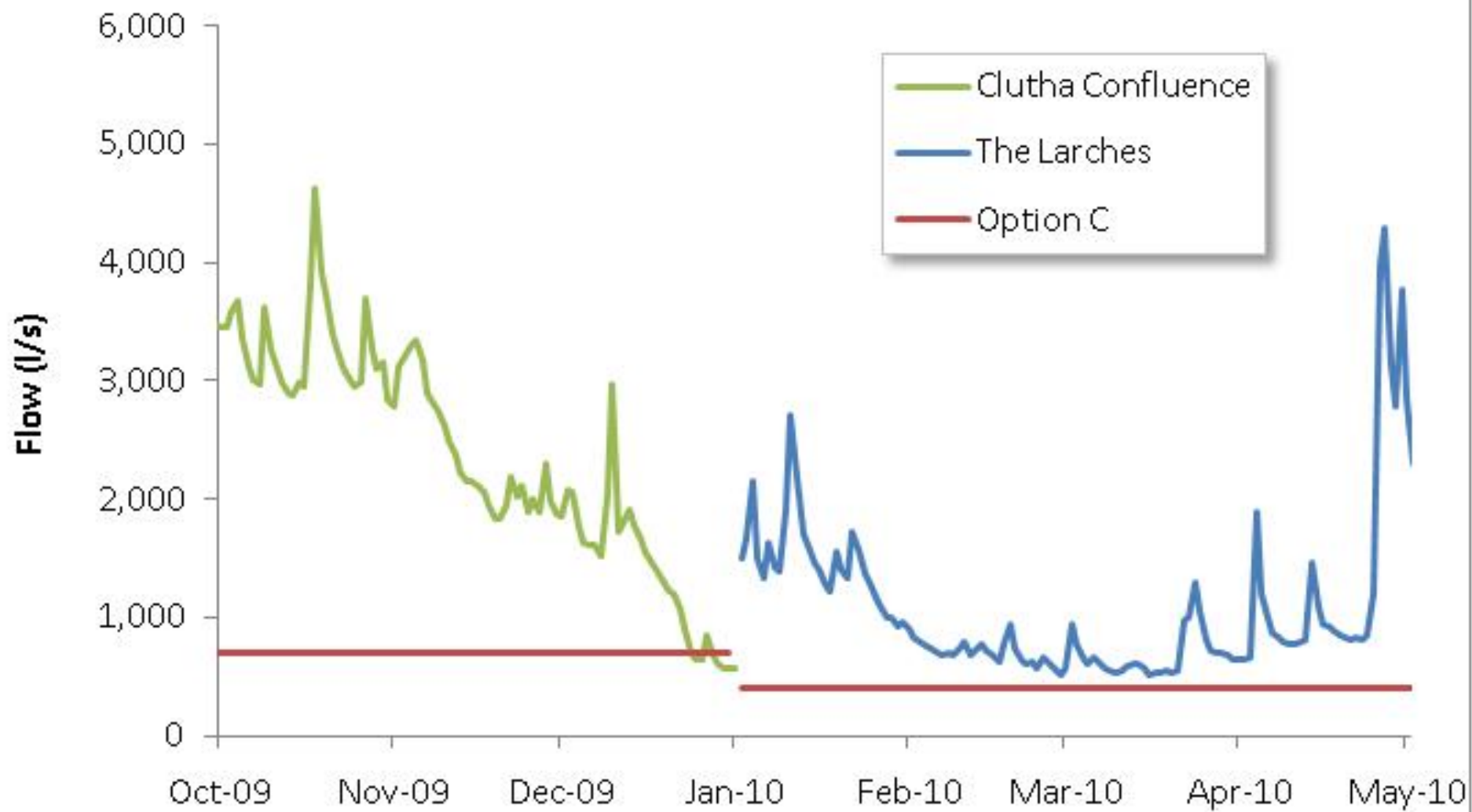
400 l/s Jan-Apr at The Larches

Option C

- May to Dec (700 l/s at Clutha confluence)
 - Flow continuity from May to December, which is similar to current flow regime
 - Flows of approx 1,000 l/s at The Larches (optimum flow for rainbow trout adult, juvenile & spawning)
 - Allows adult trout to return to the Clutha in Nov/Dec
 - Very little irrigation restriction

Option C

- Jan to April (400 l/s at The Larches)
 - Provides *status quo* for current irrigation practice
 - Does not provide flow continuity during this period
 - Distributes water resources between “upper” and “lower” water takes



Effects of minimum flow options on irrigation

| | | Restriction days per irrigation season | |
|-----------------|---|--|---------|
| | | 2009/10 | Average |
| Option A | 700 l/s all year (@ confluence) | 109 | 94 |
| Option B | 700 l/s May-Jan (@ confluence), 400 l/s Feb -Apr (@ The Larches) | 28 | 27 |
| Option C | 700 l/s May -Dec (@ confluence), 400 l/s Jan-Apr (@ The Larches) | 7 | 9.6 |

Feedback Session 2

Options for surface water management

How do these options affect you?

Where to from here....



How to provide further feedback

- ❑ Provide any further feedback by 30 June
- ❑ Workshop materials, feedback forms will be put on the website www.orc.govt.nz
- ❑ 0800 474082
- ❑ Email: policy@orc.govt.nz

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