



Kaikōura Plains Recovery Project

Lyell Creek/Waikōau Catchment Restoration Summary of Issues (Storey & Tanner 2018)

The Lyell Creek/Waikōau catchment key issues report (Storey & Tanner 2018) includes analysis of State of Environment monitoring data for water quality and benthic macroinvertebrates (2007-2018), GIS data collected by stream walks during January and February 2018, observations during a site visit by the authors on 8-9 May 2018 and discussions with Environment Canterbury staff, local landowners and other stakeholders (8-9 May 2018).

The main issues identified regarding water quality and habitat quality of the Lyell Creek/Waikōau catchment include:

- fine sediment deposited on stream beds.
- elevated *E. coli* concentrations.
- excessive growth of emergent and submerged macrophytes in channels.
- elevated concentrations of nitrate and dissolved reactive phosphorus.

Key management issues contributing to reduced water and habitat quality were identified as:

- A number of new springs that have appeared in farm paddocks as a result of the November 2016 earthquake.
- Overland flow paths that carry runoff water from farm paddocks to streams.
- Slumping of stream banks, some a result of the earthquake and some due to stock trampling.
- Reduced shade over the water because of riparian vegetation removal.
- Hard engineering works on banks of the urban reach (though very important for flood management).

These impacts on water quality and habitat quality are causing degradation of the following values associated with Lyell Creek/Waikōau:

- Aesthetic qualities of the stream network.
- Ecosystem health (as measured by the benthic macroinvertebrate community).
- Recreational and native fisheries, though it is hard to infer impacts from the available data.
- “Swimmability” at potential swimming holes, such as near the State Highway 1 (SH1) monitoring site.

The main impacts on Lyell Creek/Waikōau water quality and ecosystem health (shown or predicted) resulting from human activities in the catchment are summarised in the following table (table 1).

Impact	Likely sources or causes	Pathways	Other exacerbating factors	Issue origin	Values affected	Sections affected
fine sediment	stock access to streams, bank slumping, drain clearing, stock movement on farm paddocks and raceways	overland flow paths from paddocks and raceways	lack of riparian vegetation with deep roots	esplanade, spring heads	aesthetics; ecosystem health; fisheries; swimming	all
elevated <i>E. coli</i>	stock access to streams, faecal material on farm paddocks and raceways, leaks from septic tanks, sewers and stormwater	overland flow paths from paddocks and raceways, stormwater pipes	water or effluent irrigation: over-supply or during wet conditions	all	swimming; kai moana	mouth, West End, esplanade
elevated dissolved N and P	stock access to streams, urine and fertiliser on farm paddocks and raceways, leaks from septic tanks, sewers and stormwater, possibly groundwater	overland flow paths from paddocks and raceways, stormwater pipes, groundwater springs	water or effluent irrigation: over-supply or during wet conditions; lack of interception by riparian vegetation; low instream denitrification rates	esplanade, spring heads	ecosystem health; fisheries	esplanade, spring heads
excessive growth of macrophytes & periphyton	lack of riparian shading; high nutrients in water and/or sediment	-	-	esplanade, spring heads	aesthetics; ecosystem health; fisheries; swimming	esplanade, spring heads
habitat degradation for fish and invertebrates	excessive growth of macrophytes and periphyton; lack of riparian tree cover	-	-	all	ecosystem health; fisheries	all
low dissolved oxygen	excessive growth of macrophytes and periphyton	-	-	esplanade, spring heads	ecosystem health; fisheries	esplanade, spring heads
ammonia toxicity	nutrient input plus high pH from excessive growth of macrophytes and periphyton	-	-	esplanade, spring heads	ecosystem health; fisheries	all
toxic contaminants	roads/vehicles	stormwater pipes	-	West End, esplanade	ecosystem health; fisheries; mahinga kai; kai moana	mouth, West End, esplanade

Table 1 Summary of main impacts on Lyell Creek/Waikōau