Jed River Catchment

Water information summary and interpretation

February 2023

WetlandsNZ

Why look at water in the catchment?

- Core long term objective to improve water quality, including streams, wetlands, and groundwater.

- Need to understand historical changes in catchment

- Water quality and quantity knowledge

- What is required to update knowledge

Scope of presentation

- Jed River Catchment
- Catchment modifications
- Water quality studies
- Water quantity studies
- Water testing programme

Jed River Catchment

Figure 1

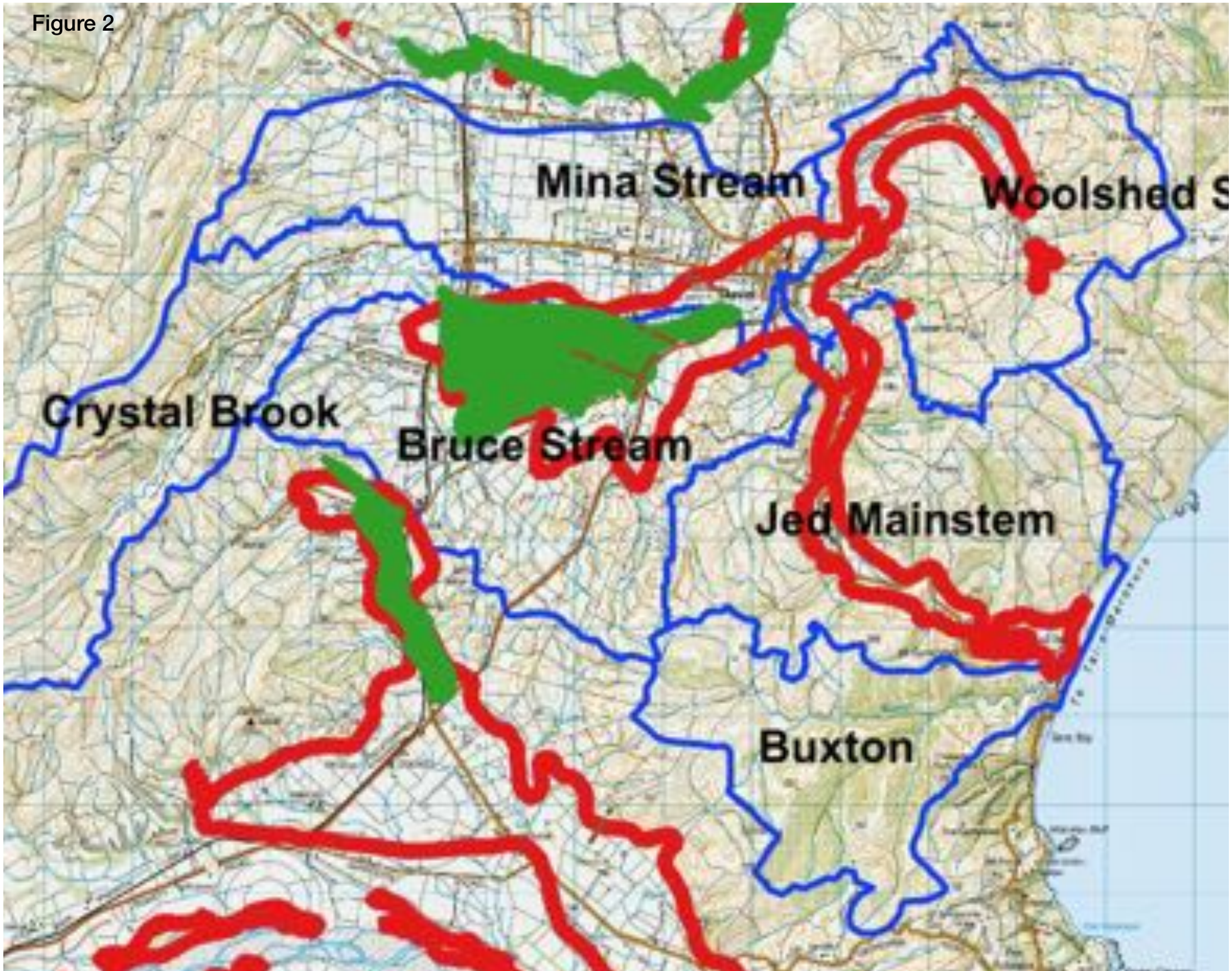
Table 1 - Catchment Areas

Catchment	Area (ha.)	% of Catchment
Buxton	844	0%
Jed Mainstem	1413	22%
Woolshed Stream	1135	18%
Crystal Brook	1238	20%
Mina Stream	1150	18%
Bruce Stream	1356	22%
Jed Catchment	6292	100%

Catchment modifications

Wetlands

Figure 2



Wetland loss

Table 2 - Wetland loss

Catchment	Area (ha.)	Wetland loss - survey map	% catchment wetland loss survey	Wetland loss - DOC	% catchment wetland loss DOC
Buxton	844	0	0.0%	2.4	0.3%
Jed Mainstem	1413	0	0.0%	189.7	13.4%
Woolshed Stream	1135	0	0.0%	183.3	16.1%
Crystal Brook	1238	117	9.5%	121.0	9.8%
Mina Stream	1150	11	0.9%	127.2	11.1%
Bruce Stream	1356	183	13.5%	346.0	25.5%
Jed Catchment	6292	310	4.9%	967.2	15.4%

1870's Survey

1870’s Survey detail

Wetland loss significance

- Using our two datasets of Survey map and DOC estimate, we have figures for wetland area of 5-15% of the catchment.

- Taking a figure of 7% as a reasonable estimate, this area of wetlands would have been sufficient to massively transform nutrients within the catchment. Their removal has effectively completely removed the ability of wetlands to treat nutrients within most of the catchment

Stream modifications

Many streams channelised, straightened, deepened, stripped of riparian vegetation, weed infested.

More natural stream bed

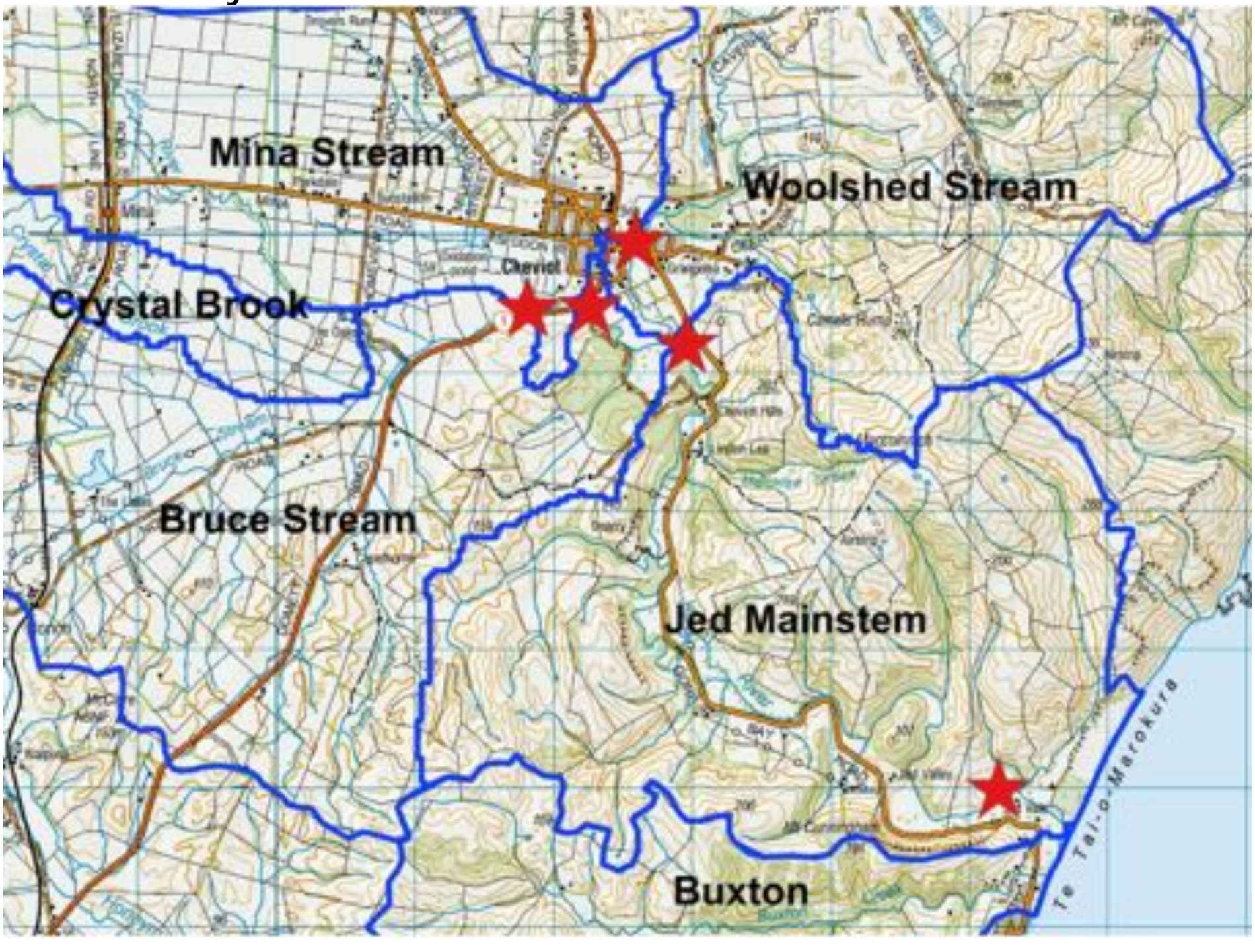
- **Wide floodway**
- **Dense vegetation**
- **Slows flows**
- **Provides habitats**
- **Facilitates natural ecosystem processes**

Summary of modifications

Modification	Degree of modification	Ecological effect
Wetland loss	Almost complete loss of wetlands	Huge reduction in ability of catchment to cleanse and purify water.
Channelisation of waterways	Significant number of waterways have been extensively modified	Speeds up water, reduces ecological processing of nutrients.
Loss of native vegetation	Almost complete loss of native vegetation	Speeds up water flow, reduces nutrient uptake.
Intensification of land use	Much of the lowlands are being intensively farmed	Increases nutrient and sediment input.
Sewage pond overflow	Significant pollution during flood events	Degrades stream quality and public perception of waterways.

Water Quality studies

The only fully documented study is an ECan study over a full year in 2010/11



Results Summary

Parameter	Median of all sites	Guideline	National Bottom Line NPS 2020
Conductivity	78	17.5	N/a
pH	8	7.2 - 7.8	N/a
Water clarity	36	85	N/a
BOD_5	3	1	N/a
DIN	0.138	0.01	N/a
NH3-N	0.026	0.9	0.24
DRP	0.067	0.001	0.018
E. coli	82	550	260

Results vs guidelines

Using guidelines applicable at time of study:

- 62% of sites exceeded guidelines

Using National Bottom Lines (NBL) from NPS-FW

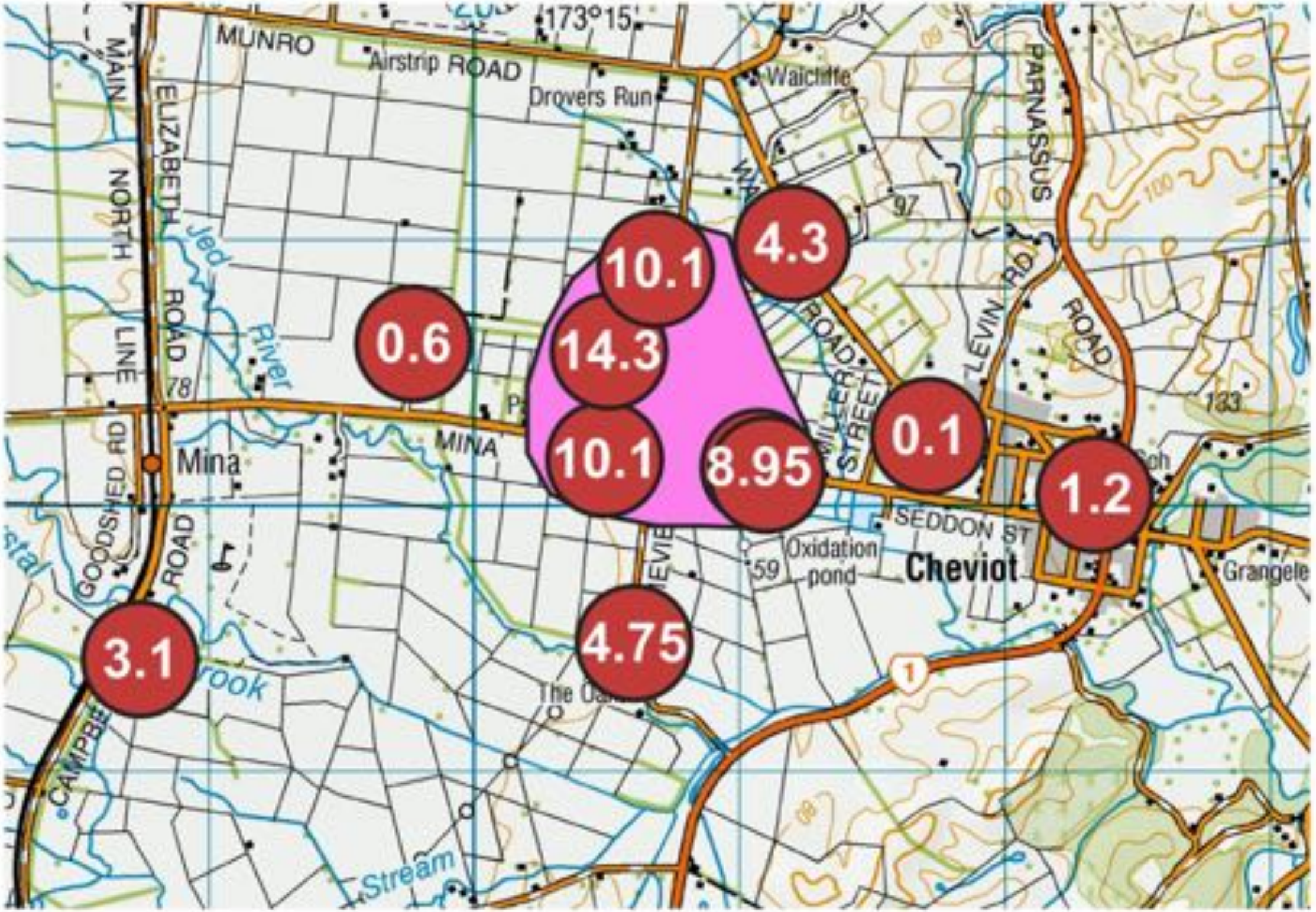
- 50% of sites exceeded National Bottom Lines

Guidelines were simply guidelines, but NBL's are statutory requirements and require ECan to limit resource use and produce an Action Plan. These are results from over 10 years ago, and there has been considerable land use intensification since then, so updating is required.

Geological considerations

- Sometimes considered that the soft sedimentary nature of the geology of the Jed catchment is the reason for the elevated nutrient levels.
- But Woolshed Stream has levels approximately 6 times less than Crystal Brook. It does have older rocks, but not that much difference.

Groundwater quality



Groundwater Summary

- The wells shown are the only data available
- Of the 11 sites, 2 exceed the standard of 11.3mg/l NO_3
- Only 2 do not exceed the 0.87mg/l guideline of the Danish study
- These are not drinking water wells, but do indicate nutrient enrichment of groundwater
- Only 1 well has been sampled since 2011

Water Quantity studies

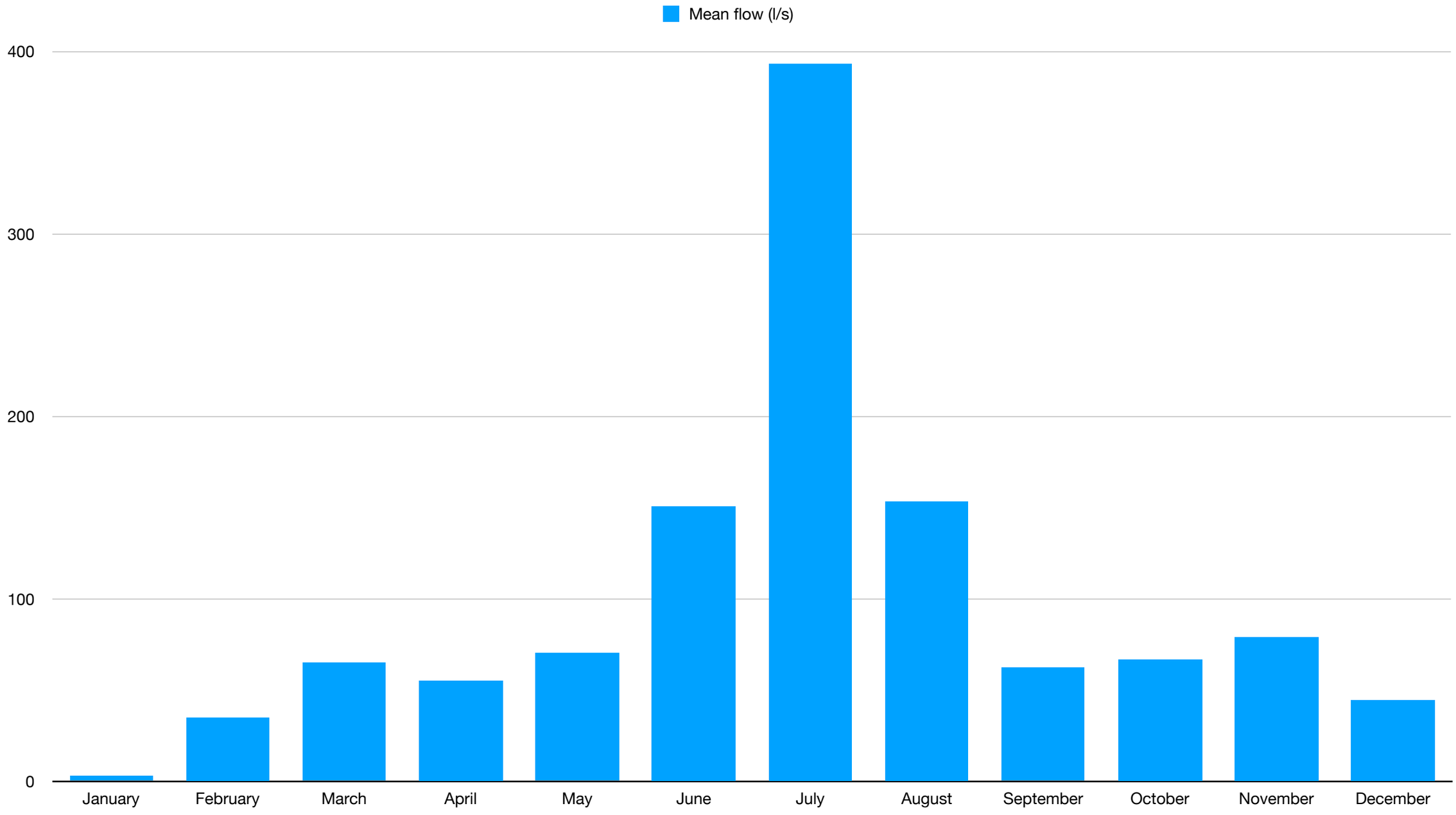
Two data sources:

- 1985 - 1988 flows of Jed @ Cheviot Hills Reserve

- Flow recorder @ Cheviot Hills Reserve (current)

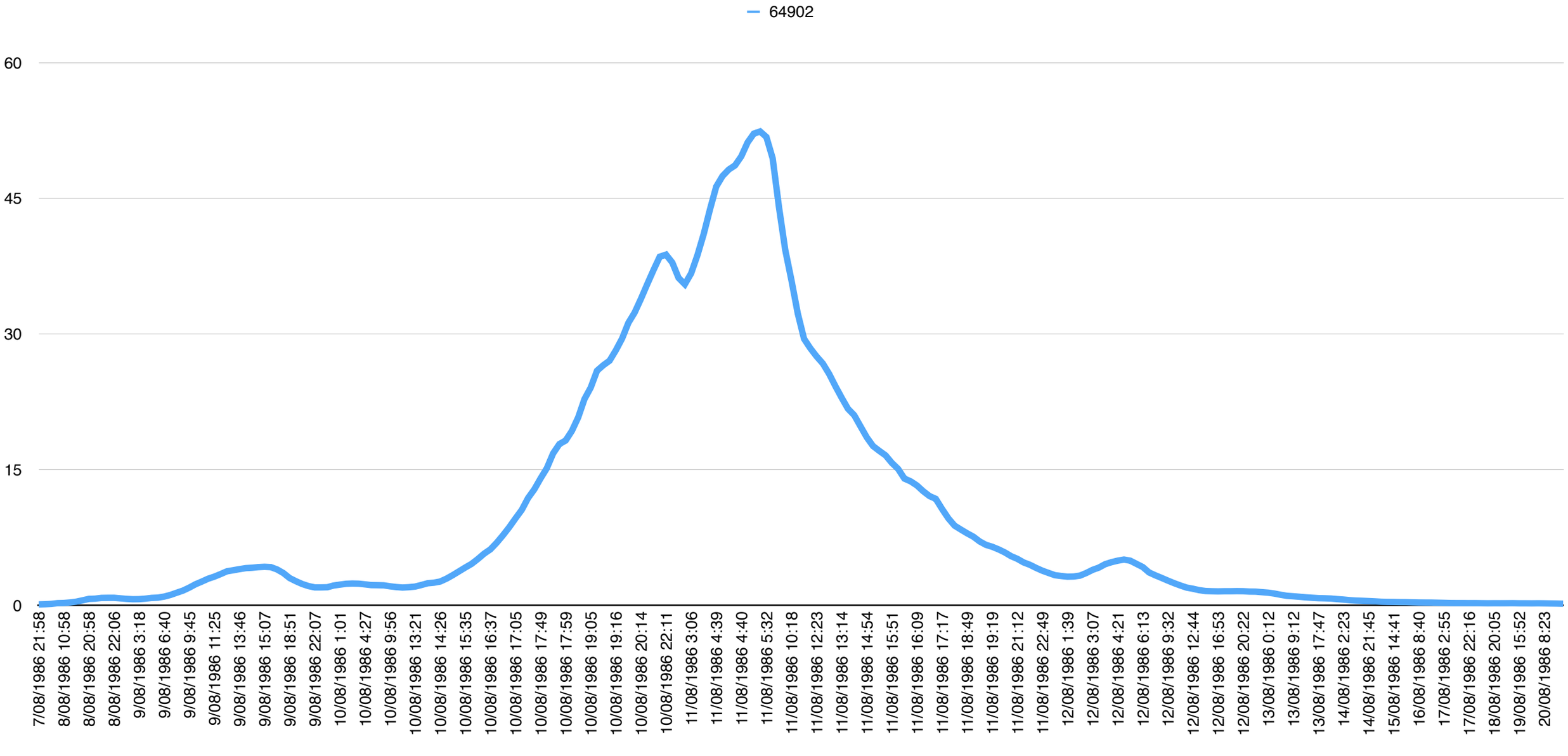
Seasonal Flows

From 1985-88

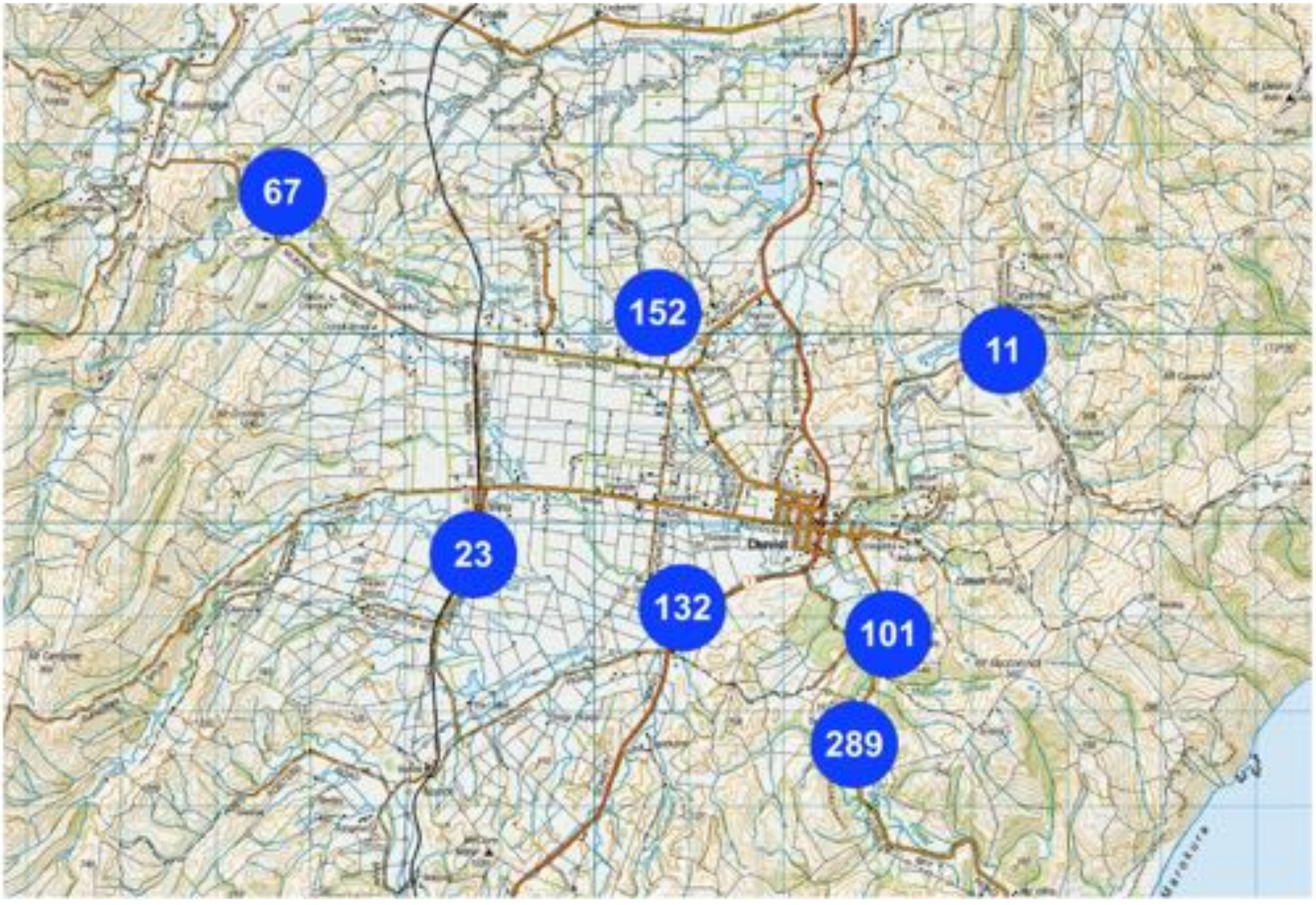


1986 Flood

1986 saw a 52 cumec flood (last year was 44 cumec). Graph shows flows over the rise & fall over less than 6 days



Catchment flows



Historical Flows

- Historical and anecdotal evidence of greater flows historically
- Need to assemble these records/photos/anecdotes and try to account for differences
- Could be willow evapotranspiration, irrigation take etc but no immediately obvious reason

Nutrient loads

Water quality measurements give instantaneous nutrient concentrations. But a better way to look at the contribution of each sub-catchment is to consider nutrient loads per year. We take the concentration in mg/l, multiply by the number of litres which flow per year, and convert to kg. A very broad approximation of the loads of Crystal Brook and Woolshed Stream is shown below.

Subcatchment	DIN load/year (kg)	DRP load/year (kg)	DIN yield kg/ ha	DRP yield kg/ ha
Woolshed Stream	258	49	0.227	0.043
Crystal Brook	1,914	573	0.507	0.152

Water testing programme

- Existing data is sufficient to say that water quality is poor within the Jed Catchment and it is a statutory requirement that it is addressed.

- However, the data is mostly over 10 years old, does not relate to current NBL's, and does not give a clear picture of all sub-catchments

- A sampling programme has been designed which will provide a clear picture, this formed part of the "Waitaha" application which was rejected by ECan