

Routine Chemical Tests On Water

The following list of elements/substances/properties have been routinely analysed in the Rangitata river over a 12 month period June 2012-July 2013 on a weekly basis and at every 2km distance (GPS located to within 1m) along the entire length. The test methods used follow the 22nd edition of the EPA Standard Methods for the Examination of Water and Wastewater where applicable, additional tests methods following Patnaik 2011 Handbook of Environmental Analysis 2nd edition or Specific test protocols have been used at all times.

Aluminium	Antimony	Arsenic	Barium	Beryllium
Bismuth	Cadmium	Cerium	Chromium	Cobalt
Copper	Iridium	Iron	Lithium	Lead
Magnesium	Molybdenum	Nickel	Osmium	Platinum
Palladium	Rhodium	Ruthenium	Silver	Silica
Strontium	Tin	Titanium	Vanadium	Zinc
Flow rate	Temperature	TDS	pH	Turbidity
Monochloroacetic acid	Monobromoacetic acid	Dibromochloroacetic acid	Ammonia	Bromide
Carbon dioxide	Chloride	Cyanide	Fluoride	Fluoroborate
Iodide	Nitrite	Nitrate	Oxygen	Perchlorate
Sulphide	Thiocyanide	Cyanate	Bisphenol a	Nonyl phenyl ethoxylate
Octyll phenol ethoxylate	Diammonium chloride	Benzyl ammonium chloride	Chlorophenoxy acid	Somatorophin
Aldicarb	Atrazine	Simazine	2-4D	DIP
DNOP	DIDP	Pyridine	DOP	Aldrin
Dieldrin	2,4,5 T	Androstenedione	Androsterone	Cholesterol
Equiline	17 alpha estradiol	Trimethyl Phosphate	Tri propyl phosphate	Ampicillin
Azithromycin	Caffeine	Carbamazepine	Codeine	Ibuprofen
Oxacillin	Tertracycline	Thiobenzdazole	Warfarin	Estrerone
Mestranol	Progesterone	Testosterone	Estrogen	Benzimidazole
Eclipse	Eprinex	Exodus	Abamectin	Ivermectin
Levamisole	Selenium	Oxfendazole	Chlorhexidine	Clorsulon
Propylene glycol	Albendazole	Anthracene	Caromene	Bibenzofuran
Naphthalene	Pyrene	BOD	COD	Carbamate
Urea	Triazine	Chloradane	Permethrin	Heptachlor
Merphos	Dichlorvos	Phthalate esters	Acrylamide	Alachlor
Bromacil	Chlordane	Chlorpyriphos	Cyanazine	Epichlorohydrin
Oryzalin	Picloram	Pyriproxifen	Terbacil	1080

All oxidation states have been analysed ie Fe (II) and Fe (III).

Major observations from 750,000 data points obtained from June 2012 – July 2013.

- The Rangitata River splits into three major zones. Above the Rangitata Gorge where the water is still clean and alpine. A transitional zone where chemical markers start to become apparent from the Gorge through to Arundel, and a dirty zone from Arundel through to the river mouth.
- Nitrate, Nitrite and Urea levels rise significantly during the season
- Marker drench chemicals have half lives significantly longer than the idealized numbers released by the industry. This is due to turbid waters and absorption onto organic effluents which reduce the effect of UV in terms of degradation speeds. The systemic ratcheting up of these chemicals suggests excessive usage by certain farms.
- Certain markers from drenches, which are solely attributable to the dairy industry are evident below Arundel.
- The levels of all pollutants such as nitrates, nitrites, urea, copper, glyphosphates, pesticides and herbicides rise steadily through the season studied.
- Flood events above 100 cumecs flush the river water but the build up quickly reaches significant levels again.
- Bovine estrogen is present throughout most of the season from the gorge to the sea.
- Elements of concern such as Chromium, arsenic and selenium are often found at levels high enough to cause concern for periods of time.
- Quaternary ammonium compounds are frequently found at levels high enough to cause issues with aquatic biota, especially downstream from the Fonterra factory discharge area.
- Each farm can be followed for its discharge area as pulses of chemicals can be traced downstream from that operation.
- Analytical methods exist if the political will is there to drive the process.