

Waikoropupu Springs

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This article is a brief study of some properties of Pupu Springs together with comparative comments on nearby rivers and resurgences. The information presented was collected by several people over the period from January 1970 until November 1971, and all analyses were made within a laboratory.

"Waikoropupu" is a Maori name meaning "where water bubbles up through a throat." However the name is more commonly simply 'Pupu Springs. Location is about 7km from Takaka; the outflow from the Springs flowing into the Takaka River at a point within 2km of the town. Grid reference for the Springs is: N.Z.M.S. I, Takaka, S8 (1968) 170819.

Although the following table of water analyses gives a comparison with other rivers and springs, at this stage only Pupu has been monitored regularly. Only single measurements have been made for other waters and so they may undergo seasonal fluctuations in flowrate, temperature, and composition. For Pupu, four water analyses were made throughout the year, while temperature was measured in the main vent at three-weekly intervals over 18 months. Flowrate was measured at weekly intervals, at the point just above the junction with Fish Creek. For this an electrical meter was used, and flows and depths were measured at the same carefully measured intervals of 5 feet (1.5m). A flowrate of 8.5 - 20 m³/sec. (300-700/secs) has been recorded. This may seem a considerable variation, yet it is quite insignificant when compared with river flows which vary seasonally by several hundred-fold. Unless otherwise stated, all results are p.p.m. (\equiv g /m³)

Sample] Locality:	Pupu Springs (**	Riwaka (Nth). Resurg.	Fish Creek Takaka	Takaka River	Motupipi River	Anatoki River	Pupu River, above springs	Pearse Resurg.
Analysis:								
Map Ref.	S.8	S.13	S.8	S.8	S.8	S.8	S.8	S.13
	171 819	288 591	170 820	621 879	622 881	620 880	172 816	136 379
Date	1.70-1.71	11.71	10.70	1.70	1.70	1.70	10.71	3.71
Temp. °C	11.7±.2						11.5	8.1
pH (glass elec.)	7.5	8.8*	7.7	7.9	7.9	7.9	7.2	
Conductivity (µmho/cm)	672		320	107	131	130		
NO ₃ -N	0.280	0.170		0.103	0.290	0.002		
NO ₂ -N	<.001							
NH ₄ -N	0.061	0.04						
Sol. Phosphorus	0.002	0.006						
Cl	110.0		22.6	2.1	2.5	1.3		
SO ₄ -Sulphur	57	8						
SiO ₂ -Si	2.3	2.2						
Ca	63.0	34.0	48.8	10.1	17.6	14.2	21.8	
Mg	9.3	1.0	3.9	1.7	2.4	1.5	1.2	
Na	65.0		14.4	3.0	4.5	0.2	3.1	
K	6.3		2.1	0.3	2.2	0.2	0.6	
Fe	≤0.1							
% O ₂ sat. ^a	60%							

* This pH was read in field with portable glass-electrode meter, and may be erroneous.

** Average of four analyses; no variation in chemical composition was detected.

Any rumours that Waikoropupu Springs water may be derived from a marine source seem quite without foundation for two major reasons:

1) Ratios of sodium/chlorine, sodium/calcium, and calcium/magnesium, are consistent with rainwater percolating through ancient marine-deposited rocks (see Geological cross-section map); the same ratios are also quite distinct from those to be expected from a seawater origin.

2) Considering the climate, topography, and geology of the surrounding district, such an efflux of water is to be expected. For the depth and expanse of marble/limestone in the region and the amount of rainwater within the catchments surrounding here, it appears that a lot of water does go underground; there are very few resurgences to account for this collection of water. Waikoropupu Springs therefore seem consistent with being the major efflux from an extensive subterranean reservoir.

The Institute of Nuclear Sciences have given an underground lifespan for this water, (from submergence to resurgence) of 3-5 years. This was determined by Tritium-Hydrogen dating.

From my own observations, Riwaka and Pearse river resurgences are greatly influenced by seasonal factors, and are direct contrasts to Pupu Springs. After heavy rains or at periods of snow-melt, both Riwaka and Pearse resurgences increase their outflow by about a fivefold factor or more. This is in accordance with having smaller catchments located at alpine altitudes.

An interesting feature close to Pupu Springs is the old overgrown crater - like basin. (Refer to locality map). This seems as though it may once have been an old spring. To get a good impression of what this appears like, consult old aerial photographs. In recent years dense gorse has made access to this crater rather

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difficult.

Although one cannot get into the spring vents due to water pressure, Pupu Spings is very fascinating to dive in. Seven powerful vents (up to 1.8m/sec. velocity) feed into the main underwater flora make these springs a very pleasant experience.