Purpose: To investigate the distribution of *Potamopyrgus antipodarum* in the Waihopai River.

Student 3: Low Merit

NZQA Intended for teacher use only

Hypothesis:

The distribution of the fresh water snail *Potamopyrgus antipodarum* from the Waihopai River dam to Queen's Drive will not significantly change down the river, but will change across the river because of the speed of the current and the amount of periphyton (the algae food source found on the beds of streams and rivers).

Raw Data – Population of *Potamopyrgus antipodarum* at each sample site in the Waihopai River

	Site 1	Site 2	Site 3	**Average**
North sample	22	23	21	22
Middle sample	9	11	13	11
South sample	20	18	19	19
Average	17	17	18	17.3

1

Fig. 1 – Population number of *Potamopyrgus antipodarum* in the Waihopai River

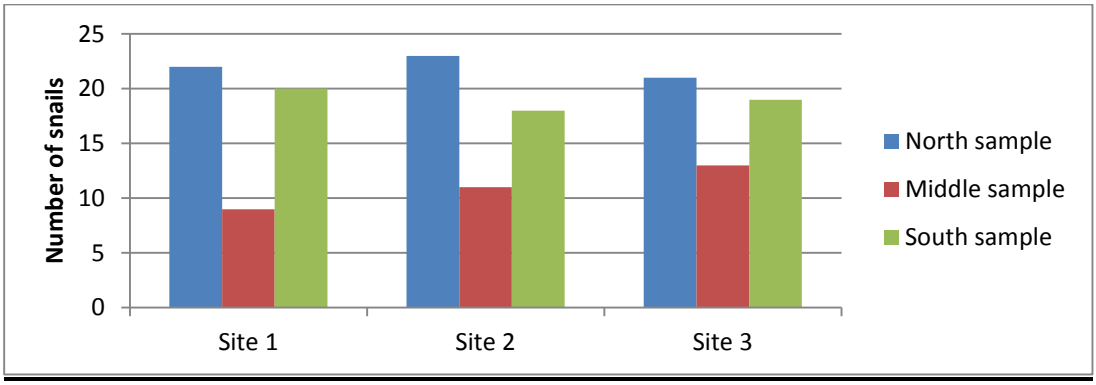

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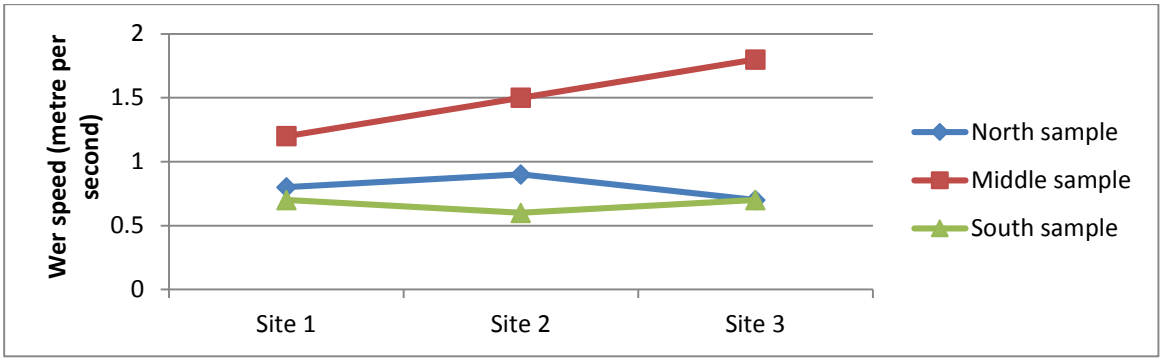
Fig. 2 - Waihopai River current (ms-1) at each sample site



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Conclusion:

Fig. 1 shows that the population number of *Potamopyrgus antipodarum* does not change significantly along the river between the Waihopai dam and Queen's Drive. A similar pattern of distribution was found on the north and south sides and the middle, collected at all three sites. The data concurs that the population numbers do change across the river's width; the

2

north and south sides had similar numbers of snails on average. The middle had the least number of snails. 2

Discussion:

This pattern is related to the speed of the water and the amount of periphyton on the rocks. Where the investigation was carried out, the Waihopai River was modified by human intervention to run straight some years ago. Therefore the distribution of *Potamopyrgus antipodarum* across the river must be affected by the abiotic factor of the current in the different sample sites, and the biotic factor of the growth of the periphyton food source of the snails. 3

The current is necessary for the respiration of many benthic invertebrates and reproduction of some fish species (Hynes 1970). Currents distribute oxygen, nutrients and food down a river system – detritus for invertebrates and drifting insects for fish and birds. 4

The Waihopai River where the investigation was carried out runs east to west and is reasonably straight. This means the north side has shading from the bank whereas the south side does not. The data in Fig. 1 show that there were slightly more snails on the north side of the river than the south side. This was not expected as the shading from the bank on the north side restricts photosynthesis in algae, and would cause less of it to grow. 3

Potamopyrgus antipodarum is an algae grazer (stated on the Landcareresearch.co.nz website), so it is more likely to live in an area with a higher amount of its desired food source. On the south side there is more sunlight and therefore more algae can carry out photosynthesis, grow and reproduce. This would normally lead to more snails in this area because of the plentiful food source. These ideas are also backed up in the *NZ Periphyton Guideline* where it states that "heavy shading does have the potential to prevent proliferations of green filamentous algae and the effects of removing this cover on periphyton growth has been widely documented." It is possible that substrate differences on the north and south sides at the three sites where the samples were taken had an effect on the algal growth and therefore snail numbers. 4

This trend along and across the river is also seen in student Y's data. The samples taken measuring current showed similar trends across the three river sites; the middle had the higher water speed compared with both sides (Fig. 2). The trend of the snails' distribution (Fig. 1) shows a relationship with the river speeds collected - where the current is slower at either side there is a greater number of *Potamopyrgus antipodarum* found compared with the middle of the river. 4

The speed of the water also plays a large part when it comes to the algae growth, where the river is fast its growth is disrupted and where it is slow its growth is not affected.

Quinn and Hickey (1990) state that it is the quality of the habitat that is provided by the water flow that is important to stream biota. Without good flows the stream becomes a lake or pond. An average velocity of 0.3 m/s tends to provide the quality for most stream life and prevent the accumulation of fine sediment. 4