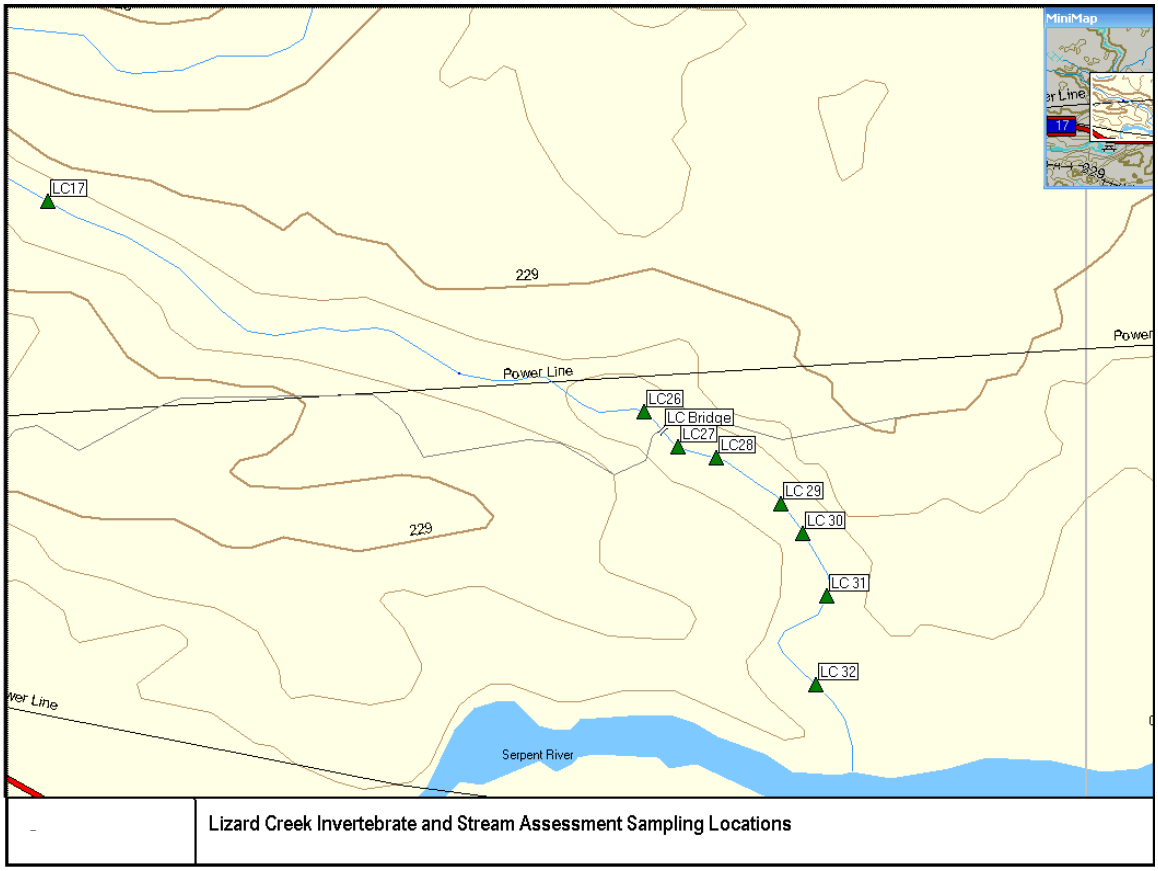
APPENDIX I: Benthic Sampling Results NEA 2009

Benthic macroinvertebrates were sampled at seven stations, with two samples collected at each station. Sampling stations were selected to coincide with stream segments sampled as part of the stream assessment. Benthic invertebrates were collected using a standard Surber sampler, although one set of samples was collected using a kick sweep method. Organisms were identified in the field to order only.

A map showing benthic macroinvertebrate sampling locations is provided below.



A complete listing of benthic macroinvertebrate sampling results are provided below.

Benthic Macroinvertebrate Sampling Results

Benthic invertebrates sampled at Station LC17, with cobble boulder substrata, had very moderate species diversity, and relatively low abundance, with 65 to 380 organisms/m^2. Most organisms observed were of the Orders Plecoptera, Coleoptera and Ephemeroptera. Tricopterans were sampled in lower numbers. These results were typical of other sites sampled.

Station LC 27 was also located in an area with cobble boulder substrata. The main taxa present were Ephemeroptera and Plecoptera, with lower numbers of seven other taxa.

Station LC 28 was located in an area of cobble boulder riffles. Species richness at this location was high (14 taxa), although density was relatively low, at 89 organisms/m^2. The most abundant taxa were Ephemeroptera, Tricoptera, Plecoptera and Chironomidae; indicating good water quality.

Station LC 29 was situated in a cobble boulder riffle zone downstream of the fifth falls. Species abundance was relatively low, with the most abundant taxa being Ephemeroptera and Tricoptera, with lower numbers of five other taxa.

Station LC 30 was located in a cobble boulder zone upstream of the third falls. Species richness at this location was high, with 17 taxa sampled. Density was also lower with 89 organisms/m^2. The most abundant taxa observed was Ephemeroptera, followed by Plecoptera, Tricoptera and Anisoptera, with lower numbers of 13 other taxa.

Station LC 31 was located above the second falls, with substrata consisting of boulder and cobble. Species richness at this location was relatively low with nine taxa., the most abundant taxa being Plecoptera, and an overall abundance of 167 organisms/m^2.

Station LC 32 was located in a shallow gravel riffle downstream of the first falls. Abundance and diversity were variable between the two sites sampled, compared to most

of the upstream sites,with a total of 13 taxa sampled, and abundance of 86 to 1087 organisms/ m^2. The most abundant organisms were of the order Ephemeroptera, followed by the family Chironomidae, and the Order Tricoptera.

Benthic Macroinvertebrates Discussion

The benthic macroinvertebrate sampling indicates population composition of these organisms to be typical for this type and location of stream, although the abundance may be lower than other streams. The reasons for this are not clear, but may be due to the type of substrate, and possibly low summer levels. The substrate, being partially embedded, with a significant clay content, may prevent benthic organisms from burrowing, which is an important requirement for many invertebrates. Having conducted invertebrate sampling over two field seasons, separated by two years significantly would be expected to reduce the variability normally encountered with this type of survey, but natural population dynamic variability may still be a factor.

The presence of shredders, scrapers, predators and collectors as indicated by caddisfly larvae, stonefly nymphs, dragonfly and mayfly nymphs, would be indicative of a healthy reach of river, as expected. In general the presence of organisms from the orders Ephemeroptera, Plecoptera and Tricoptera (EPT), are considered indicators of good water quality and stream health (Griffiths, 1999). Water quality is not considered an issue in this case, because it will not be affected directly. Stream health is also affected by availability of water.

Water quantity may be affected for much of the study area, due to the diversion of water from lower Lizard Lake to the upstream end of Reach 1. Almost all of the streambed downstream of Lizard Lake exhibits a relatively flat shallow profile. For this reason, a reduction in flow would not significantly reduce the wetted perimeter, which is necessary habitat for benthic invertebrates. The available aquatic habitat may be affected by a reduction in depth and velocity, but the wetted surface area available for invertebrates will not be reduced extensively. In stream flows will be required to be provided for the

natural stream channel, and requirement of benthic invertebrates will be considered in that determination.

Table 1 Lizard Creek Benthic Invertebrates

Taxonomic Group / Station	LC17			LC27		LC28	LC29	LC30		LC31		LC32	
	R1	R2	R3	R1	R2		R1	R2	R3	R1	R2	R1	R2
Acarina									1				2
Oligochaeta					1			1	2				1
Nematoda					3								
Hirudinea													
Amphipoda						1			1	1			
Isopoda									3				
Chironomidae				1	3	8		1	3	1	1		10
Simulidae						2			1				5
Diptera					3				1	2			2
Tipulidae						1							
Ephemeroptera	5				1	30	9	2	44	3	2	1	52
Plecoptera	5	32.28	3	9	5	9			14	4	6		5
Hemiptera						3			1				2
Coleoptera	10					1	2		2			1	
Megaloptera	1					1			1				1
Anisoptera	1		1	2	2	5	2		5	3	2	1	5
Zygoptera		1			1					2	1		
Tricoptera	2	2	2	2	9	18	2	4	5	2		5	8
Gastropoda						1							4
Pelecypoda						2			1				4
Decapoda						6			3	1			
Zooplankton									1				
Hydra													
Platyhelminthes							1						
Ceratopogonidae													
Culicidae													
Tabanidae													
Lepidoptera													
Others	2					1							
Substrata	Boulder Cobble	Boulder Cobble	Boulder Cobble	Gravel Cobble	Boulder Cobble	Boulder Cobble	Boulder Cobble	Gravel Cobble	Boulder Cobble	Boulder Cobble	Boulder Cobble	Boulder Cobble	Boulder Cobble
Number of Organisms	26	35.28	6	14	28	89	16	8	89	19	12	8	101
Number of Taxa	7	3	3	4	9	15	5	4	17	9	5	4	13
Density (n/m2)	280	380	65	151	301	89	172	86	89	204	129	86	1087