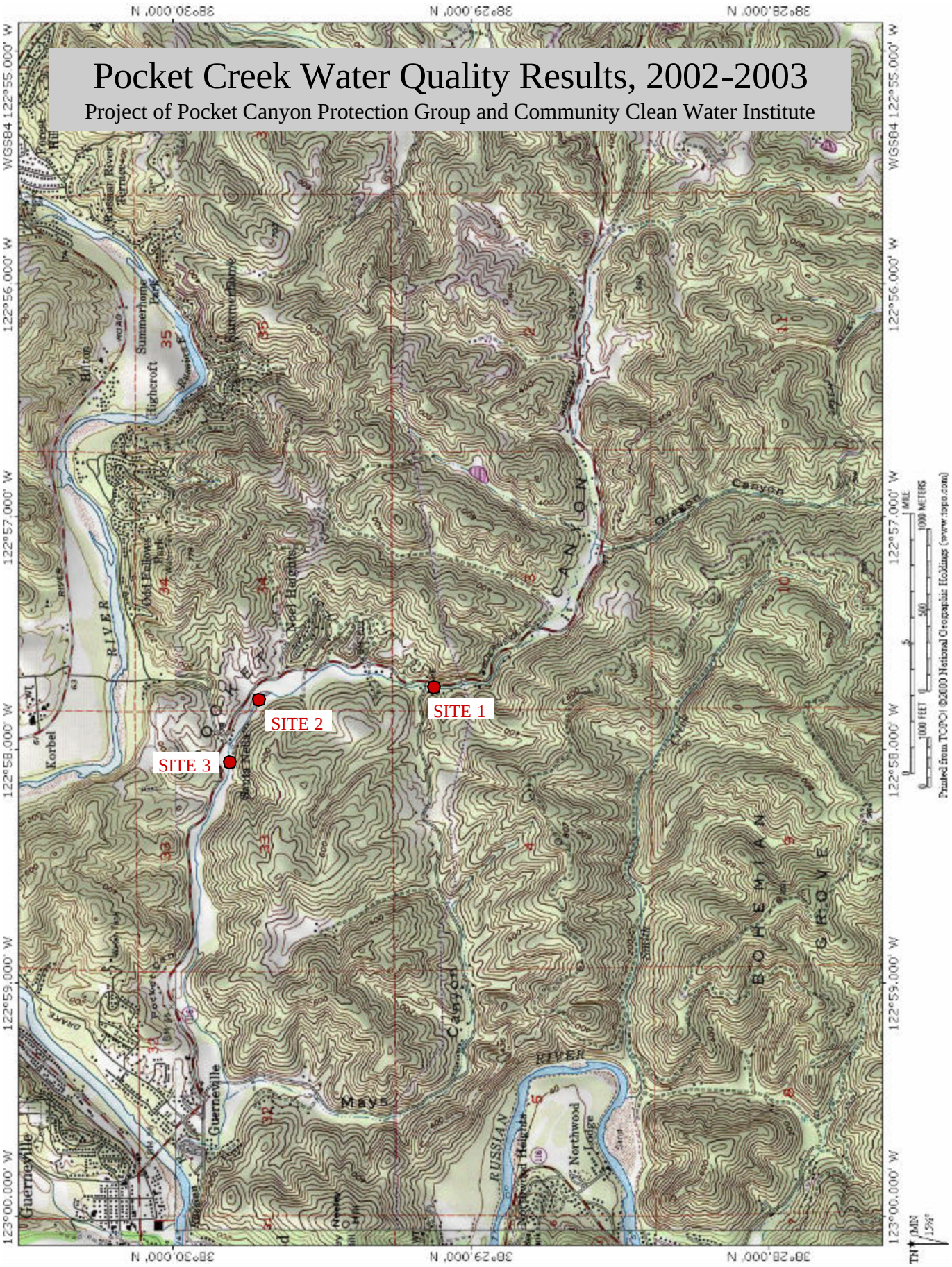
Pocket Creek Water Quality Results, 2002-2003

Project of Pocket Canyon Protection Group and Community Clean Water Institute



Pocket Creek Data Summary Report: 5/02 to 5/03

Community Clean Water Institute P.O. Box 1082 Occidental, CA 95465 www.ccwi.org

Overview: Pocket Creek is a cold water tributary to the Russian River, running along HWY 116 west to Guerneville. It represents a single body sub-watershed where Salmonids have been sighted. Land uses include single family dwellings, mixed second growth redwood forest, and vineyards. Threats include siltation from roads, development, and timber harvest, subsurface wells, and pollution from vineyards and septic systems.

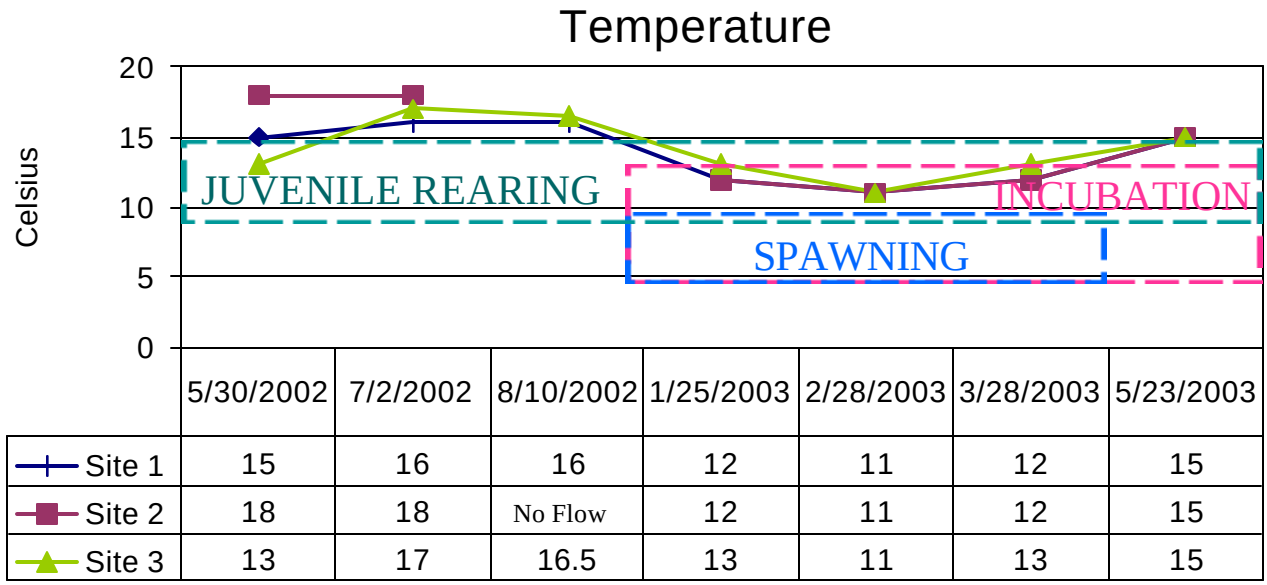
Sampling Conditions

DATE	TIME	WEATHER
5/30/02	12:30-2:10	Sunny
7/2/02	12:00-1:20	Sunny
8/10/02	12:00-12:30	Sunny
1/25/02	11:00-11:50	Overcast, recent rain
2/28/03	2:00-3:30	Partly cloudy, recent rain
3/28/03	10:45-12:20	Sunny
5/23/03	11:35-12:10	Sunny, recent rain

Pocket Creek ran dry after the August testing, and did not begin to flow again until late November.

CCWI and several volunteers from Pocket Canyon Protection Group began testing Pocket Creek for water quality in May of 2002. Turbidity, pH, dissolved oxygen, conductivity, temperature, nitrate-nitrogen and orthophosphate testing was preformed on a monthly basis, and less frequently flow.

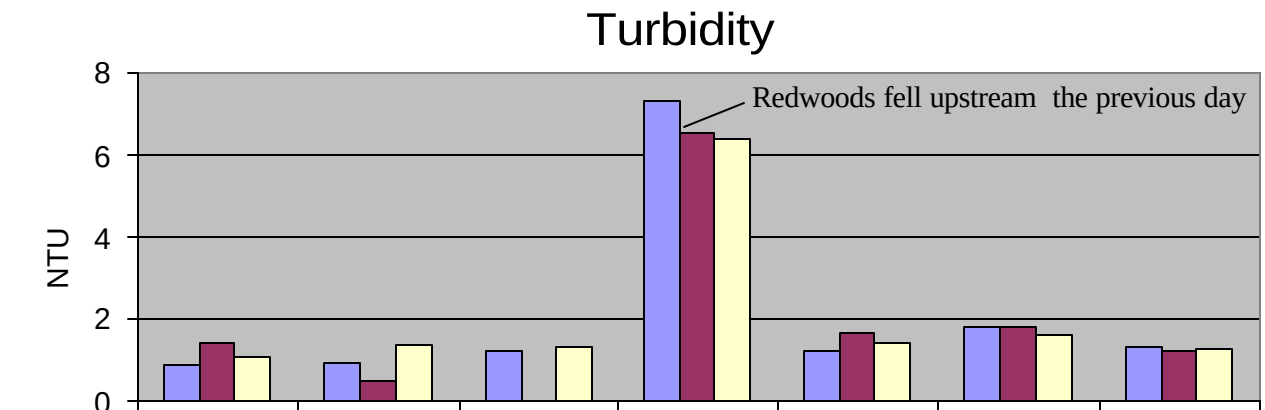
From one year of data, it appears that Pocket Creek is a stable, clean stream, capable of supporting salmonids during most of their lifecycle. Most parameters are extremely consistent throughout the year, giving the measurements added validity and characterizing the stream as healthy. Limitations Pocket Creek encounters are slightly elevated winter temperatures, and water scarcity. Summering salmonid juveniles would have to leave the system in late summer as it dries up, and occasional winter afternoon temperatures may stress embryos, but not cause significant mortality.



	5/30/2002	7/2/2002	8/10/2002	1/25/2003	2/28/2003	3/28/2003	5/23/2003
Site 1	15	16	16	12	11	12	15
Site 2	18	18	No Flow	12	11	12	15
Site 3	13	17	16.5	13	11	13	15

Instrument: bulb thermometer

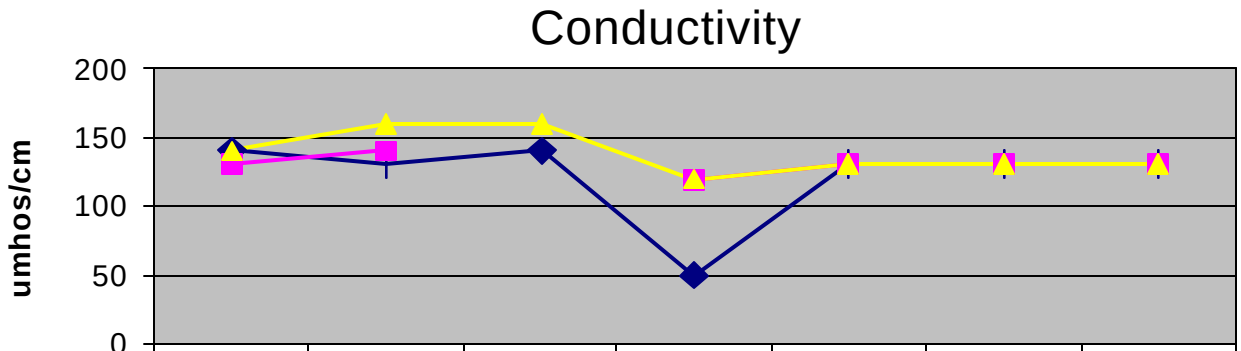
Pocket Creek temperatures are generally on target for the Russian River system. Since they were usually measured during the warmer parts of the day, they represent the extreme of the day. Also, the sites were not chosen for Salmonid habitat, so may not represent the deep, cool pools or optimum spawning spots. From November through April, temperatures above 13º C begin to cause significant mortality to salmonid embryos. Temperatures of 19º C begin to stress and inhibit growth in adults and juveniles, and at 24-25 º C, they must migrate to avoid death.



	5/30/2002	7/2/2002	8/10/2002	1/25/2003	2/28/2003	3/28/2003	5/23/2003
Site 1	0.86	0.91	1.24	7.3	1.24	1.8	1.33
Site 2	1.41	0.49	No Flow	6.54	1.64	1.83	1.25
Site 3	1.11	1.38	1.34	6.38	1.43	1.6	1.28

Hach 2100P Turbidimeter

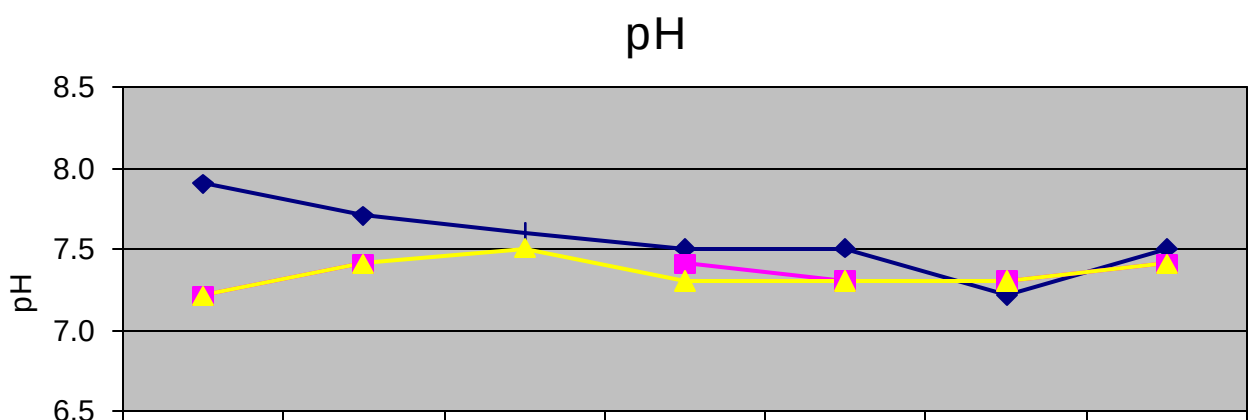
Pocket Creek has no problems with Turbidity from looking at these numbers. It is important to note that storm events were not targeted, so peak numbers were not captured. However, samples taken in January, February, and May of this year experienced recent rain, and still show remarkably low turbidity. Summer turbidity represents background levels, which here are low and healthy, even for drinking water. Salmon begin to experience ill effects at frequent levels above 10 NTU, so the turbidity doesn't appear to impair fisheries in Pocket Creek.



	5/30/2002	7/2/2002	8/10/2002	1/25/2003	2/28/2003	3/28/2003	5/23/2003
Site 1	140	130	140	50	130	130	130
Site 2	130	140	No Flow	120	130	130	130
Site 3	140	160	160	120	130	130	130

Oakton ECTestr low

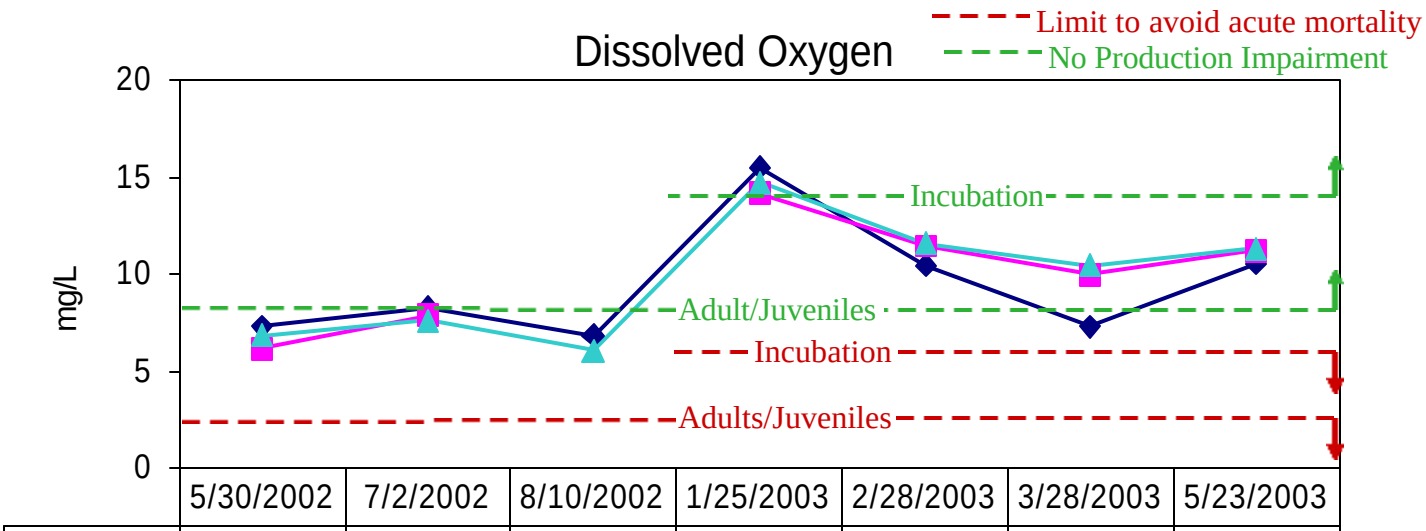
Conductivity, the measure of ions, (or salts), on Pocket Creek is consistently low all year round, indicating a healthy system. General guidelines say 100 to 500umhos/cm are best for good mixed fisheries. High temperature, clay soils, nutrients and runoff, wastewater, and agricultural runoff increase conductivity to unhealthy levels. In the winter the numbers drop slightly from dilution, especially during storm events. The extremely low outlier at site 1 in January may be natural, an operation error, or oil runoff from the road directly adjacent to the stream there. The consistency of the numbers through time and across sites is highly valuable in years to come as an excellent baseline signifier.



	5/30/2002	7/2/2002	8/10/2002	1/25/2003	2/28/2003	3/28/2003	5/23/2003
Site 1	7.9	7.7	7.6	7.5	7.5	7.2	7.5
Site 2	7.2	7.4	No Flow	7.400	7.300	7.300	7.400
Site 3	7.2	7.4	7.5	7.3	7.3	7.3	7.4

Oakton Double Junction pH testr

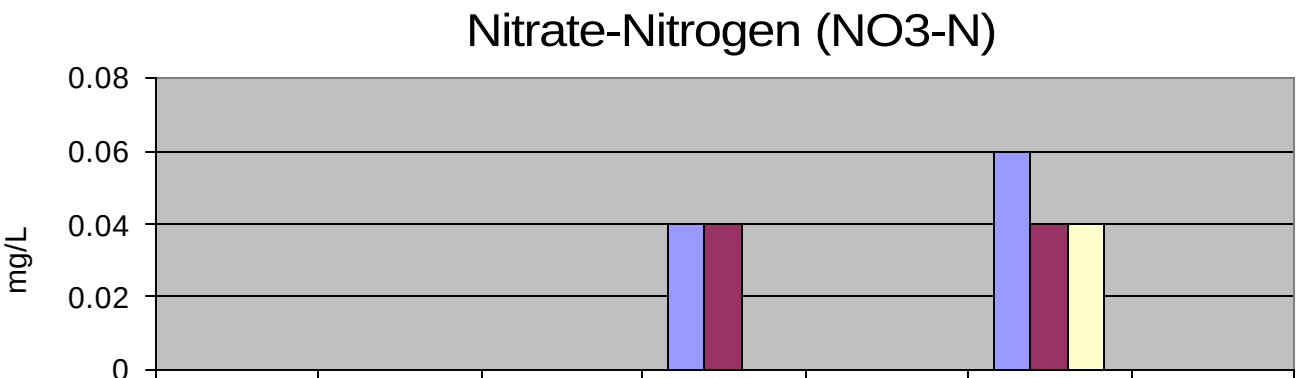
pH for most aquatic life should lie between 6.5 and 8.5. Pocket Creek has normal ranges. pH is lowered by rainwater and redwood needles, and raised by serpentine soils and algae growth. There could be numerous factors contributing to the pH balance of this stream, so a change in algae growth or soil and woody debris input may affect it.



	5/30/2002	7/2/2002	8/10/2002	1/25/2003	2/28/2003	3/28/2003	5/23/2003
Site 1	7.3	8.3	6.8	15.5	10.5	7.3	10.6
Site 2	6.2	7.9	No Flow	14.2	11.5	10	11.2
Site 3	6.9	7.6	6.1	14.7	11.6	10.5	11.3

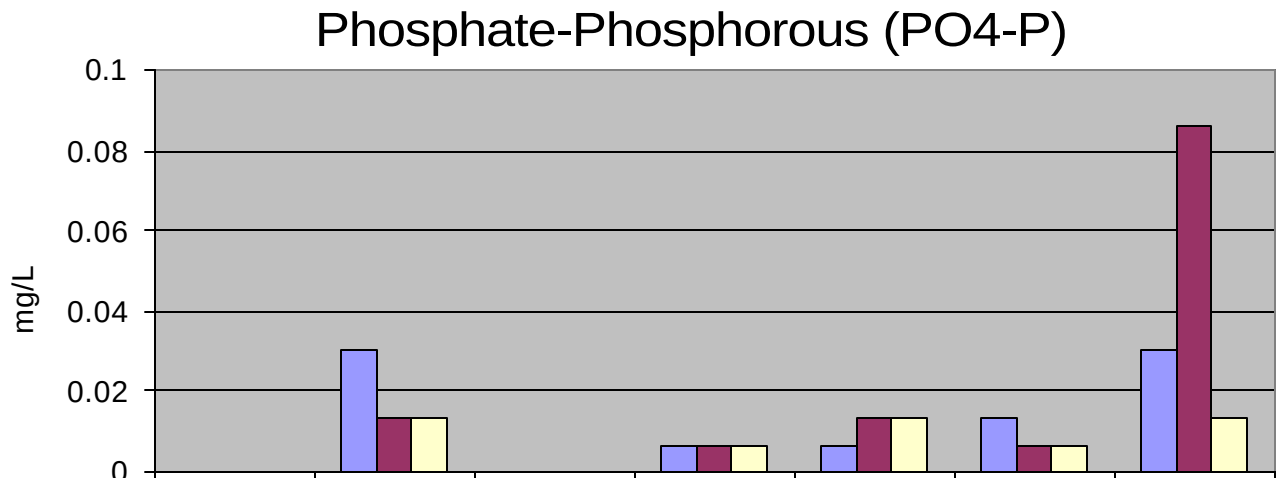
ICM Portable Dissolved Oxygen Meter

The SWRCB sets general guidelines for dissolved oxygen between 6 and 8mg/L minimum. Pocket Creek was always at least 6mg/L, although the levels were not always at optimum for Salmonid preferences. However, during the critical times for each lifecycle, dissolved oxygen was above acute mortality levels. No impairment occurs at levels above 8mg/L for adults and juveniles, and 11mg/L for incubating stages. Note that dissolved oxygen levels are at their highest in late afternoon and lowest at dawn, so these numbers do not represent the lowest oxygen within a 24 hour period. Also, the sites were not chosen on Salmonid habitat value, and do not represent the entire stream. Although these numbers are encouraging, the creek dried up for a considerable period of time in late summer and fall. These dry months would not support any aquatic life, forcing rearing fish to migrate elsewhere.



	5/30/2002	7/2/2002	8/10/2002	1/25/2003	2/28/2003	3/28/2003	5/23/2003
Site 1	NO DATA	0	NO DATA	0.04	0	0.06	0
Site 2		0		0.04	0	0.04	0
Site 3		0		0	0	0.04	0

Instrument: Nitrate-Nitrogen Test Kit Hach. Colorimeter/Cadmium Reduction



	5/30/2002	7/2/2002	8/10/2002	1/25/2003	2/28/2003	3/28/2003	5/23/2003
Site 1	NO DATA	0.03	NO DATA	0.0067	0.0067	0.013	0.03
Site 2		0.013		0.0067	0.013	0.0067	0.086
Site 3		0.013		0.0067	0.013	0.0067	0.013

Instrument: Orthophosphate, Total Phosphate Test Kit Hach Model PO-24. Colorimeter/Ascorbic Acid

The USEPA makes a general phosphate recommendation for streams of below 0.1mg/L, and below 1mg/L for Nitrate. Nutrients enter streams through natural erosion, groundwater, decaying matter, wastewater, household and industrial cleaning products, and animal waste. Organic pesticides and fertilizers also manifest as phosphate in streams. Phosphate is the limiting factor for growth in the stream, because it is much scarcer than other nutrients like potassium and nitrogen. Therefore, phosphorus availability dictates the amount of biological growth . If a natural stream receives a large dose of phosphorus, harmful algae blooms will likely occur. While too little nutrients leads to decreased production, too much leads to over production and eutrophication. Nitrate is toxic to infants and pregnant women and cause miscarriages in animals. Phosphate is not directly toxic to organisms, but can indirectly devastate a stream ecosystem.

Pocket Creek's nutrient levels are great, very low and consistent. This indicates little excess of decaying matter, and no indication of septic leaks or erosion. There is an outlier on 5/23/03 for phosphate. It would be cause for concern if the one-time spike were to become a pattern.