Stevens and Permanente Creeks Watershed Council
Volunteer Monitoring and Outreach Program
End of Year Report, Fall 2005

1. Introduction
The Stevens and Permanente Creeks Watershed Council (SPCWC) initiated a Volunteer Monitoring and Outreach Program (VMOP) in 2004, thanks to funding from a Supplemental Environmental Project proposed by the Palo Alto Regional Water Quality Control Plant. This report presents the results of the first year of monitoring conducted from September 2004 through August, 2005.

The headwaters of Stevens Creek are in the Santa Cruz Mountains in Monte Bello Open Space Preserve. The creek contains wooded riparian habitat that benefits a remnant run of Steelhead Trout. The Santa Clara Valley Water Conservation District built a dam on Stevens Creek in 1935 creating Stevens Creek Reservoir. Stevens Creek discharges into South San Francisco Bay next to Moffett Field in Mountain View, through Whisman slough.

The SPCWC is a collection of community residents, city representatives, agency officials, scientists, environmental advocates, and other interested stakeholders with a common vision for a better watershed. The goals of this pilot program are to educate the community about the health of the creek, promote stewardship of the watershed, and to produce data useful for assessing current creek conditions and directing efforts to prevent pollution and protect and restore the habitat value of the watershed.

The RWQCB's Surface Water Ambient Monitoring Program (SWAMP) monitored Stevens creek in 2001 and 2002. In order to relate new data collected to these baseline data, three of the monitoring locations and all of the parameters selected for this volunteer monitoring program are a subset of those selected by the SWAMP.

Thanks to funding from the National Fish and Wildlife Foundation, SPCWC is expanding the program to include additional monitoring locations and parameters and two more years of data collection.

2. Planning and Preparation
To prepare for implementation of the VMOP, the following activities were carried out:

- The VMOP coordinator attended two training events: the Clean Water Team's "Collecting Good Water Quality Data" and "Train the Trainer: Citizen Monitoring" courses offered through the East Bay Watershed Center at Merritt College.
- A Monitoring Plan and Quality Assurance Project Plan (QAPP) were drafted.
- A Manual was compiled for volunteers, including
  - a modified monitoring plan,
  - an excerpt from the QAPP,
  - a map,

- creek safety guidelines,
- calibration and data collection standard operating procedures and data sheets, and
- fact sheets on good quality data and on each parameter in the plan.

- Volunteers were recruited, and
- A successful training event was held and attended by twelve prospective volunteers.

3. Monitoring Activities

Volunteers monitored the creek 19 times between the middle of September 2004 and the end of August, 2005. Eight volunteers participated in at least three events and a few participated several times. VMOP volunteers have volunteered over 200 hours to date including about 50 hours in training and 150 hours monitoring.

Figure 1. Calibration of Meter

The VMOP coordinator assisted with the calibration and monitoring until the volunteers felt confident using the equipment. Changes were made as experience was gained during the first monitoring events. These changes included simplifying the calibration process and slight changes in monitoring locations. Changes to monitoring locations were made after the Santa Clara Valley Water District (SCVWD) altered the stream channel at La Avenida, and also to make access easier at Chestnut Picnic area.

The meters are calibrated before each monitoring event. Calibration data were recorded for calculating the accuracy of our measurements. Monitoring includes recording visual observations and meter readings at each of four locations in the watershed. Our multi-probe meter (YSI 556 MPS) has four probes within one module that analyzes directly in the stream: dissolved oxygen (DO), temperature, pH, and specific conductance. The readings on the YSI meter are also logged on the meter for each station. Beginning in December, grab samples were collected with a bailer, and analyzed using a portable turbidity meter (HF Scientific DRT-15CE) provided by the SCVWD. Repeated measurements were recorded at each station to evaluate precision.

4. Monitoring Locations

Sampling sites are indicated on the attached map. The following criteria were evaluated when choosing sampling locations:

- safe access,
- permission to cross private property,
- samples can be taken in main river current or where homogeneous mixing of water through the cross section of the channel occurs,
- samples can be obtained that represent the part of the water body of interest,

- location complements or supplements historic data,
- location represents an area that possesses unique value for fish and wildlife or for recreational use
- location represents water flowing from the various types of land uses that may affect water quality.

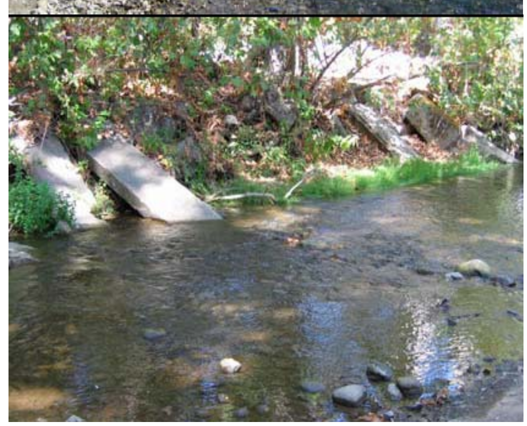
Figure 2 Volunteers Monitoring at Moss Rock

Three of the initial monitoring sites were chosen from those previously selected by the RWQCB's SWAMP. This will allow the data collected by volunteers to be compared with the SWAMP baseline data. A fourth site is at McClellan Ranch, a Cupertino-owned park where each year thousands of elementary students participate in creek education programs and high school students conduct field studies.

From the Baylands to the headwaters the four sites are:

1. La Aveninda: where the creek passes the end of La Avenida between Highway 101 and the Bay (SWAMP site number STE 020):. The coordinates for this site are latitude 37.41279 and longitude -122.06874. This site represents the slower moving waters near the bay, and will detect pollutant sources in the urban area of the watershed.

2. McClellan Ranch: the coordinates for this site are latitude 37.31307 and longitude 122.06397. This site is above most of the urban area, but downstream from Deep Cliff Golf Course.



3. Chestnut Picnic Area: below Steven's Creek Reservoir, near the USGS and SCVWD Gauging Station (SWAMP site number STE 070). The coordinates for this site are latitude 37.30320 and longitude -122.074564. This site represents the conditions in the creek below the Reservoir. It also is below the tributaries that drain a nearby quarry. One of these tributaries, Swiss Creek, flows into the reservoir. The other is an unnamed tributary that flows into Stevens Creek between the dam and Chestnut.

4. Moss Rock: off Stevens Canyon Road, approximately one mile upstream from where it meets Mt. Eden Rd (SWAMP site number STE 100). The coordinates for this site are latitude 37.27226 and longitude -122.08291. This site is representative of the creek in the upper watershed above the reservoir.

Additional sites will be added as resources allow. Their locations will be prioritized based on whether they have been monitored by the SWAMP program and/or their ability to detect pollutant sources (e.g., above and below stormwater outfalls or land uses that may contribute non-point source pollutants.) Other criteria will be considered such as safety and accessibility.

4. Data Management

The data logged in the YSI meter were downloaded and stored in an excel file. The calibration data, visual observations, readings and repeated readings were entered into an excel spreadsheet provided by the Regional Water Quality Control Board's Clean Water Team. This spreadsheet allows for calculation of accuracy and precision based on the replicate measurements and calibration data.

5. Data Quality

Our efforts to ensure good quality data included one-on-one training of volunteers, frequent and careful calibration of our instruments, and duplicate measurements at all stations. Inaccuracy (how far the data are from "true values") was calculated as the difference between the value of a known standard and the result obtained when analyzing that standard. The imprecision (how reproducible the data are) was calculated as both the deviation (the difference between the two repeated measured values) and percent imprecision (the difference between the first value and the average of the two values, divided by the average, multiplied by one hundred.)

The measured inaccuracy, imprecision, and tolerable error are listed for each parameter in Table 1. We obtained a tolerable error for each parameter from a paper by Revital Katznelson[1] (currently of the SWRCB Clean Water Team). In this paper, tolerable error is based on the ecological or physiological significance of the data as explained in the table's footnotes. The accuracy and precision of our data compare favorably with "tolerable error." As can be seen in the table below, both the imprecision and inaccuracy measured for our data are within that considered tolerable even when the measured values are close to being limiting for aquatic life.

Table 1. Data Quality

Characteristic (Parameter)	Units	Measured Inaccuracy Expressed as value and or percent	Measured Imprecision (deviation and percent imprecision)	Tolerable Error Based on ecological or physiological significance (Katznelson)
Specific Conductance	µS/cm	+/-15µS/cm +/-1.95%	+/-2µS/cm +/-0.4%	+/-30%
Dissolved Oxygen	mg/l	+/-6.90% relative saturation	+/-0.2 mg/l +/-1.29%	+/- 0.4 mg/l in range 4-7 +/- 1 from 0-3 and 8-12 mg/l (1)
pH	pH units	0.2 units (4) +/-3%	+/-0.2 units +/-6%	pH: +/-0.5 pH units from pH ranges 1-6, 7-8, and 9-14 pH +/- 0.3 in the ranges of 6-7 and 8-9 (2)
Turbidity	NTU	ND	+/-4NTU +/-8.33%	50% (3)
Temperature	°C	ND	+/-0.1 °C +/-0.33%	+/- 0.5

(1) where values are inadequate to support life or "physiologically comfortable" a higher error is tolerable. When the value is close to limiting, the tolerable error is less.
(2) in "uncomfortable zones" of pH, the tolerable error is less.
(3) high tolerable error, because once water becomes turbid, the impact on aquatic life is not from the amount of turbidity, but how long it lasts

[1] Revital Katznelson, Ph.D *Tailoring of Data Quality Objectives to Specific Monitoring Questions*

6. Results

6.1 Water Temperature

6.1.1 Temperature Impacts and Limits:

- The Regional Board's Basin Plan does not specify a numeric limit for temperature, but instead states temperatures "shall not be altered unless …alteration in temperature does not adversely affect beneficial uses". The Basin Plan also states "the temperature of any freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature."
- EPA's Draft Volunteer Stream Monitoring Manual suggests:
    - 24 °C (75 °F) as a maximum for Rainbow trout survival,
    - 19 °C (66 °F) as a maximum for growth of trout,
    - 9 °C (48 °F) for spawning and
    - 13 °C (55 °F) for embryo survival.
- Increased temperatures can make fish more susceptible to disease, reduce fish growth efficiency, and reduce the amount of dissolved oxygen available for aquatic life. Higher than normal temperatures in a stream can result in selection of heat-tolerant species.

6.1.2 Temperature Findings

- Seasonal and spatial variations in recorded temperatures are shown in Figure 1. a. Draft diurnal temperatures data, recorded by the state Surface Water Ambient Monitoring Program (SWAMP) for three days in the fall of 2002 are shown in Figure 1. c.
- A "Fisheries and Aquatic Habitat Collaborative Effort" resulting from a Guadalupe Coyote Resource Conservation District complaint against the SCVWD, has designated a several mile long stretch below the dam as a "cold water management zone." The SCVWD goal is to insure that the temperature in this stretch is maintained below 19 °C.
    - Draft SWAMP data from the late summer of 2002 and data collected by the SCVWD in the summer and fall of 2000 show that in this cold-water zone, temperatures rarely exceeded 22°C. This is above the 19 °C goal, to ensure trout growth, but not above the 24°C limit for trout survival.
    - Our summer and fall temperature data were never above 19 °C, however they were generally collected before late afternoon when temperatures are highest.
    - In the spring when Steelhead trout are expected to spawn in this stretch, our data show the temperatures to be above the 9°C limit for spawning

and even above the 13°C limit for embryo survival (the average of four April measurements made at Chestnut and McClellan was 15 °C.)

- Summer temperatures reached 18.9 °C in July at La Avenida. This measurement was made at 9 AM. When the SWAMP continuously monitored temperature on June 23, 2003, the temperature at 9AM was 18.3 °C. By 4:45PM that day the temperature had risen to 25.3 °C. So it is likely that the water temperature at La Avenida reached 25 °C this year on July afternoons. This exceeds the maximum recommended temperature for Rainbow trout survival.
- Not surprisingly, temperatures were usually lowest at the station highest in the watershed (Moss Rock) and usually highest at the station closest to the Bay (La Avenida).
- The difference between upper and lower watershed temperatures was the greatest in the fall when the water at Moss Rock was 9 °C cooler than at La Avenida.
- Stevens Creek Reservoir acts as a reservoir of heat as well as water. Through most of the year, the water temperature below the dam at Chestnut was warmer than at Moss Rock : 5 °C warmer in the spring, and 5-7 °C warmer in the fall. In the fall and winter, the water at Chestnut was even warmer than the next station downstream (McClellan.) However, in the late summer the reservoir kept the water at Chestnut 2-3 °C cooler then at Moss Rock.

6. 2 Dissolved Oxygen

6.2.1 Dissolved Oxygen Limits and Affects:

- The Regional Board's Basin Plan specifies a minimum dissolved oxygen for warm water habitat of 5.0 mg/l and for cold water habitat of 7.0 mg/l.
- Although 5-7 mg/l are considered goals for protecting aquatic life, it is optimal for DO to be above 8 mg/l to protect more sensitive species.
- DO levels vary throughout the day (see Figure 1. c. based on Draft SWAMP data.) During the day, photosynthesizing algae and other submerged plants create oxygen. These plants, bacteria and aquatic animals use up oxygen when they respire, so at night there is a net depletion of DO.
- DO levels vary seasonally (see Figure 1. b.) When the water is cooler in the winter, it can hold significantly more dissolved oxygen.
- DO levels vary spatially. Oxygen mixes into the water more readily in the riffles and runs where the water is moving. In deep pools, oxygen can be depleted faster than it is supplied by diffusion and mixing.

Figure 1. a. Temperature at all Stations

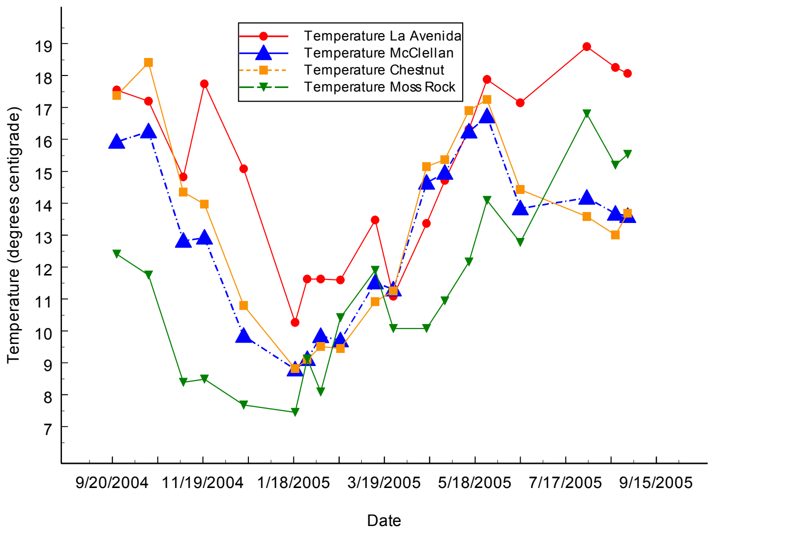


Figure 1. c. SWAMP Continuous Dissolved Oxygen Data

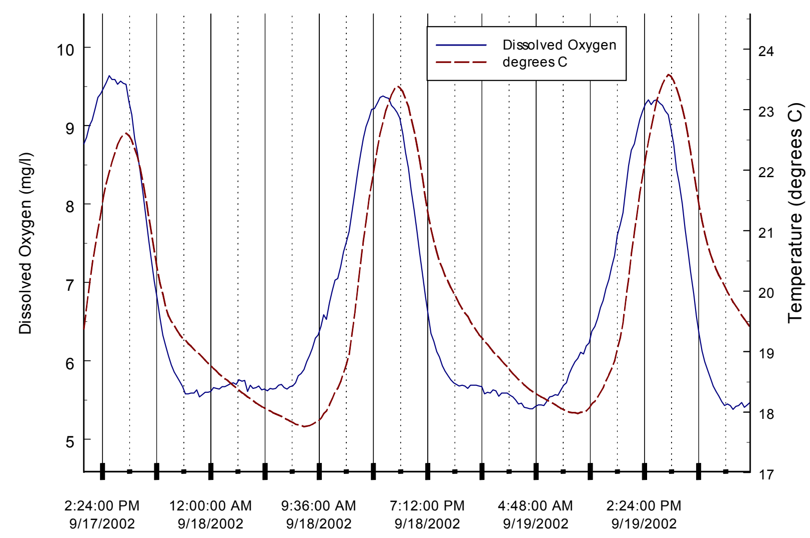


Figure 1. b. Dissolved Oxygen at all Stations

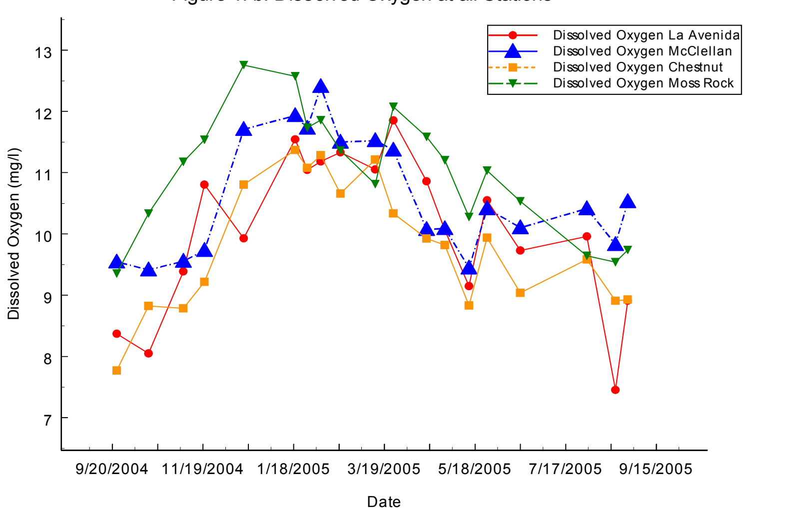
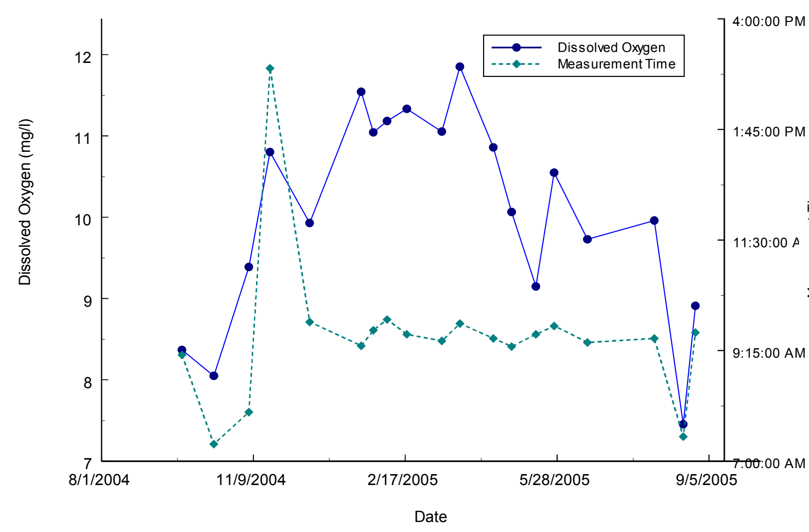


Figure 1. d. Dissolved Oxygen versus Measurement Time at La Avenida



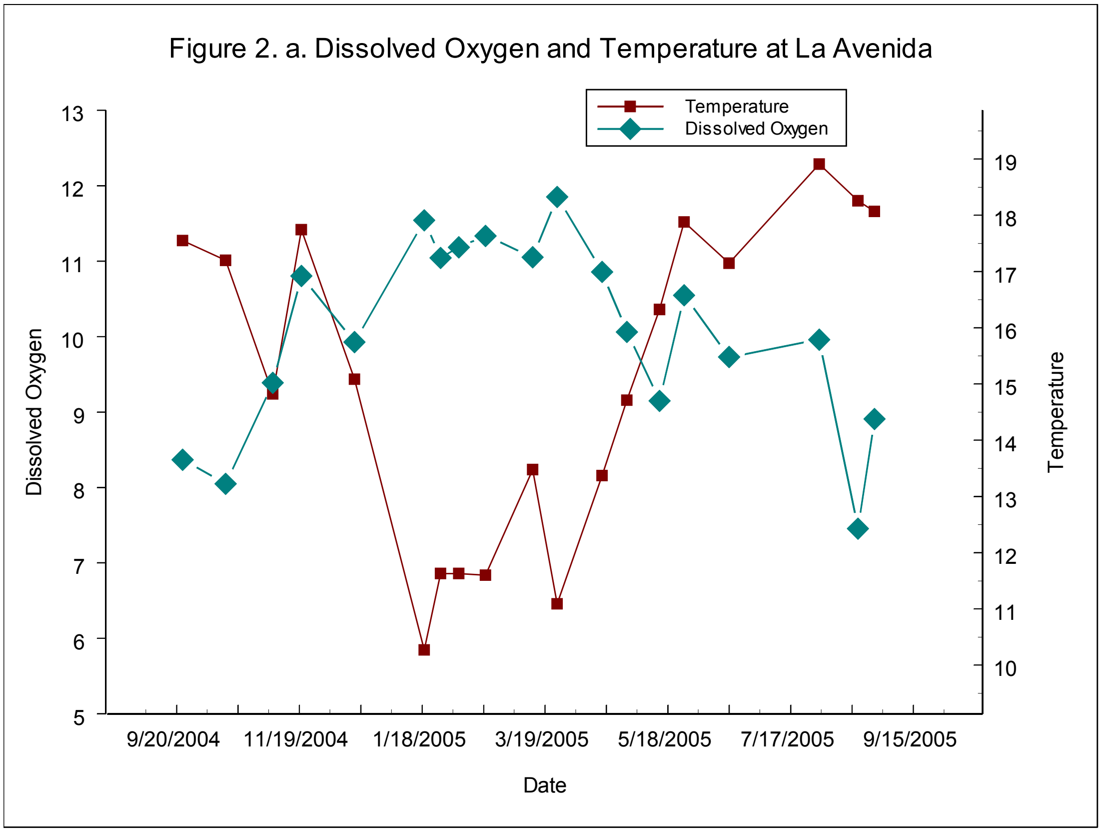


Figure 2. a. Dissolved Oxygen and Temperature at La Avenida
Temperature
Dissolved Oxygen
Dissolved Oxygen
Temperature
Date
9/20/2004
11/19/2004
1/18/2005
3/19/2005
5/18/2005
7/17/2005
9/15/2005

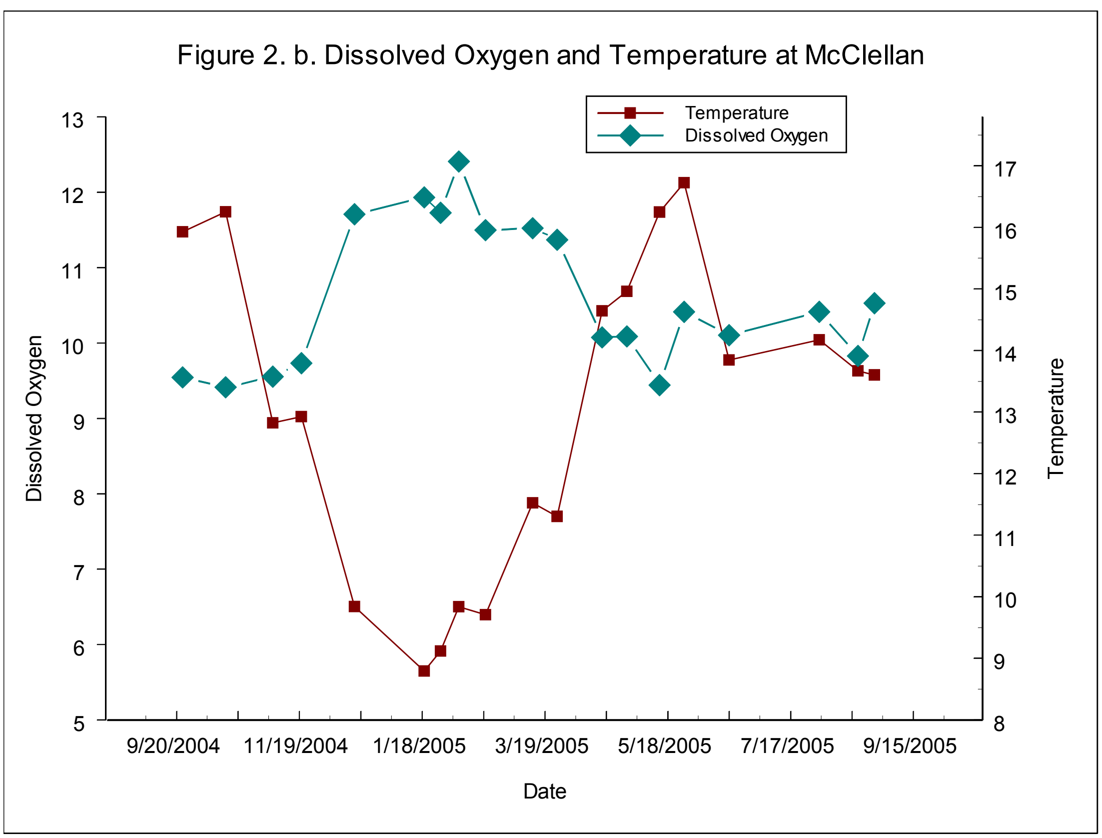


Figure 2. b. Dissolved Oxygen and Temperature at McClellan
Temperature
Dissolved Oxygen
Dissolved Oxygen
Temperature
Date
9/20/2004
11/19/2004
1/18/2005
3/19/2005
5/18/2005
7/17/2005
9/15/2005

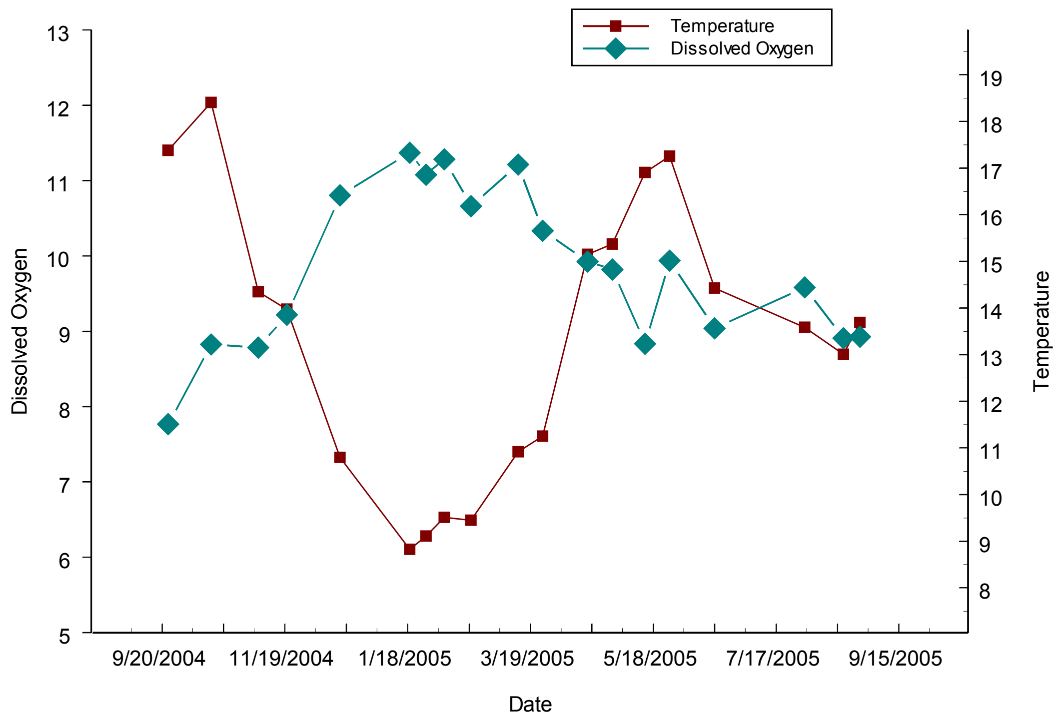


Figure 2. c. Dissolved Oxygen and Temperature at Chestnut

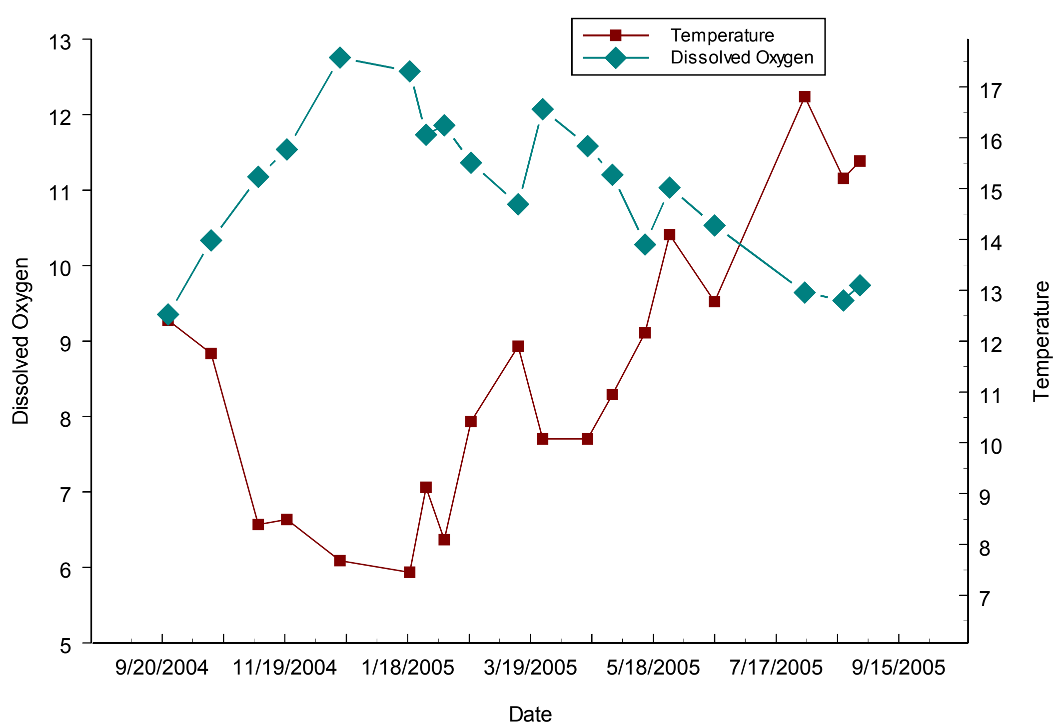


Figure 2. d. Dissolved Oxygen and Temperature at Moss Rock

6.2.2 Dissolved Oxygen Findings

- Figures 2. a. through d. show dissolved oxygen and temperature at all four monitoring stations. It is clear from these charts that seasonal dissolved oxygen concentration is inversely proportional to the temperature.
- When SWAMP collected continuous DO data in the late summer of 2002, the DO dipped just below 5 mg/l in the early morning. Our DO readings never dropped below 7 mg/l. There are insufficient data to determine if this represents an improvement in available oxygen, but it is encouraging.
- In late summer 2004 and 2005, we recorded the dissolved oxygen concentration at La Avenida at 7AM in order to determine if DO is limiting in the early morning before photosynthesis begins. Otherwise, most data were collected late morning. From Figure 1. d. showing the values for DO compared to the time the measurements were made, it is clear that the lowest DO was found in the early morning.
- All of the monitoring stations are at stretches of the creek that might be classified as “runs.” The velocity of the stream was lowest in the summer at La Avenida, but not slow enough to be considered a pool. In the next year of sampling, we will monitor pools in the early morning to determine if the DO concentration may be limiting.
- The lowest readings for DO were at Chestnut and at La Avenida. These two stations likely have more organic material exerting an oxygen demand. At Chestnut, there was probably more phytoplankton from the reservoir, and at La Avenida there was more visible algae growing on the stream bottom, probably due to sun exposure and warmer water. These locations also have slower moving water than at McClellan and Moss Rock, resulting in less turbulence and less oxygenation of the water.
- Highest dissolved oxygen readings were always found at Moss Rock with an average reading of 11.4 mg/l.

6.3 pH

6.3.1 pH Limits and Affects:

- The Basin Plan states “the pH shall not be depressed below 6.5 nor raised above 8.5…Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.”
- Low pH water is acidic and high pH water is basic. Many organisms can survive a larger range than 6.5-8.5 in pH, but this range is an objective in order to be protective of a wide variety of organisms. At low pH, ammonia is more toxic to fish and heavy metals are more soluble. Both very low and high pH can damage fish gills and other sensitive tissues.

- Values for pH change throughout the day, in part due to photosynthesis removing carbon dioxide from the water during the daylight hours and respiration increasing carbon dioxide concentrations during the nighttime.
- The pH can also vary depending on the geology of the tributary streams due to the buffering capacity of the inorganic material contributed to the water.

6.3.2 pH Findings:

- Values for pH are graphed in Figures 3. a. through 3. d.
- pH averages about 8 throughout the watershed, with readings slightly above 8 in the upper watershed and slightly below 8 nearer the Bay.
- The pH only once exceeded the upper pH objective of 8.5, but only by 0.1 pH unit, less than the expected error of +/- 0.2 pH units.
- There appears to be no correlation between pH and specific conductance (see below.)

6.4 Specific Conductance

6.4.1 Specific Conductance Limits and Affects:

- Specific conductance is a measure of how easily electric current passes through water. Electrical current passes more easily through waters with higher concentrations of negatively and positively charged ions, like chloride, nitrates, sodium, potassium, etc. A current also passes more quickly when the temperature increases. Specific conductance is the conductivity of the water adjusted to what the value would be if measured in 25 °C water ensuring that the values are comparable from one season to the next as the temperature rises and falls.
- Higher specific conductivity may be a result of naturally occurring ions or might be from human generated pollutants (agricultural waste, fertilizers, sewage, etc.)
- The Regional Board's Basin Plan specifies "controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat."

6.4.2 Specific Conductance Findings

- Specific conductance results are shown in figures 3.a. through 4. b. Specific conductance is always much higher at La Avenida than at the upstream sites: average 794 µS/cm vs. an average of about 460 µS/cm at both McClellan and Chestnut. Moss Rock usually has a slightly higher conductivity than the two middle sites with an average reading of 515 µS/cm.

- The range in specific conductance is largest near the Bay at La Avenida (232 to 1042 μS/cm) and next largest above the reservoir at Moss Rock (282-652 μS/cm.) At both McClellan and Chestnut the range is much smaller, about 410 to 430 μS/cm. This may be due to the equalizing affect of the reservoir.

Figure 3. a. Specific Conductance and pH at La Avenida

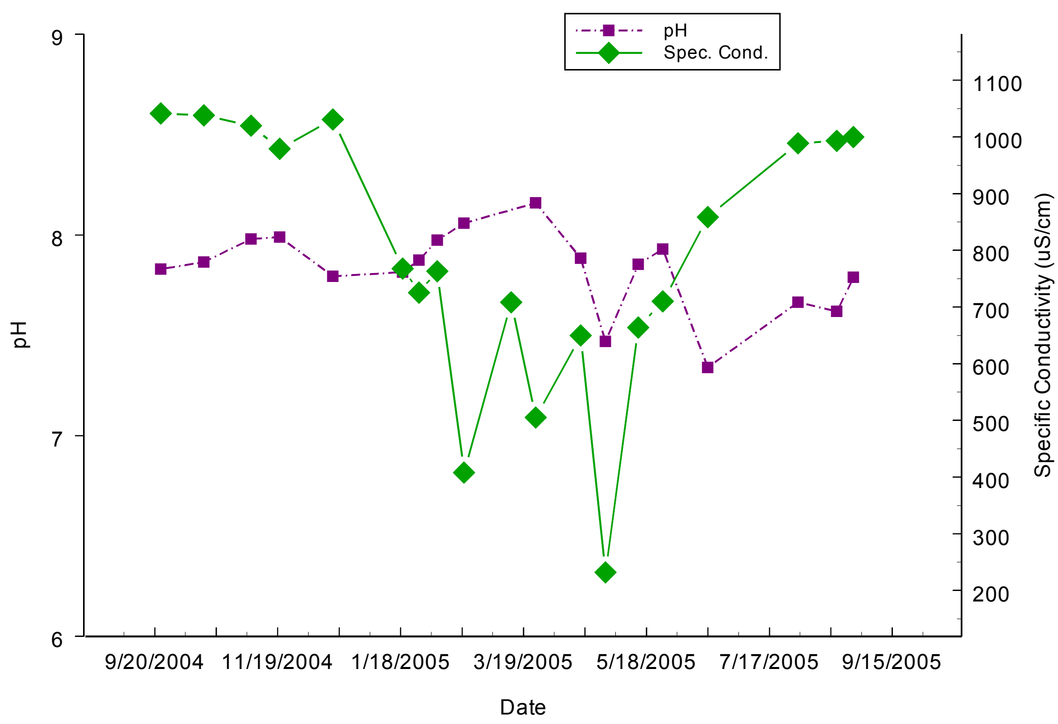
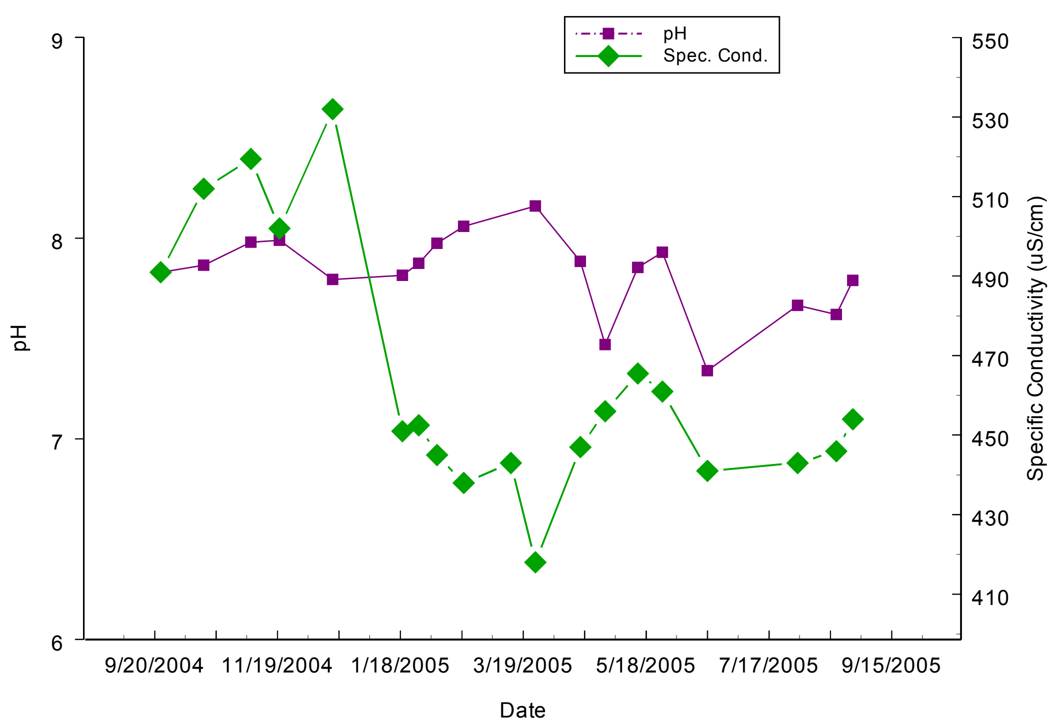


Figure 3. b. Specific Conductance and pH at McClellan



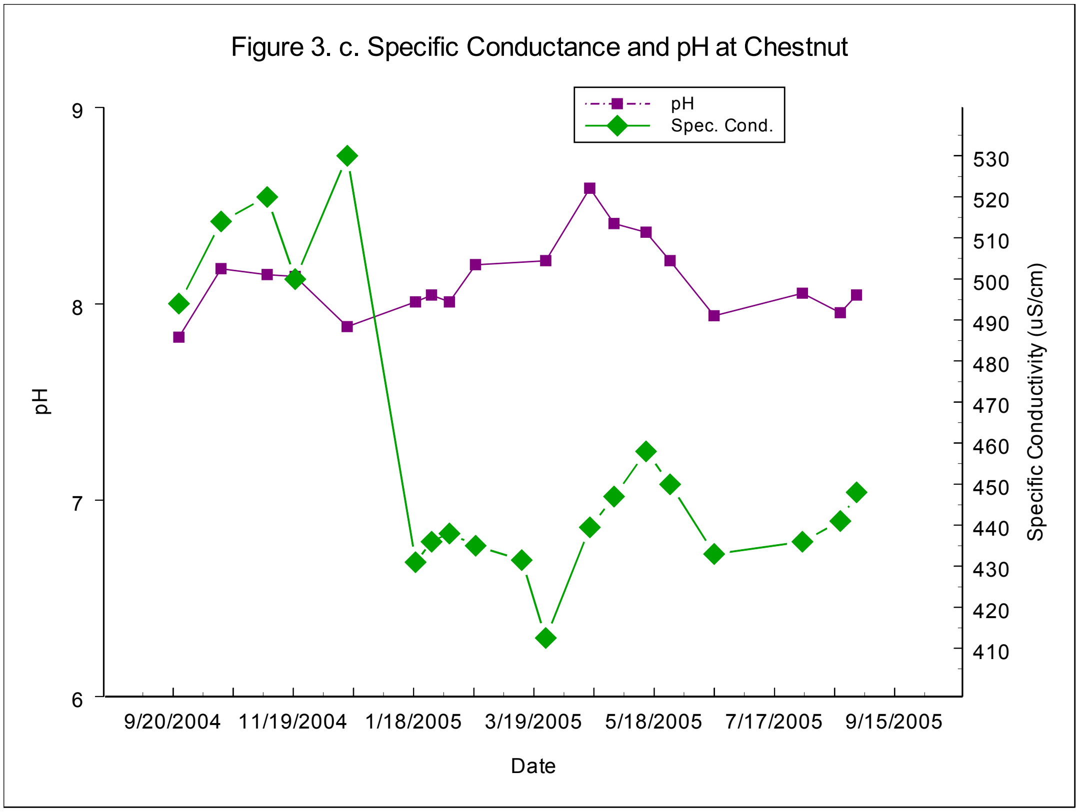


Figure 3. c. Specific Conductance and pH at Chestnut
pH
Spec. Cond.
9
8
7
6
530
520
510
500
490
480
470
460
450
440
430
420
410
pH
Specific Conductivity (uS/cm)
9/20/2004
11/19/2004
1/18/2005
3/19/2005
5/18/2005
7/17/2005
9/15/2005
Date

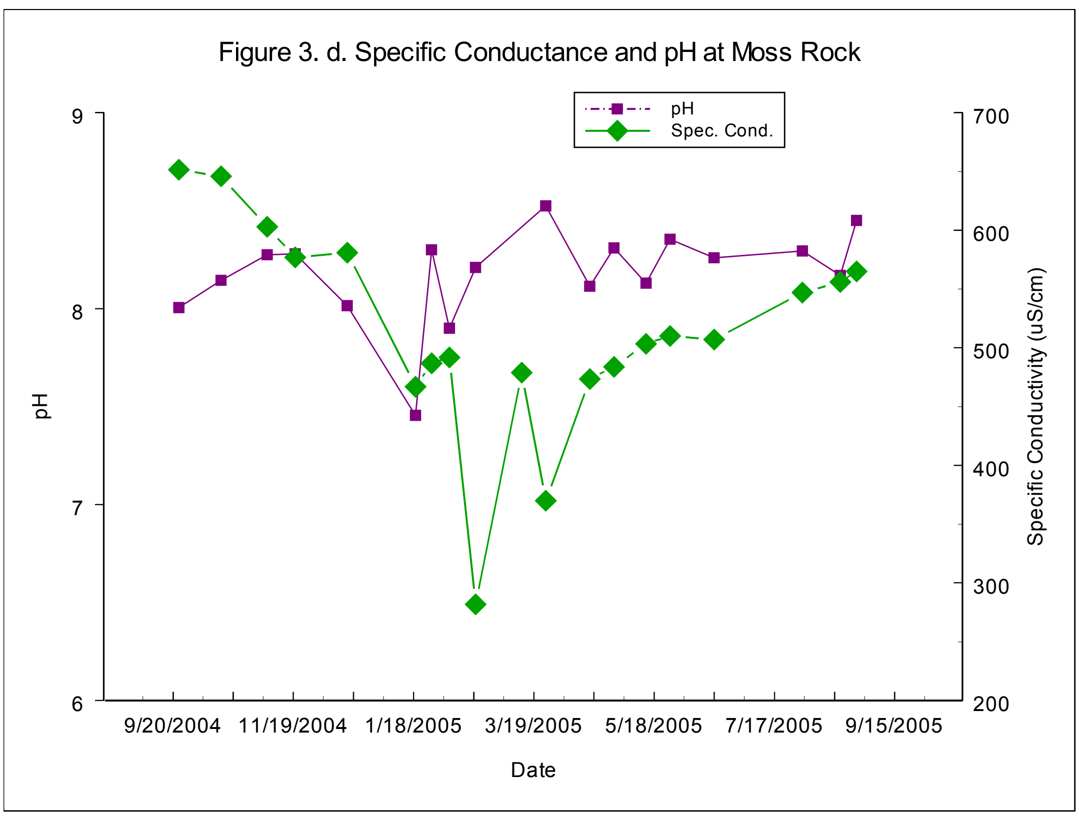


Figure 3. d. Specific Conductance and pH at Moss Rock
pH
Spec. Cond.
9
8
7
6
700
600
500
400
300
200
pH
Specific Conductivity (uS/cm)
9/20/2004
11/19/2004
1/18/2005
3/19/2005
5/18/2005
7/17/2005
9/15/2005
Date

- The higher specific conductance values at Moss Rock were not surprising because of the geology of the area. Our monitoring station is just upstream of a large rock called "Soda Rock" and it is likely that this formation is also present above Moss Rock. Seepage draining from Soda Rock was tested and had a specific conductance over 8,000 μS/cm. Figures 3. a. through d, show the specific conductance vs. pH. It appears from these figures that there is no obvious correlation between these two parameters.
- Specific conductance dropped steadily at all stations in the winter. Figure 4. a. shows specific conductance vs. inches rainfall for each storm event.
- In order to evaluate whether the higher specific conductance values at La Avenida were due to tidal influence, the tide level was calculated for the time of each monitoring event in the fall and summer, when there was no rain to impact specific conductance values, and graphed against conductance (see Figure 4. b.) There appears to be no correlation between tide and conductance.

6.5. Turbidity

6.4.1 Turbidity Limits and Affects:

- Turbidity is a measure of the cloudiness of water. Our turbidity meter measures the quantity of light passing through a sample and reports the result in nephelometric turbidity units (NTU.)
- Turbidity can be a result of particulate mineral or organic matter, bacteria or algae. It can be from natural sources, or from human induced changes in the watershed. High turbidity over an extended period can make it difficult for aquatic organisms to find their food. High turbidity can cause the temperature of water to increase. The particles causing turbidity can also settle out and coat the bottom of a stream make it difficult for bottom dwelling organisms or fish eggs to get enough oxygen.
- The Regional Board's Basin Plan states that "waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses."

6.4.2 Turbidity Findings

- Figures 5.a. is a graph of turbidity values at all four stations versus rainfall. The highest turbidity readings were found when monitoring was conducted during a storm event.
- As with specific conductance, the range in turbidity was highest at the top and bottom of the watershed. And the reservoir seems to act as an equalization basin. The turbidity at the two stations below the reservoir did not exhibit much variation, except for dropping in the spring. Throughout the winter, the turbidity at McClellan and Chestnut ranged from about 20 to 60 NTU, where at Moss Rock and La Avenida it ranged from 0.8 to 508 NTU and 0.9 to 266 NTU respectively.

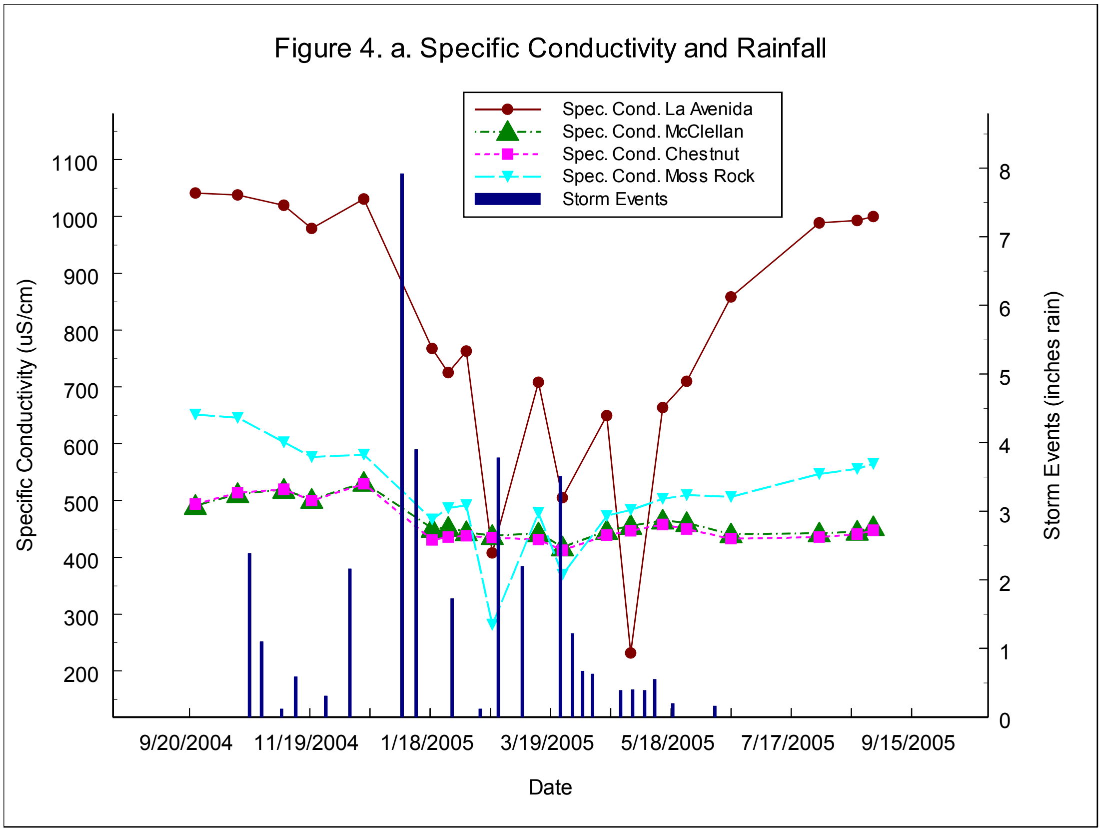


Figure 4. a. Specific Conductivity and Rainfall
Spec. Cond. La Avenida
Spec. Cond. McClellan
Spec. Cond. Chestnut
Spec. Cond. Moss Rock
Storm Events
Specific Conductivity (uS/cm)
Storm Events (inches rain)
Date
9/20/2004
11/19/2004
1/18/2005
3/19/2005
5/18/2005
7/17/2005
9/15/2005

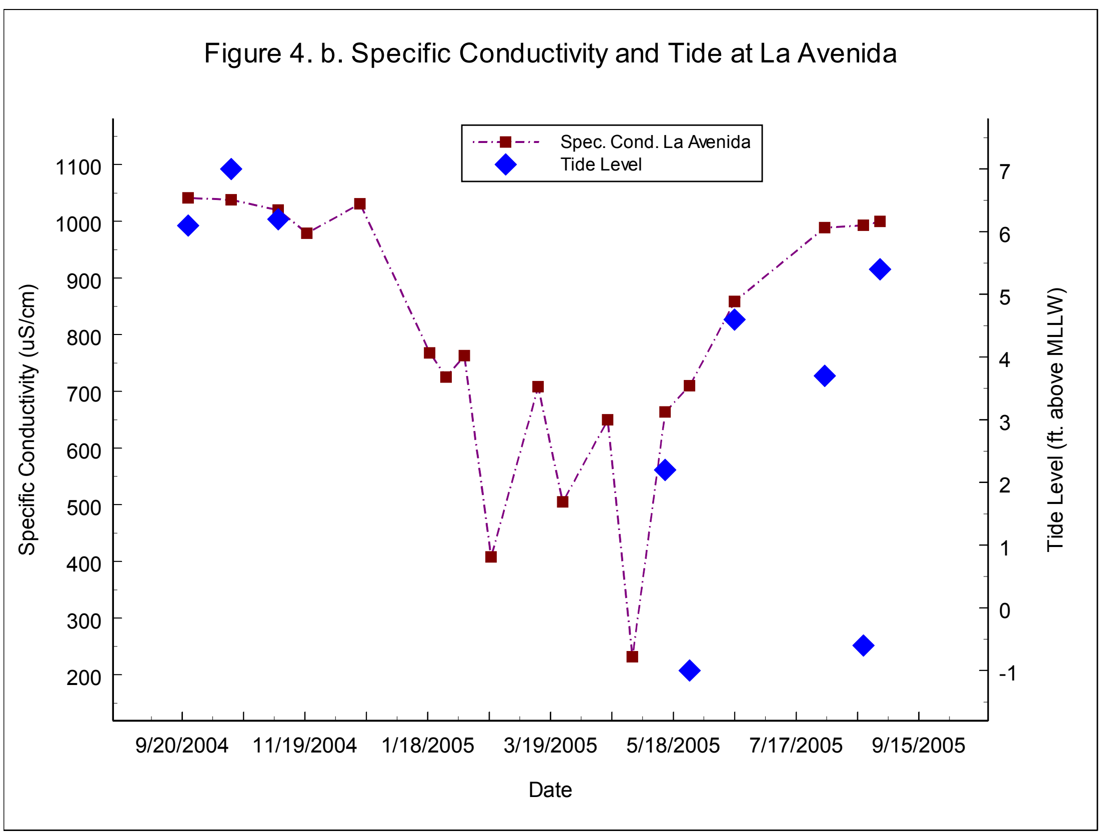


Figure 4. b. Specific Conductivity and Tide at La Avenida
Spec. Cond. La Avenida
Tide Level
Specific Conductivity (uS/cm)
Tide Level (ft. above MLLW)
Date
9/20/2004
11/19/2004
1/18/2005
3/19/2005
5/18/2005
7/17/2005
9/15/2005

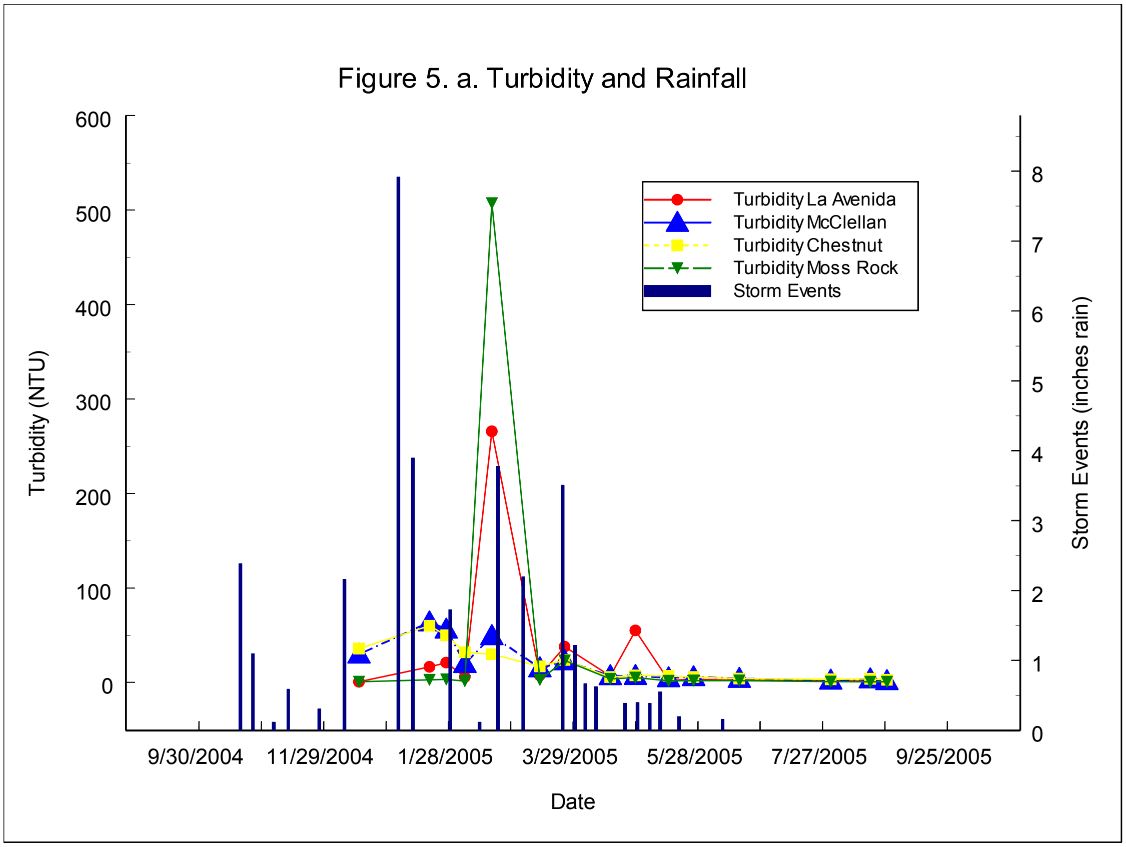


Figure 5. a. Turbidity and Rainfall
Turbidity (NTU)
Storm Events (inches rain)
Turbidity La Avenida
Turbidity McClellan
Turbidity Chestnut
Turbidity Moss Rock
Storm Events
9/30/2004
11/29/2004
1/28/2005
3/29/2005
5/28/2005
7/27/2005
9/25/2005
Date

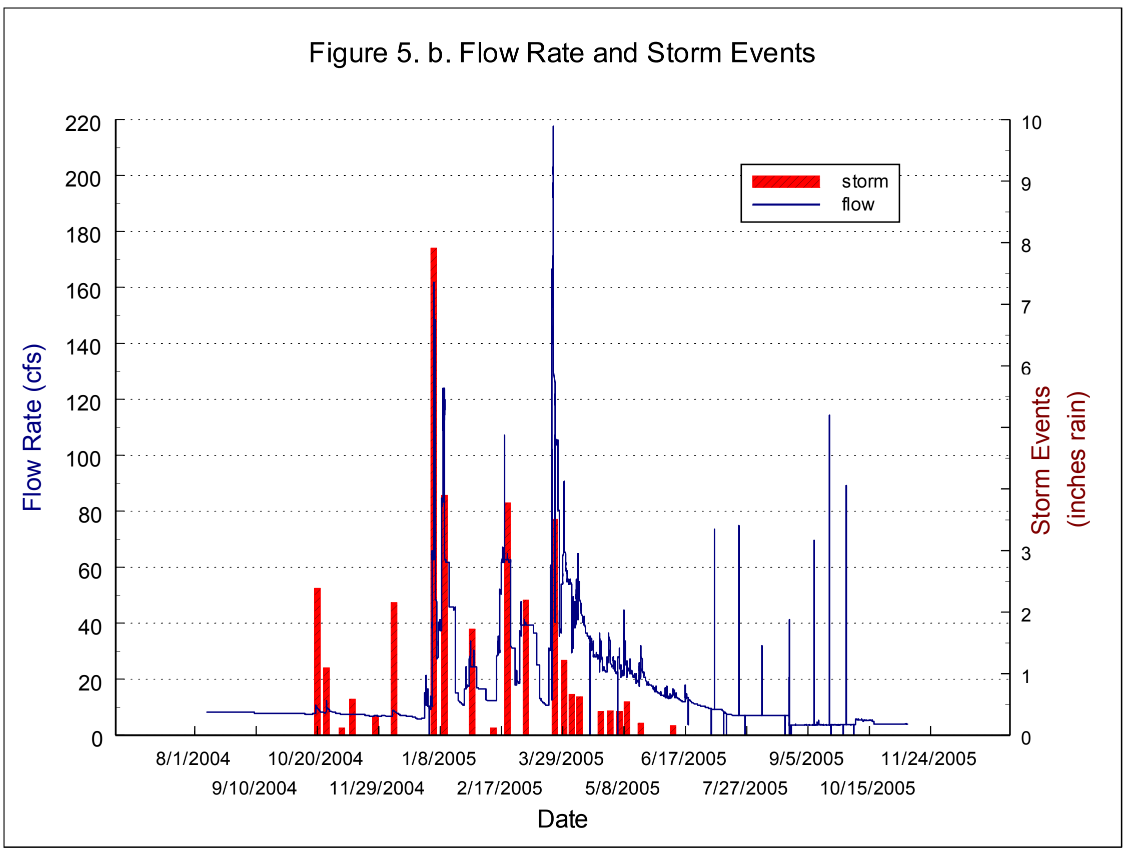


Figure 5. b. Flow Rate and Storm Events
Flow Rate (cfs)
Storm Events (inches rain)
storm
flow
8/1/2004
9/10/2004
10/20/2004
11/29/2004
1/8/2005
2/17/2005
3/29/2005
5/8/2005
6/17/2005
7/27/2005
9/5/2005
10/15/2005
11/24/2005
Date

7. Summary and Recommendations

The project has been successful in getting community members involved as stewards of Stevens Creek. The volunteers enthusiastically produced data that are usable and comparable to earlier monitoring conducted by SWAMP. Eight volunteers have contributed a total of about 150 hours to monitoring Stevens Creek during the year. The monitoring results are encouraging in that they show the water quality to be generally protective of aquatic life. However, the data do raise questions and concerns about the health of the watershed that we will continue to study through our volunteer monitoring efforts.

Temperature was found to exceed limits for that recommended for various life stages of fish in both in the SPCWC and the SWAMP monitoring efforts. The 2002 SWAMP data show elevated temperatures in the summer months especially at La Avenida and Chestnut. Our data show temperatures above the 9°C limit for spawning and even above the 13°C limit for embryo survival in the spring when spawning and embryo growth are expected to occur.

Although dissolved oxygen results were never below 7 mg/l, we did not often monitor early in the morning when DO levels would be lowest. We also did not monitor pools where lack of turbulence would result in lower DO concentrations. SWAMP data from 2002 did record DO as low as 5 mg/l at La Avenida in the summer.

The turbidity levels, especially at Chestnut and McClellan Ranch, may have a negative impact on aquatic life. It is clear that fine sediments coming over the dam in the winter months are settling out somewhere before the La Avenida monitoring site, and therefore may be impacting fish or benthic invertebrates in the stream channel. The constantly elevated turbidities at these two stations below the reservoir may make it challenging for aquatic organisms to find their food, or for fish to successfully spawn.

Our results also raise questions about the elevated specific conductance found at La Avenida. These higher levels are also seen in the SWAMP data. Further study should be conducted to determine the source. The higher conductivity may be due to urban runoff or possibly from diversion of water with higher specific conductance from Permanente Creek into Stevens Creek.

In order to get a sense of the flow in Stevens Creek and how it relates to rainfall in the watershed, Figure 5. b. was created showing flow rate vs. storm events. The rainfall and flow rate data were taken from the SCVWD website for the gauge below the dam (Station ID: 1482 Stevens Ck. Outflow) and storm events, calculated from rain data collected at the station off Stevens Canyon Rd., directly behind the California Department of Forestry. These data are preliminary. They have been corrected, but we have not been able to obtain the corrected data from the SCVWD.

The SPCWC pilot VMOP program will continue for two more years, thanks to funding from the San Francisco Bay Salmonid Habitat Restoration Fund. This fund will allow us to expand the program to additional sites and additional parameters, including a macroinvertebrate sampling and mapping of non-native vegetation. We hope to learn in March whether we can proceed with this program expansion.