Walnut Creek Watershed
Walnut and Grayson Creeks
Water Quality Midterm Report
Monitor Dates: Aug 2017 – Jan 2018
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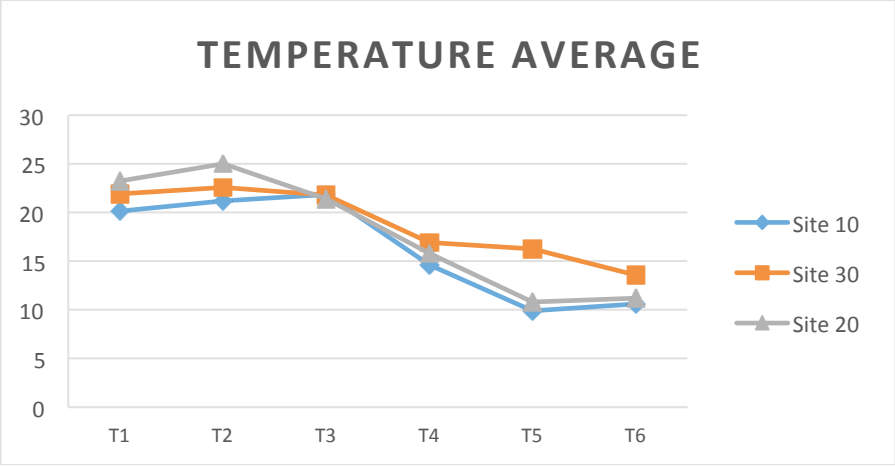
Purpose and Methods

The Watershed Project is testing four water quality parameters at three sites in Central Contra Costa County: WLN010 (Walnut Creek-City of Walnut Creek), WLN020 (Walnut Creek-City of Concord) and WLN030 (Grayson Creek-City of Pleasant Hill). Images and detailed site information are on pgs. 4-7. Monitoring took place once a month during the first weekend in the morning hours. Water quality was measured using a YSI Pro Plus meter for the first month and a YSI ProDSS meter for the remaining five months. The parameters that were recorded were temperature (°C), dissolved oxygen (mg/L), specific conductivity (µS/cm) and turbidity (NTU). Monitoring of the three sites began in August 2017 and ran until January 2018 for the midterm report. Monitoring will continue until July 2018.

Water Temperature

Temperature is one of the most important abiotic factors that helps determine what type of organisms are present in a given water system. When water temperature rises, it can be considered more harmful to aquatic life in comparison to cold water. However, both extremes can affect growth, disease tolerance and survival rate in aquatic organisms. Water that is too cold will slow down biological processes and metabolic rates of aquatic organisms. On the other hand, water that is too warm can cause high respiratory rates, which can stress fish and other organisms.

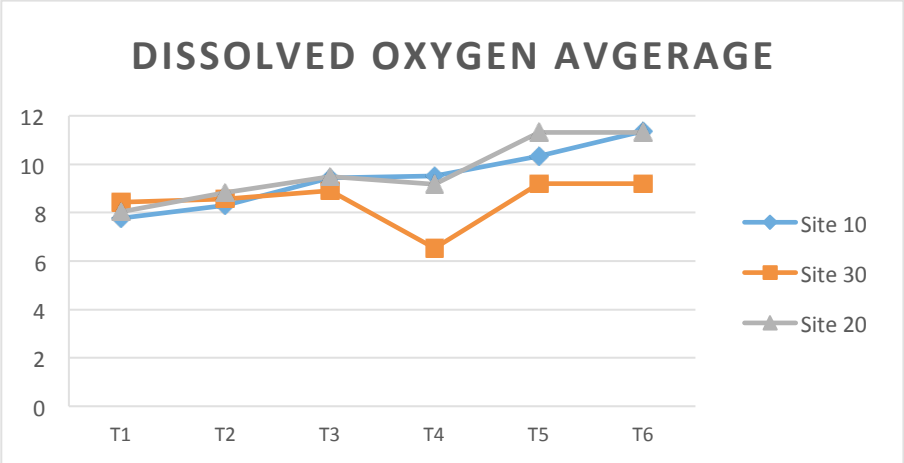
Observations: Temperatures were recorded between 10°C and 25°C from Aug 2017 through Jan 2018, with higher temperatures recorded in late fall and lower temperatures recorded during the winter months. Temperatures stayed within a range that is still nonlethal to organisms found in the creek. Temperature higher than 25°C are considered dangerous to these aquatic organisms, especially fish.



Temperature averages recorded from Aug 2017 through Jan 2018.

Dissolved Oxygen
Dissolved oxygen (DO) refers to the free oxygen present in the water column. It is an important water quality parameter, as the oxygen present in the water helps organisms with respiration. Temperature can also affect DO, as the solubility of oxygen will decrease as temperature increases. This means that colder bodies of water can hold more DO compared to warmer waters.

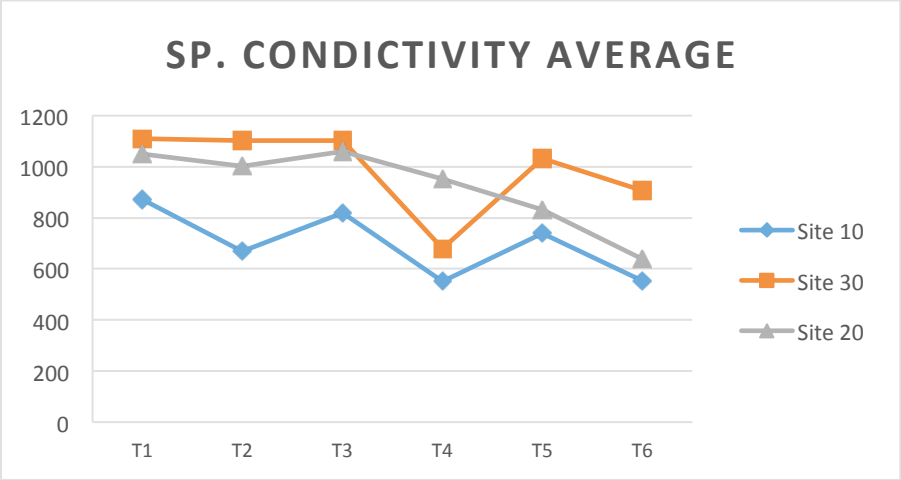
Observations: According to the EPA, the recommended level of Dissolved Oxygen (DO) in a healthy stream is greater than 8.0 mg/L (milligrams per liter). When DO levels in a stream drop below 5.0 mg/L, fish, macroinvertebrates and other aquatic organisms are put under stress. Dissolved oxygen stayed between the ranges of 6.5mg/L and 11.5mg/L. There was a drop in DO during the month of November. Site 30 had a more significant drop in DO compared to the other two sites, this could have been due to rainfall from the previous weeks.



Dissolved oxygen averages recorded from Aug 2017 through Jan 2018.

Conductivity
Conductivity is the water's capability to pass an electric flow. This ability is related to the concentration of ions present in the water. The ions come from dissolved salts and inorganic material that are deposited into a water system either through natural chemical reactions or through urban activity. Conductivity for the most part is stable, but significant changes like rain or runoff can change conductivity. Because conductivity can easily fluctuate, it is used as an indicator of changes in a given system.

Observations: According to the EPA, conductivity levels should stay between 150 and 500µS/cm in order to support a freshwater ecosystem. Conductivity stayed between the ranges of 550 and 1110µS/cm, which is higher than the EPA's recommendation. Conductivity dropped in all three sites during November. High conductivity may be due to the creek running through major urban areas and having a slow flow. Again, the most noticeable change was in November after rainfall.

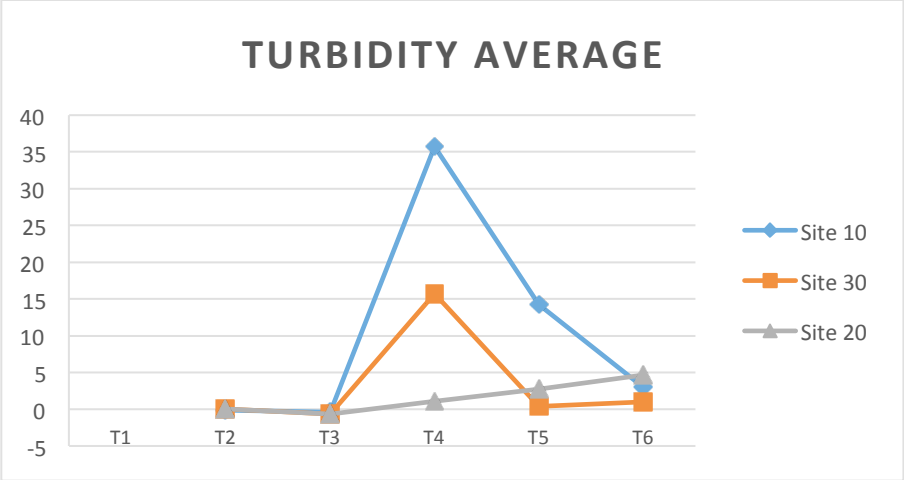


Specific conductivity averages recorded from Aug 2017 through Jan 2018.

Turbidity

Turbidity is the visual determination of water clarity. In other words, turbid water will appear murky or cloudy due to suspended solids present in the water column. High turbidity levels can also change the color of the water and again reduce clarity. Turbidity is an important indicator of health. By visually observing an increase of turbidity one can immediately notice a change in the water quality and possible hazards to aquatic life.

Observations: Recommended turbidity levels vary depending on what organisms live in the creek. Generally, a turbidity of less than 10NTU is tolerable. Turbidity in the three sites remained suitable to support fish and other organisms, staying under 10NTU. The only exception again took place in November, where turbidity peaked at 36 NTU and 16 NTU; two sites where water flow tends to be slower.



Turbidity averages recorded from Aug 2017 through Jan 2018.

Conclusion
Overall all three sites are in relatively decent conditions, in terms of these four specific water quality parameters. Specific conductivity is the only parameter that is at ahigh level for organisms found in the creek. Turbidity was the other parameter that had a spike, but has begun to drop to a suitable level as of January. Small fish, crawfish, two types of egrets and mallard ducks have been observedat the monitoring sites.A bird survey of the Grayson Creek riparian habitat is currently being conducted by partner organizations, which will provide additional data on avian biodiversity in the watershed.Some parameters, such as temperature and dissolved oxygen may begin to shift toward unsafe levels, as we move into the spring and summer months.

Walnut Creek Watershed Site 1 (WLN010)
Walnut Creek at Civic Park
City of Walnut Creek
Latitude: 37.904944
Longitude: -122.057861

Walnut Creek Watershed Site 3 (WLN030)
Grayson Creek behind Pleasant Hill Middle School
City of Pleasant Hill
Latitude: 37.938234
Longitude: -122.064166

Walnut Creek Watershed Site 2 (WLN020)
Walnut Creek below the #1 drop structure where SR-242 and I-680 split
City of Concord
Latitude: 37.961569
Longitude: -122.05239