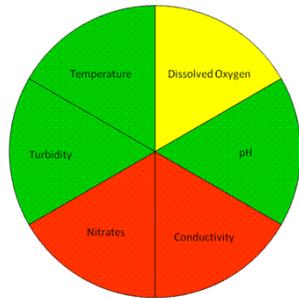


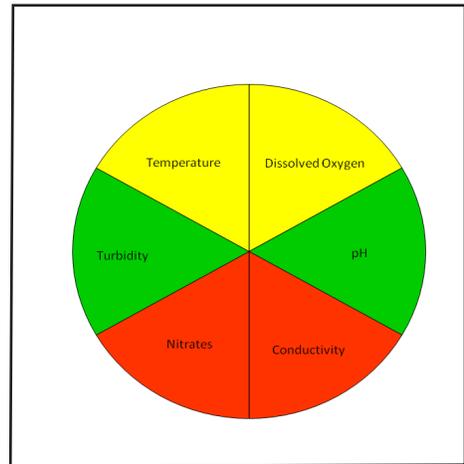
WALNUT CREEK WATERSHED REPORT CARD



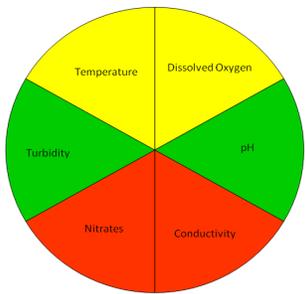
August 2018-August 2019



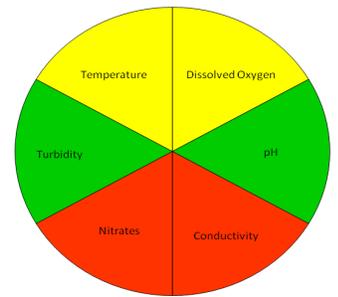
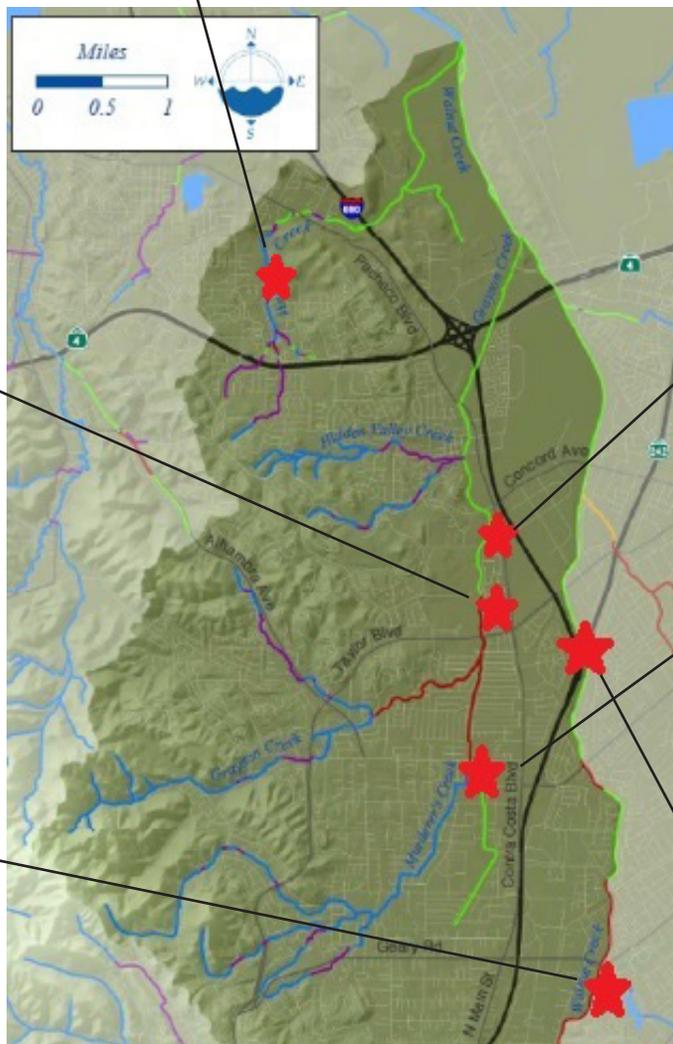
ALH110: Alhambra Creek



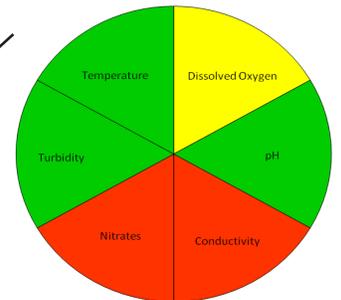
Overall Score



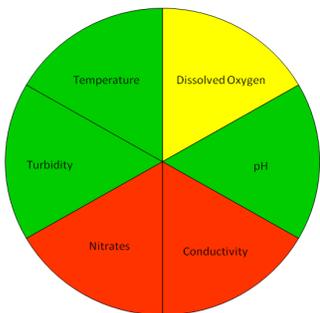
WAL045: Walnut Creek SR-242



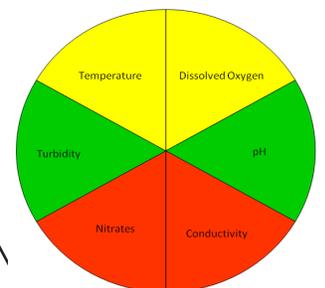
CEO160: Grayson Creek at Chilpancingo Pkwy



CEO170: Grayson Creek behind Pleasant Hill Middle School



WAL080: Walnut Creek at Civic Park



CEO166: Grayson Creek at Gulf Club Rd.

TEMPERATURE IN WALNUT CREEK WATERSHED

Water temperature affects all creatures living in the stream, as well as directly influencing water chemistry, including Conductivity and Dissolved Oxygen. Different animals have different preferred temperature ranges; cold water fish such as rainbow trout like water to be less than 16°C, although they can tolerate higher temperatures. However, temperatures

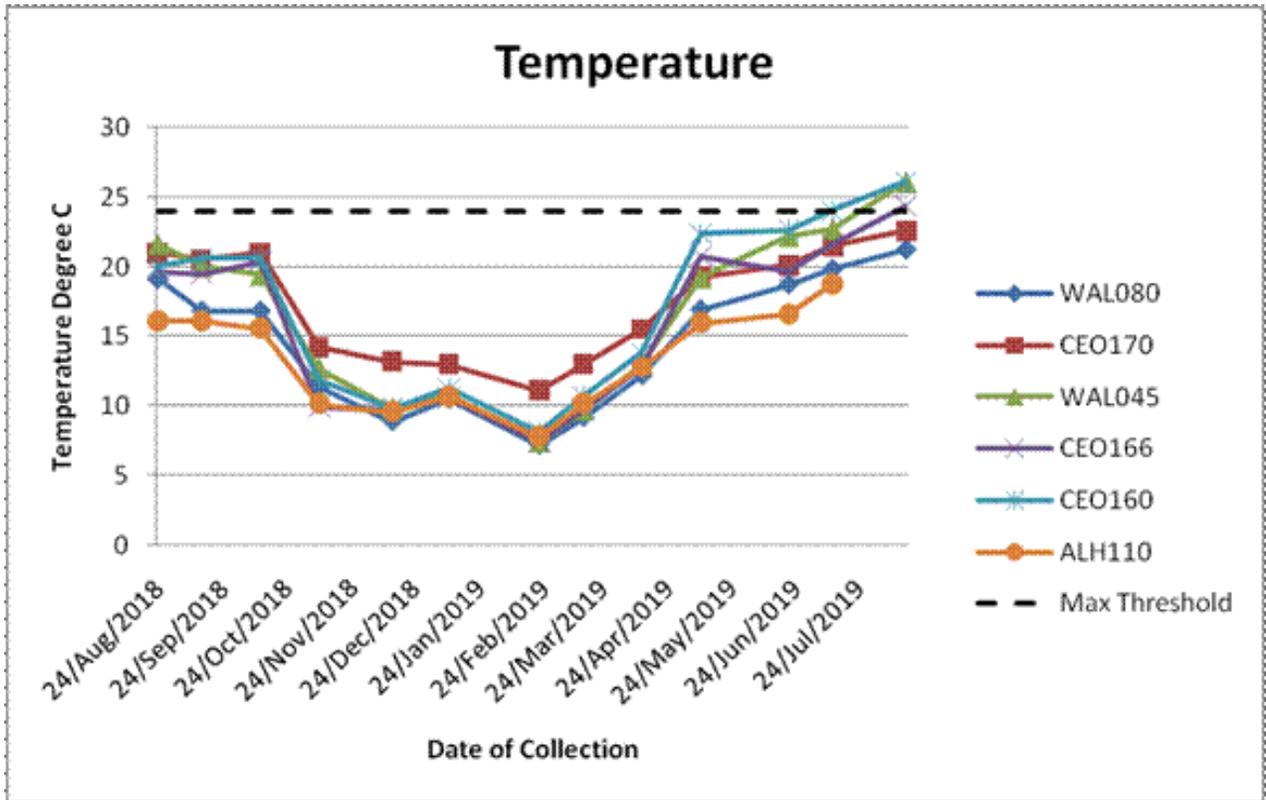
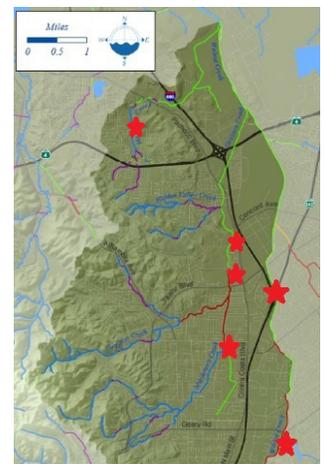


Figure 1: Recorded temperature levels were mainly within the healthy range for aquatic life, with the exception of several sites in August 2019.

Site Code	Site Name
ALH110	Alhambra Creek
WAL045	Walnut Creek SR-242
WAL080	Walnut Creek at Civic Park
CEO160	Grayson Creek at Chilpancingo Pkwy
CEO166	Grayson Creek at Gulf Club Rd.
CEO170	Grayson Creek behind Pleasant



DISSOLVED OXYGEN IN WALNUT CREEK WATERSHED

Dissolved Oxygen refers to free O₂ molecules in the body of water. Aquatic organisms depend on oxygen for respiration. Oxygen is dissolved in water through aeration, via moving over rocks or waterfalls, and photosynthesis by plants living in the creek. Cold water can hold more dissolved oxygen than warm water because the molecules in the water move slower and, thereby, retain more oxygen.

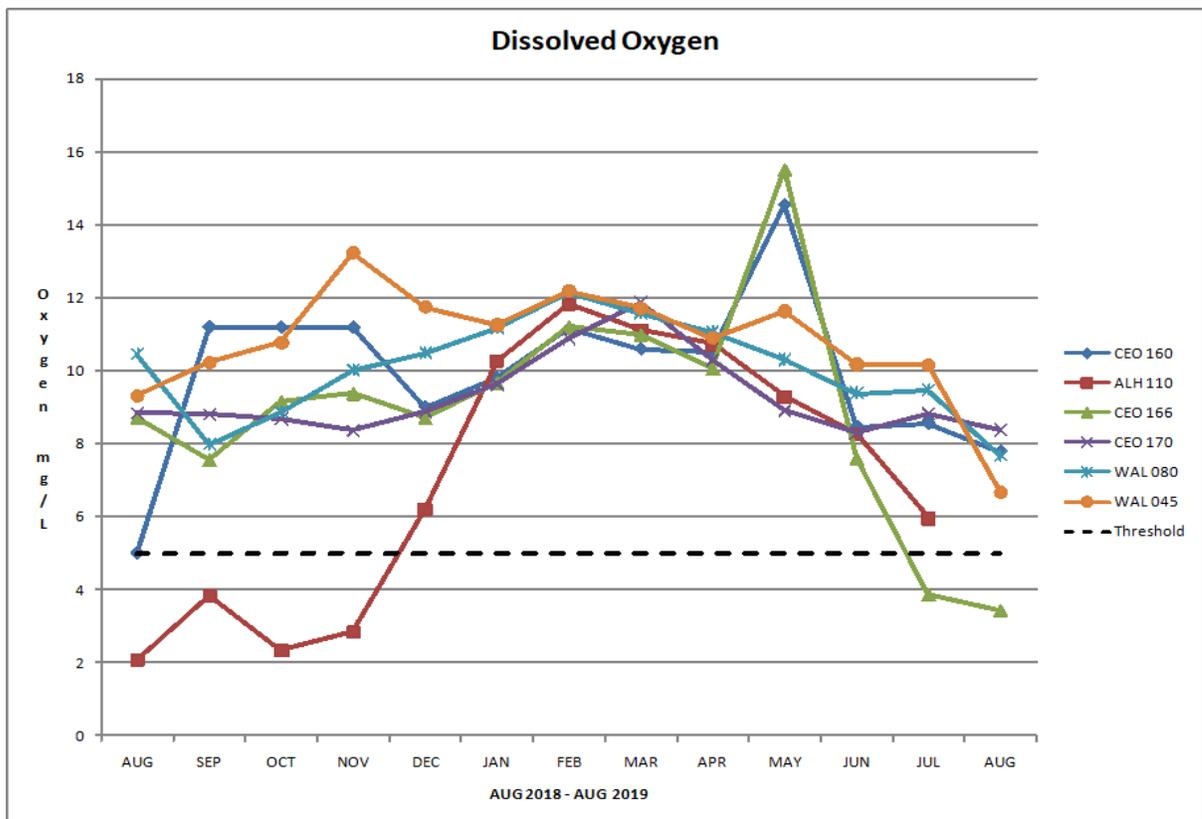
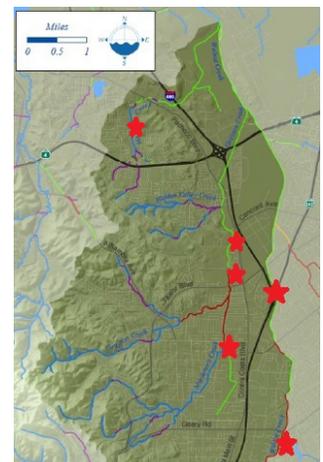


Figure 2: Dissolved oxygen levels trended lower in the summer months, falling below the threshold in the case of ALH110 and CEO166.

Site Code	Site Name
ALH110	Alhambra Creek
WAL045	Walnut Creek SR-242
WAL080	Walnut Creek at Civic Park
CEO160	Grayson Creek at Chilpancingo Pkwy
CEO166	Grayson Creek at Gulf Club Rd.
CEO170	Grayson Creek behind Pleasant



PH IN WALNUT CREEK WATERSHED

pH measures how acidic or basic the water is. The pH of water ranges from 0-14. A pH of 7 indicates a neutral measurement while measurements below 7 are more acidic, and above 7 indicates a base. The healthy pH range for life in streams is between 6-9.

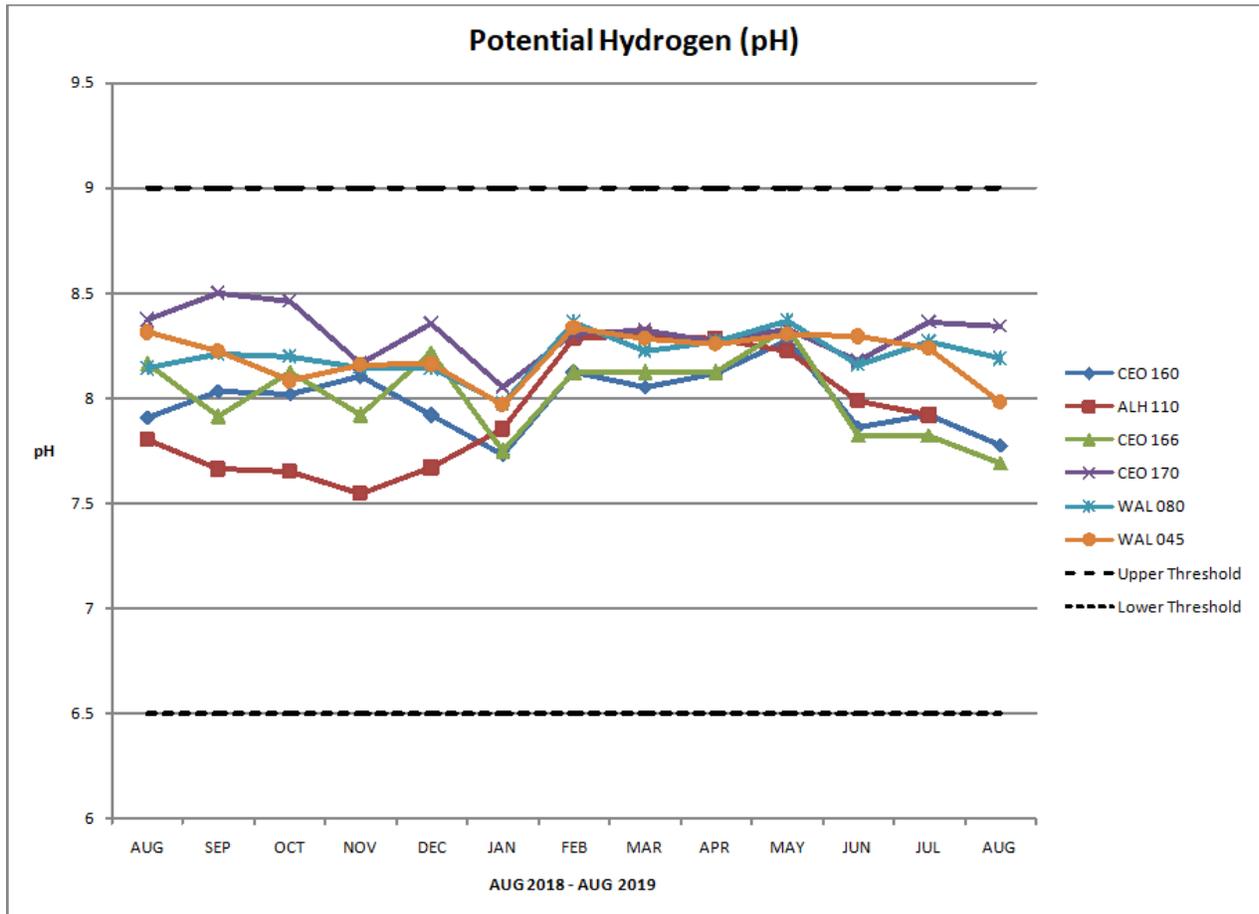
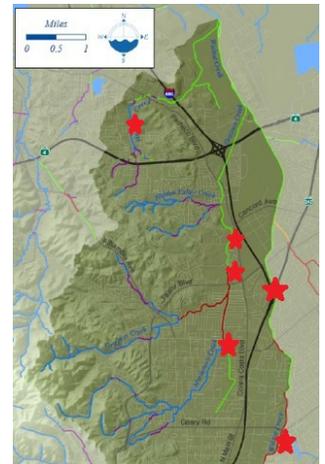


Figure 3: All pH levels recorded were within the healthy range for supporting aquatic life.

Site Code	Site Name
ALH110	Alhambra Creek
WAL045	Walnut Creek SR-242
WAL080	Walnut Creek at Civic Park
CEO160	Grayson Creek at Chilpancingo Pkwy
CEO166	Grayson Creek at Gulf Club Rd.
CEO170	Grayson Creek behind Pleasant



SPECIFIC CONDUCTIVITY IN WALNUT CREEK WATERSHED

Conductivity measures the concentration of ions (charged particles) present in water. Conductivity is related to salinity, which measures just dissolved salts. Conductivity may be related to the underlying geology of the stream bed, or result from urban runoff containing nutrients like phosphates and nitrates, which are found in fertilizers. Freshwater animals prefer a conductivity under 500 micro-Siemens per centimeter ($\mu\text{mhos/cm}$).

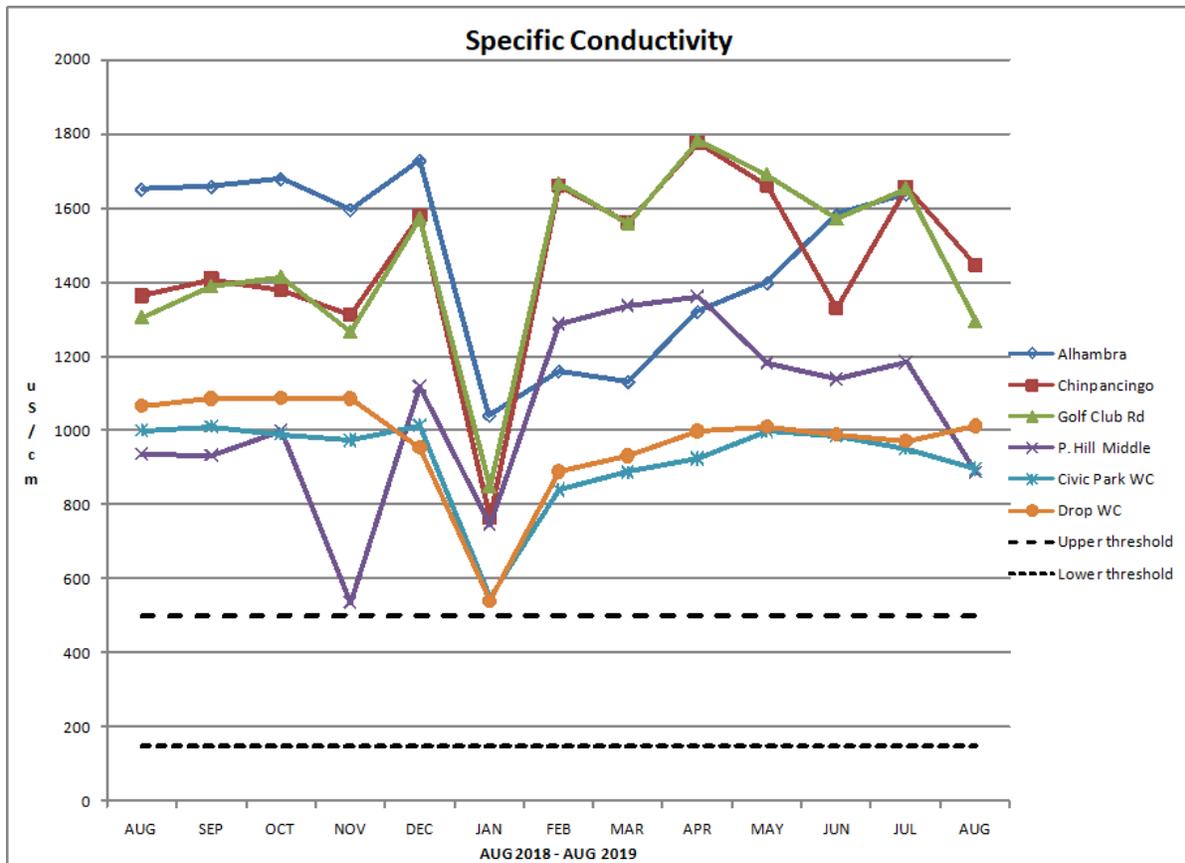
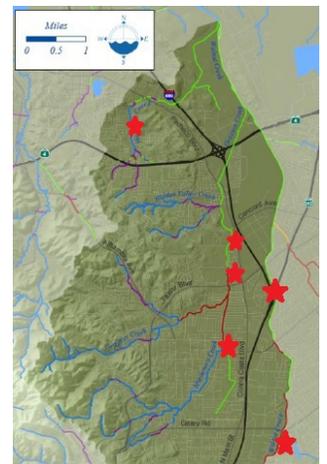


Figure 4: Measured specific conductivity was consistently higher than deemed healthy for aquatic life. A noted drop occurred in January, when we sampled shortly after a rain event.

Site Code	Site Name
ALH110	Alhambra Creek
WAL045	Walnut Creek SR-242
WAL080	Walnut Creek at Civic Park
CEO160	Grayson Creek at Chilpancingo Pkwy
CEO166	Grayson Creek at Gulf Club Rd.
CEO170	Grayson Creek behind Pleasant



NITRATES IN WALNUT CREEK WATERSHED

The term nitrate refers to NO_3^- , nitrates are nitrogen in the form NO_3^- . Sources of nitrates include fertilizer, animal waste, human waste (typically from leaking septic systems), and industrial pollution. Nitrates are a critical nutrient for aquatic plants and algae, which utilize nitrates as a food source, but elevated nitrate levels can contribute to overgrowth of algae, and associated low oxygen levels can lead to so-called “dead zones.”

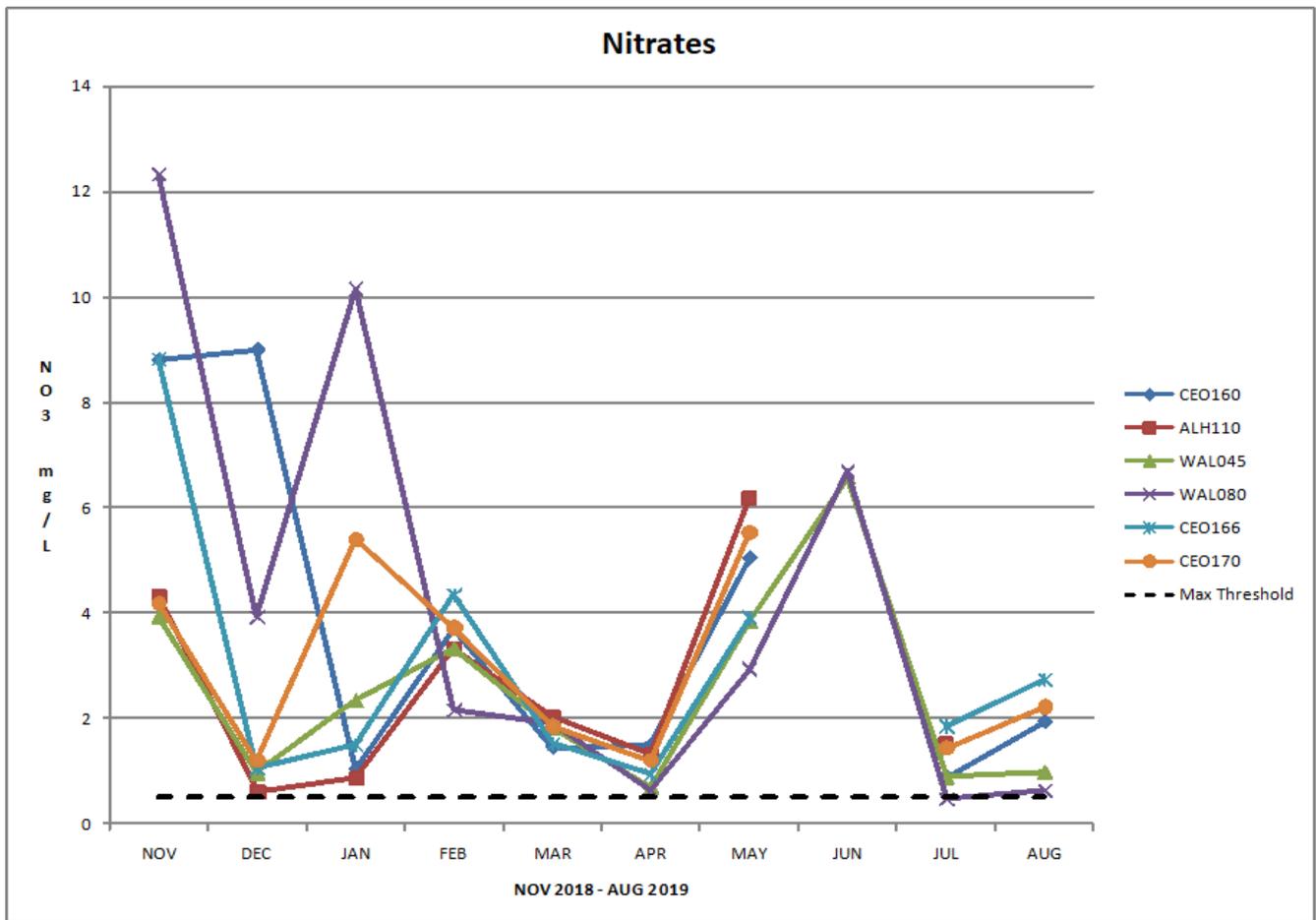
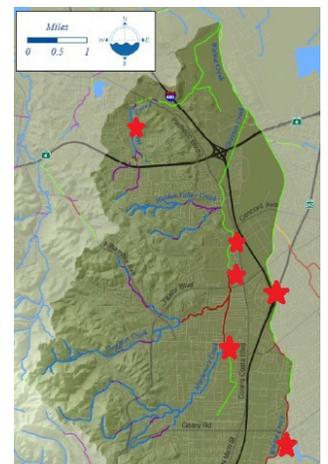


Figure 5: Recorded nitrate levels were consistently higher than deemed healthy for supporting aquatic life, and well into the

Site Code	Site Name
ALH110	Alhambra Creek
WAL045	Walnut Creek SR-242
WAL080	Walnut Creek at Civic Park
CEO160	Grayson Creek at Chilpancingo Pkwy
CEO166	Grayson Creek at Gulf Club Rd.
CEO170	Grayson Creek behind Pleasant



TURBIDITY IN WALNUT CREEK WATERSHED

Turbidity measures how clear the water is. Turbidity is correlated with the total suspended solids and dissolved materials present in the water. Rainfall often increases turbidity in creeks, as storm water runoff contributes to higher flows and can cause creek-bed erosion. Fish prefer very clear water, with a turbidity of less than 10 NTU.

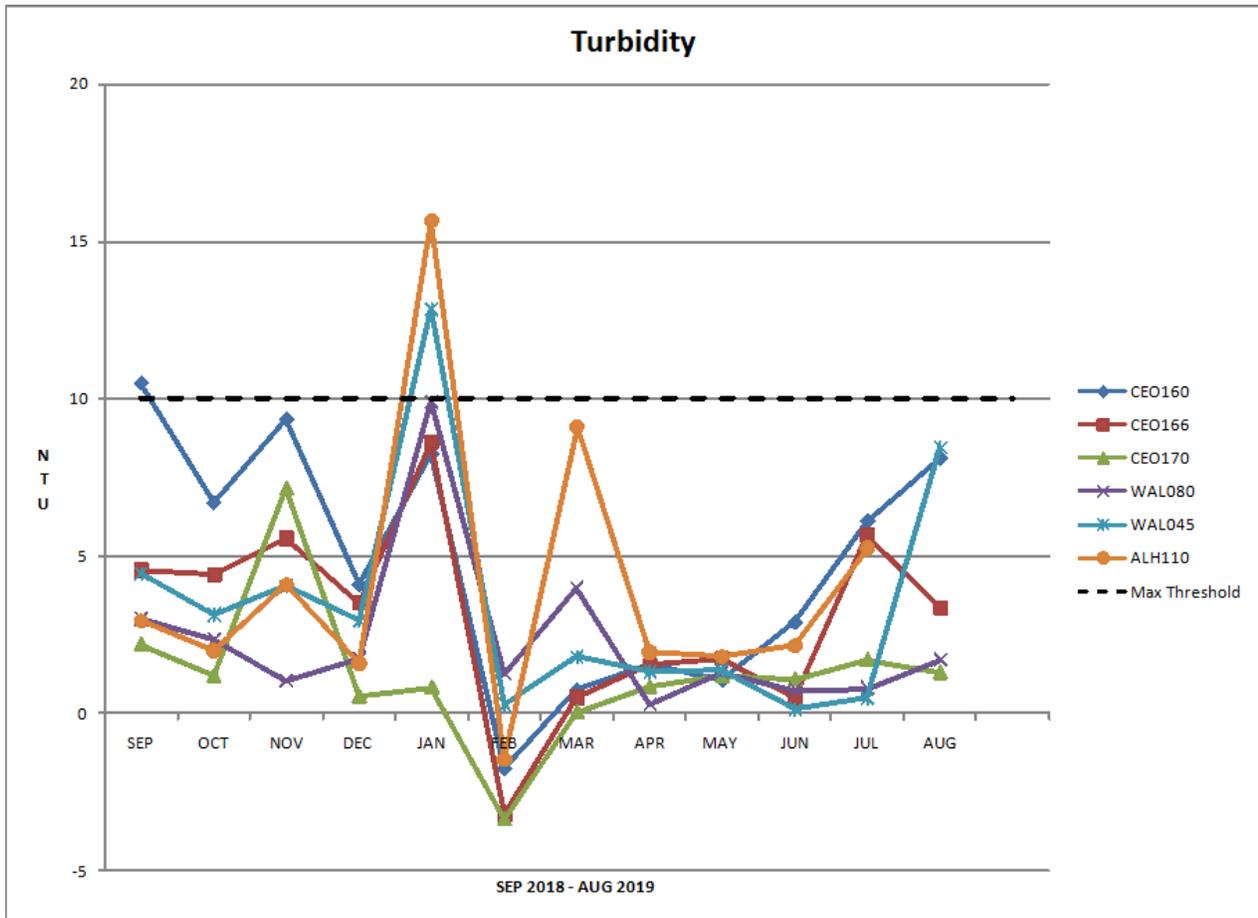
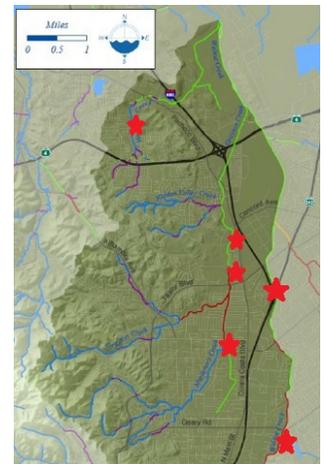


Figure 1: Recorded turbidity levels stayed below the threshold for the most part, except for in January 2019, when there was a noted increase in turbidity. As it happened, we monitored right after a storm dropped 0.14 inches of rain, leading to turbid water.

Site Code	Site Name
ALH110	Alhambra Creek
WAL045	Walnut Creek SR-242
WAL080	Walnut Creek at Civic Park
CEO160	Grayson Creek at Chilpancingo Pkwy
CEO166	Grayson Creek at Gulf Club Rd.
CEO170	Grayson Creek behind Pleasant



DISCUSSION

Assessing creek health in urban streams can be tricky because most of these areas will never be pristine again, and the same is true of the water quality in the creeks. For example, while the EPA states that conductivity in streams should be between 50-500 uS/cm to best support aquatic life, other sources indicate that conductivity is not a “problem” in urban streams until it surpasses 2,000 uS/cm. While it is good to keep these differences in mind, in this report card we’ve used the thresholds that are deemed best to support aquatic life rather than what is to be expected in urban streams.

Overall, specific conductivity and nitrates are consistently higher than the healthy threshold in the Walnut Creek Watershed, while temperature approaches the upper threshold and dissolved oxygen approached the lower threshold in the summer months. These exceedances are not uncommon in urban streams, where runoff carries all manner of solids and charged particles into the creeks, and a combination of low water and low shade lead to warming of creek water in the summer months.

For more information on The Watershed Project’s Creek Monitoring Program, please contact Helen Fitanides at helen@thewatershedproject.org, or visit <https://maps.waterreporter.org/459de41c/> to see all our monitoring data.



Volunteer Elizabeth Dougherty takes measurements in Walnut Creek.