

Stream Water Chemistry Report Summary

Stream Name: Judges Creek

Water Chemistry Parameters	Observed Value			Standard
	2013	2014	2015	
Total Suspended Solids	38.91 ± 5.83 mg/L	28.70 ± 6.30 mg/L	22.22 ± 21.55 mg/L	< 11.2 mg/L
Alkalinity	237.50 ± 9.69 mg/L	241.67 ± 10.47 mg/L	264.57 ± 20.14 mg/L	< 224.83 mg/L
Chloride	7.09 ± 0.81 mg/L	9.27 ± 0.88 mg/L	7.94 ± 1.73 mg/L	
Total Phosphorus	0.05 ± 0.02 mg/L	0.07 ± 0.02 mg/L	0.04 ± 0.01 mg/L	< 0.01 - 0.03 mg/L
Chlorophyll a Content	0.75 ± 0.12 mg/L	0.72 ± 0.13 mg/L	1.73 ± 1.23 mg/L	
Temperature	14.20 ± 1.56 C	12.46 ± 1.56 C	14.30 ± 2.41 C	< 25.15 C
pH	7.93 ± 0.19	7.84 ± 0.12	7.82 ± 0.34 mg/L	Between 6.5-8.5
Conductivity	0.35 ± 0.03 spc	0.47 ± 0.03 spc	0.53 ± 0.15 spc	
Dissolved Oxygen	7.17 ± 0.58 mg/L	7.95 ± 0.55 mg/L	8.70 ± 2.26 mg/L	> 6.0 mg/L
Total Organic Nitrogen	0.576 ± 0.07 mg/L	0.658 ± 0.07 mg/L	0.479 ± 0.18 mg/L	< 1.1mg/L
Caffeine			0.00025 µg/L	

When the study was first initiated Judges Creek was one of the most degraded sites being monitored. Since the exclusion of multiple cattle sites, the water quality at this stream has demonstrated signs of improvement. In particular total phosphorus and total organic nitrogen levels have both declined throughout the study, with the greatest decreases occurring between 2014 and 2015. From 2014 to 2015 total phosphorus values have decreased by approximately 94%, while total organic nitrogen levels have decreased by approximately 27%. These decreases in nutrients have coincided with a decrease in total suspended solids of approximately 23% from 2014 to 2015. It is important to note that while on average we have observed a decline in measures of nitrogen, phosphorus, and sediment in Judge's Creek the variability surrounding these measures are quite high. Consequently it is difficult to discern with confidence if the 2015 total suspended solids, total phosphorus, and total organic nitrogen levels are lower than the 2013 values. Continued monitoring at this site is needed to confirm these trends and rule out simple year to year variability as the main driver of these apparent trends.

Perhaps one of the most surprising findings at this site for the 2015 year was the notable increase in chlorophyll a content in the stream. From the year 2014 to 2015 there was a 140% increase in chlorophyll a content. The higher chlorophyll a content may have contributed to the apparent decrease in total phosphorus and total organic nitrogen observed from 2014 to 2015. As nuisance vegetation grows in the streams it utilizes available organic nitrogen and phosphorus compounds, incorporating these materials into its biomass, and potentially decreasing in stream nitrogen and phosphorus concentrations. These high chlorophyll a values may also simply reflect other environmental factors that stimulated in stream vegetation growth. For example at the reference site in 2015 there was a notable increase in chlorophyll a content without a notable change in nutrient levels, suggesting other environmental factors may be driving the chlorophyll a trends.