

Lake County Clean Water Program Report – August 2017

Lake County

Lake County completed mapping of County culverts and outfalls in 2014. We mapped 2896 outfalls, 2071 connector outfall and 3695 culverts. The County also continues to sample total suspended sediment, phosphorus and nitrogen in storm-related water quality testing and coordinate with the state on their monthly sediment and water quality sampling in Clear Lake.

The Community Development Department requires sediment and erosion control and stormwater management for all new construction and development and currently performs between five and ten grading inspections annually. This year the County fully expended the last of \$12.7 million in Department of Water Resources grant funds to acquire an additional 300 plus acres on the Middle Creek Restoration Area. This brings the County to the half-way point in land acquisitions for the restoration project. We are waiting on additional funding to resume the acquisition process to move the project forward. The estimated reduction in sediment and associated phosphorus load for this project is 28% of the TMDL allotment. We continue to regularly convene public stormwater meetings.

The TMDL water quality results indicated very low concentrations of nitrogen in the samples with many non-detects for both total nitrogen and total Kjeldahl nitrogen. Not surprisingly, results of TMDL monitoring demonstrated a strong relationship between total suspended solids (TSS) and phosphorus in the three primary tributaries – Scotts Creek, Middle Creek and Kelsey Creek (Figure 1). The relationship between phosphorus, TSS and total nitrogen and discharge was not as robust, most likely due to the location of sampling versus the gage location. Nonetheless, the flood flows in these three tributaries were very high this winter and contributed to flood conditions on the lake for four weeks between February and March.

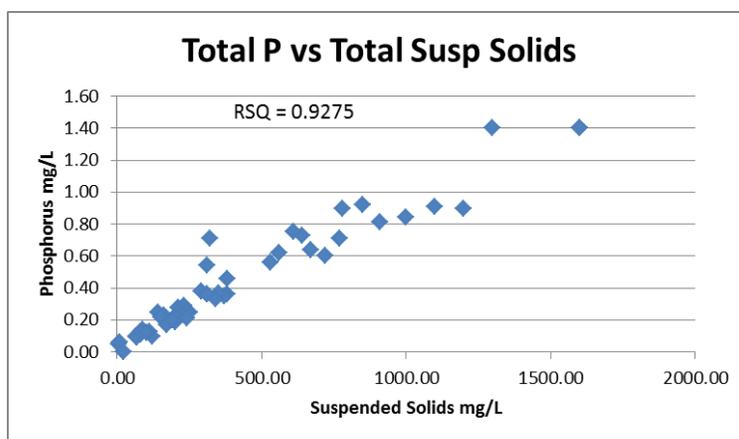


Figure 1. Combined total suspended solids and phosphorus data (2014-2017) from TMDL monitoring samples for the three primary Clear Lake tributaries.

Heavy rains and flooding early in 2017 no doubt deposited sediment and associated phosphorus in the lake from the three major tributaries – Middle Creek, Scott's Creek and Kelsey Creek. The early and

dense cyanobacterial blooms this summer may be a consequence of this sediment-borne nutrient influx. The Middle Creek Restoration Project will be a significant step in controlling the Scott's Creek and Middle Creek sediment and phosphorus deposition.

To help reduce sediment runoff on unpaved County roads, the County applies Perma-zyme Soil Conditioner to bind the loose particles and reduce soil loss. Potential sources of sediment include unauthorized off highway vehicle use on steep grades within the Clear Lake watershed, newly-planted grape vineyards with no established cover crop as well as natural scouring of creek banks.

The grading permits help with vineyard establishment, but until cover grasses become established the sheet flow runoff during rain events can be significant. Most County vineyards use drip irrigation to conserve water and reduce soil loss, but heavy rain events can move soil. Unauthorized or unregulated marijuana grows may also contribute to illegal water use as well as erosion. The County is in the process of establishing a cannabis ordinance to regulate the cultivation of medical and personal use cannabis in the County.

City of Clearlake

Each year the City of Clearlake grades over 50 miles of dirt roads before wet weather arrives in the fall. Clearlake also treats its unpaved roads with Perma-zyme. Each year Clearlake also cleans out several miles of creek drainage including Burns Valley Creek, Molesworth Creek and Miller Creek to prevent sediment loading in the creeks from discharging into the lake. Additionally all storm drop inlets in Clearlake get pumped and cleaned with a Vactor pump truck. This process pulls all the sediment build-up out of the drop inlet before it is discharged to the lake.

City of Lakeport

Lakeport performs weekly street sweeping on five major arterials in the city (Eleventh Street, Main Street, Lakeport Boulevard, North High Street and Lakeshore Boulevard). About four cubic yards of debris including leaves, dirt and trash are collected each time. Lakeport also regularly maintains (trash and debris removal) the Tenth Street and Forbes Creek drainages annually and after storm events.

In FY2014-15 and 2015-16, the City rehabilitated the pavement on Hartley, First, Second, Fourth and Fifth streets and Mellor Drive where deteriorated pavement was creating sediment-laden runoff. The First Street work included storm drainage improvements. In May 2016 and 2017 Lakeport held an annual downtown clean-up day. Volunteers, the Main Street Business Association and the City's franchise waste hauler coordinate to remove trash and debris from streets, sidewalks, curbs and gutters.

Since 2010, all new storm water drop inlets and curb inlets in Lakeport have been required to include a 1' deep sediment basin to trap sediment and debris. Public storm water inlets are maintained annually by City staff with a vacuum truck before the start of the rainy season.

Summary

As illustrated in Figure 1, the relationship between total suspended solids and phosphorus is quite robust, suggesting total suspended solids may be a viable surrogate for phosphorus. With the current data, it is difficult to directly quantify the reduction in phosphorus inputs to the lake. However by plotting total mg/L suspended solids per cubic foot per second flow over time, Kelsey Creek shows a 60% reduction in the amount of suspended solids present in creek flows from December 2014 through February 2017 (Figure 2). A similar trend of 42% reduction is present in Middle Creek (Figure 3) however no clear trend is demonstrated in Scott's Creek (Figure 4). Continued sampling for TMDL nutrients will help clarify these relationships and as the gage data improves, we may be able to better estimate the quantity of phosphorus reductions over time.

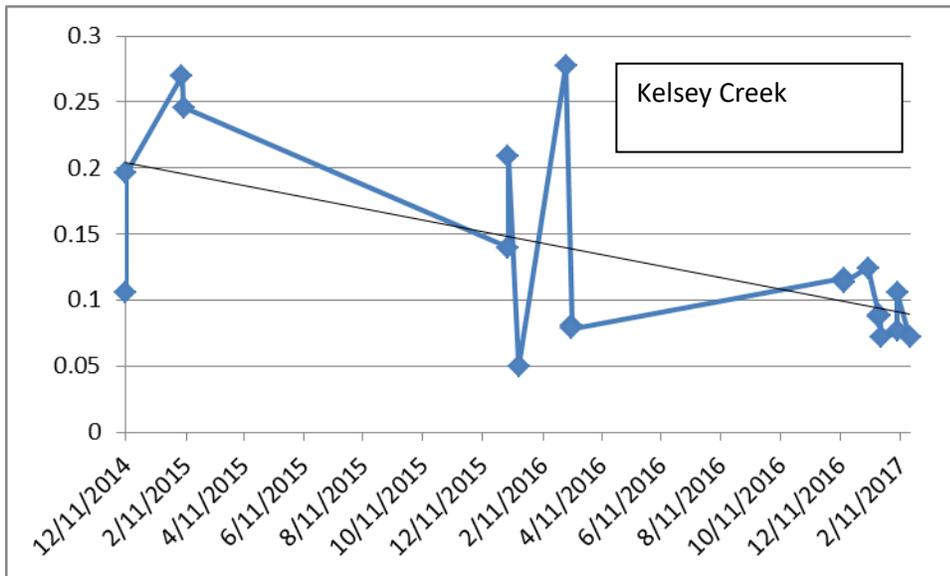


Figure 2. Total suspended solids (mg/L)/discharge (CFS) on Kelsey Creek over the duration of TMDL water quality samples (12/2014 – 2/2017). The black line indicates the linear trend. R square for TSS and CFS = 0.897.

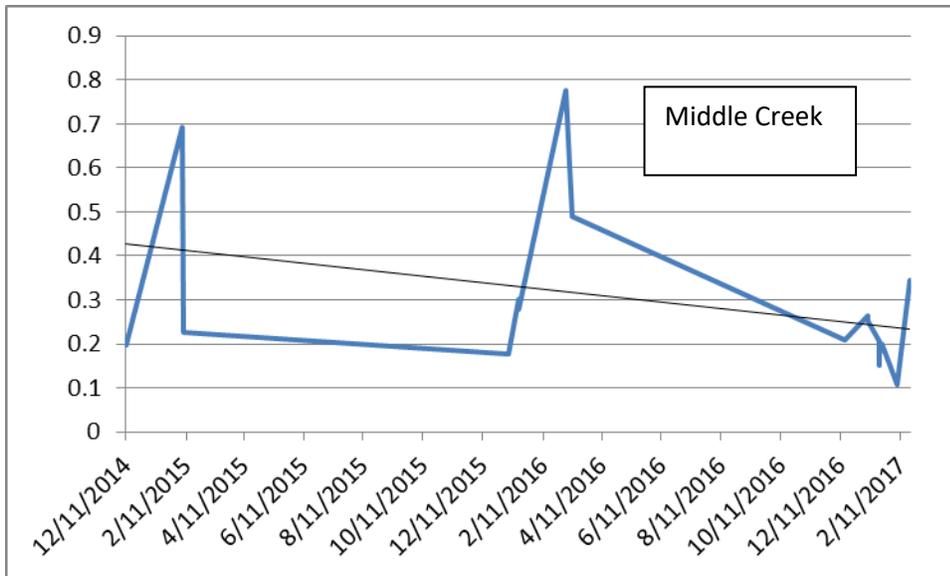


Figure 3. Total suspended solids (mg/L)/discharge (CFS) on Middle Creek over the duration of TMDL water quality samples (12/2014 – 2/2017). The black line indicates the linear trend. R square for TSS and CFS = 0.645.

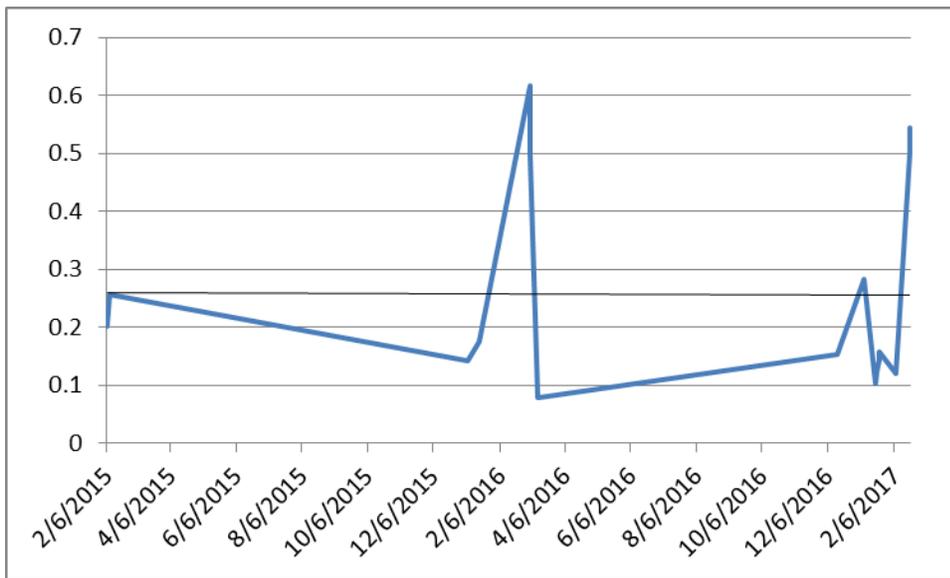


Figure 4. Total suspended solids (mg/L)/discharge (CFS) on Scott's Creek over the duration of TMDL water quality samples (12/2014 – 2/2017). The black line indicates the linear trend. R square for TSS and CFS = 0.241.

Based on the TMDL sampling data, the County is making strides in the reduction of nutrient inputs from the landscape into Clear Lake. Eventual completion of the Middle Creek Restoration Project will significantly augment these efforts. The County will continue to enforce construction and grading ordinances and inspections. The cities continue to maintain their vigilance and participation in the stormwater and clean water program with concomitant reduction of sediment input to the lake. The

cities and the County recently revitalized the stormwater/clean water coordination committee to better coordinate our County-wide clean water program and will endeavor to further the permit requirements as outlined in the guidance document.