# 2014 PGOLID Stream Monitoring Summary

*Compiled by Moriya Rufer, PGOLID Water Resource Coordinator*

## Overall Summary

Overall, 2014 showed no new large problems; however, there some results that stood out in this year's stream monitoring results. 2014 started out as a very wet year. In the fall of 2010 the ground was saturated with water, and in the winter of 2010-2014 NW Minnesota had a lot of snow cover. In spring of 2014, the spring thaw led to very high lake levels. 2014 monitoring results show that the flow from the Pelican River chain was higher coming into Pelican Lake, but it was also higher going out of Pelican Lake so there was no negative effect in lake water quality (see 2014 Lake Monitoring Summary). The flow at the other subwatersheds (Bob Creek, Spring Creek) was essentially the same as the historical averages. The Pelican River Watershed is much larger than the Spring Creek and Bob Creek Watersheds, so there is much more water and land area to contribute water to PGOLID lakes during wet years.

## 2014 Comparisons to Historical Averages

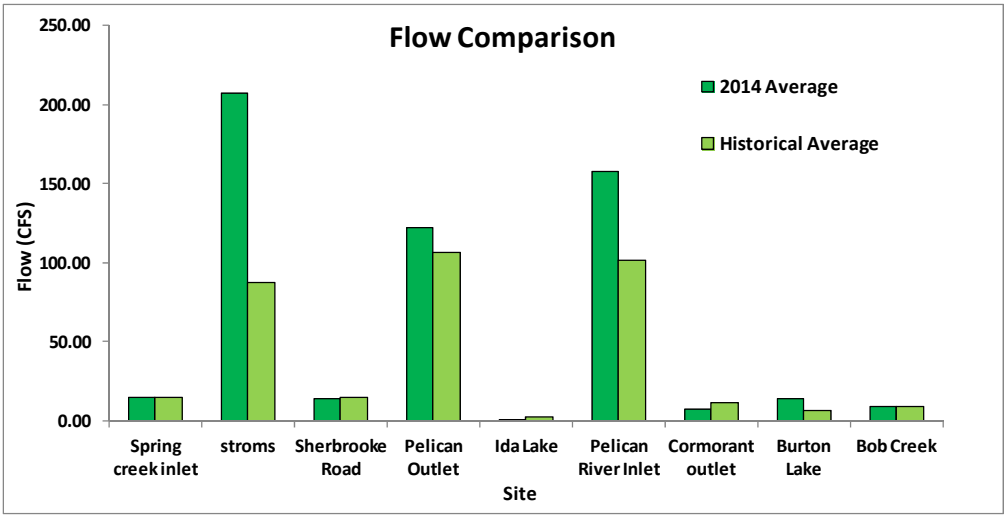


Figure 1. Water flow at each site comparing the historical average to the 2014 average.

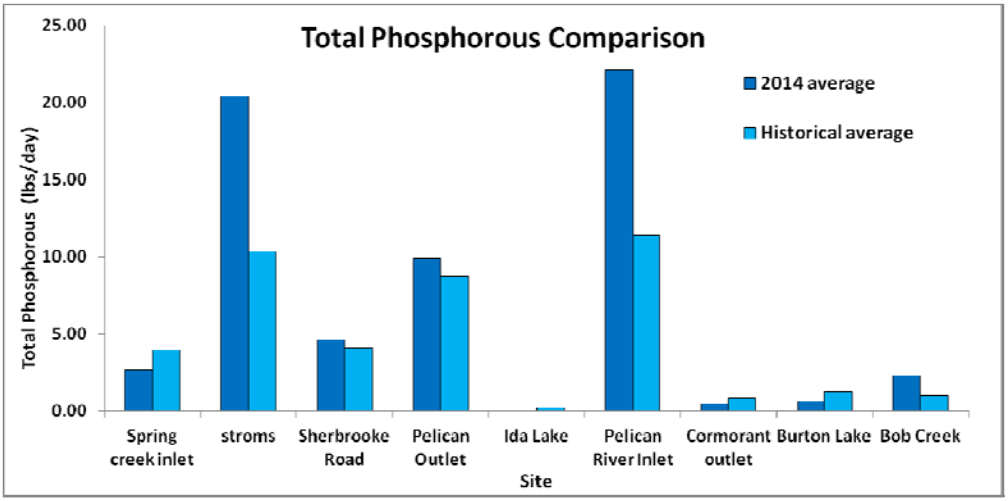


Figure 2. Total phosphorus loading at each site comparing the historical average to the 2014 average.

The flow at the Pelican River Inlet was higher in 2014 than the historical average (Figure 1). The flow was also higher at the Pelican River Outlet, so the extra water just flowed through the lakes. The sediment loading for 2014 is slightly higher than the historical average, but that is most likely due to the fact that the flow of water running into Pelican Lake was higher.

The Bob Creek Watershed includes two monitoring sites, Bob Creek and the Burton Lake outlet. This watershed showed water flows consistent to historical averages (Figure 1). This resulted in total phosphorus and total suspended solids loading that is consistent with historical averages (Figures 2 and 3).

The Spring Creek Watershed showed water flow consistent with the historical averages in 2014 (Figure 1). Cormorant Lake had their outlet control structure

discharging at full capacity in the spring, but has not been discharging this fall.

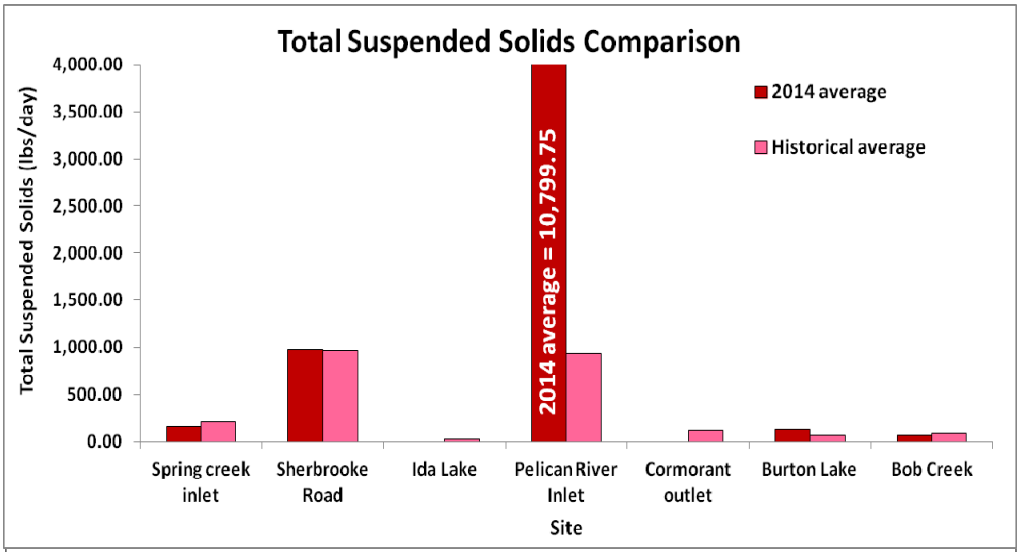


Figure 3. Total suspended solids loading at each site comparing the historical average to the 2014 average.

Historically, 73% of the water flowing into Pelican Lake comes from the Pelican River, 17% from Spring Creek, 9% from Bob Creek, and 1% from Duck Lake (Figure 4). In 2014, the Pelican River increased to 77%, which decreased the portion from the other inlets. This increase in Pelican River flow is most likely due to the saturated ground and wet spring. The Pelican River Watershed is much larger than the Spring Creek and Bob Creek Watersheds, so there is much more water and land area to contribute water to PGOLID lakes during wet years.

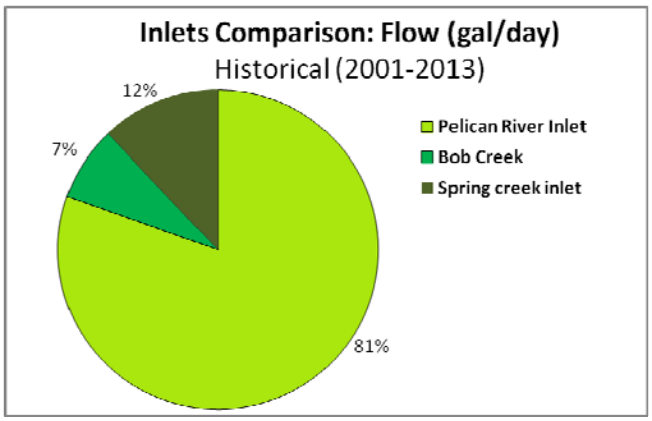


Figure 4. proportions for Pelican Lake inlets Historical inlet flow

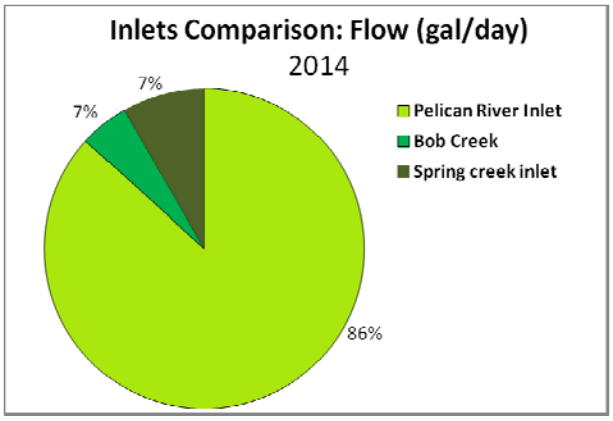


Figure 5. 2014 inlet flow proportions for Pelican Lake inlets

The phosphorus loading into Pelican Lake mirrors the flow in comparing historical phosphorus loading levels to 2014 levels (Figures 6-7). The increase in flow in the Pelican River translated to an increase in phosphorus loading into Pelican Lake from the Pelican River Watershed in 2014.

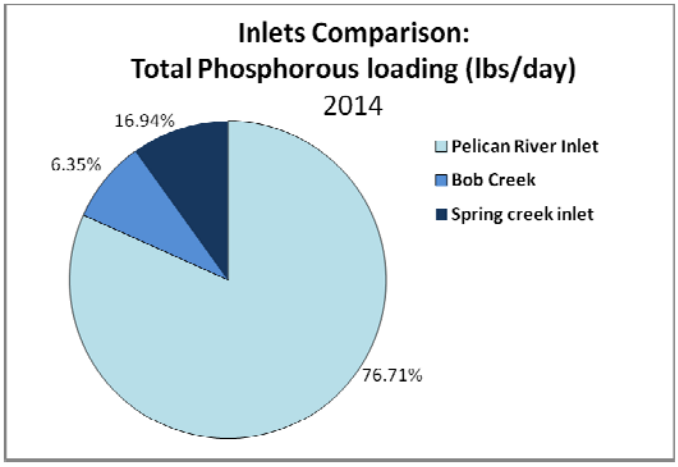


Figure 6. Historical inlet flow proportions for Pelican Lake inlets

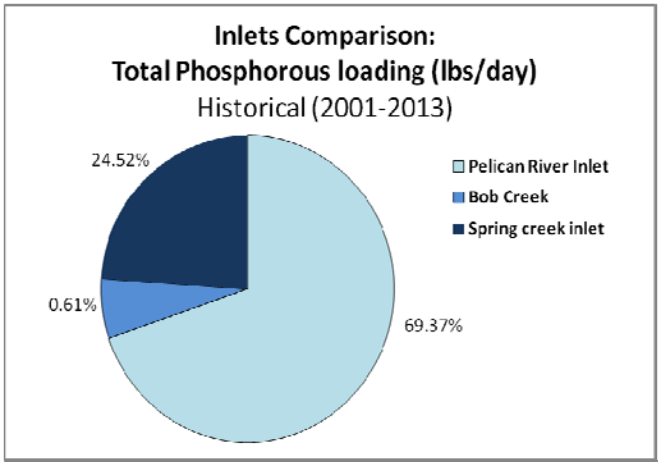


Figure 7. 2014 inlet flow proportions for Pelican Lake inlets

## Inlet vs Outlet Flow

The outlet flow follows the inlet flow, which keeps water levels fairly regulated (Figure 8). In addition, the phosphorus coming into and out of the lake follow each other, which means that extra phosphorus is not remaining in the lake (Figure 9). These results are good for water quality. If extra phosphorus was remaining in the lake, it would feed additional plant and algae growth.

The peaks in flow and phosphorus loading occur in the spring months, April-May, and are most likely attributed to spring thaw. In spring of 2013 was the highest recorded flow, and spring of 2014 was high as well.

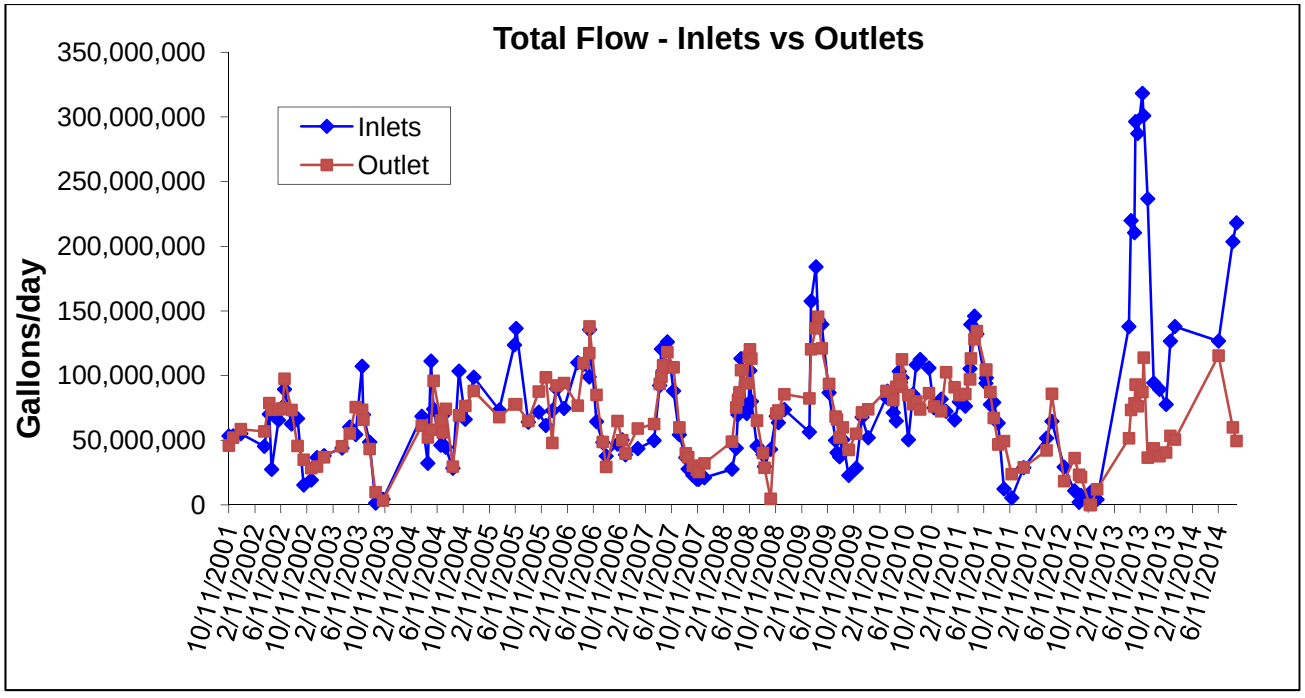


Figure 8. Historical inlet versus outlet flow in Pelican Lake.

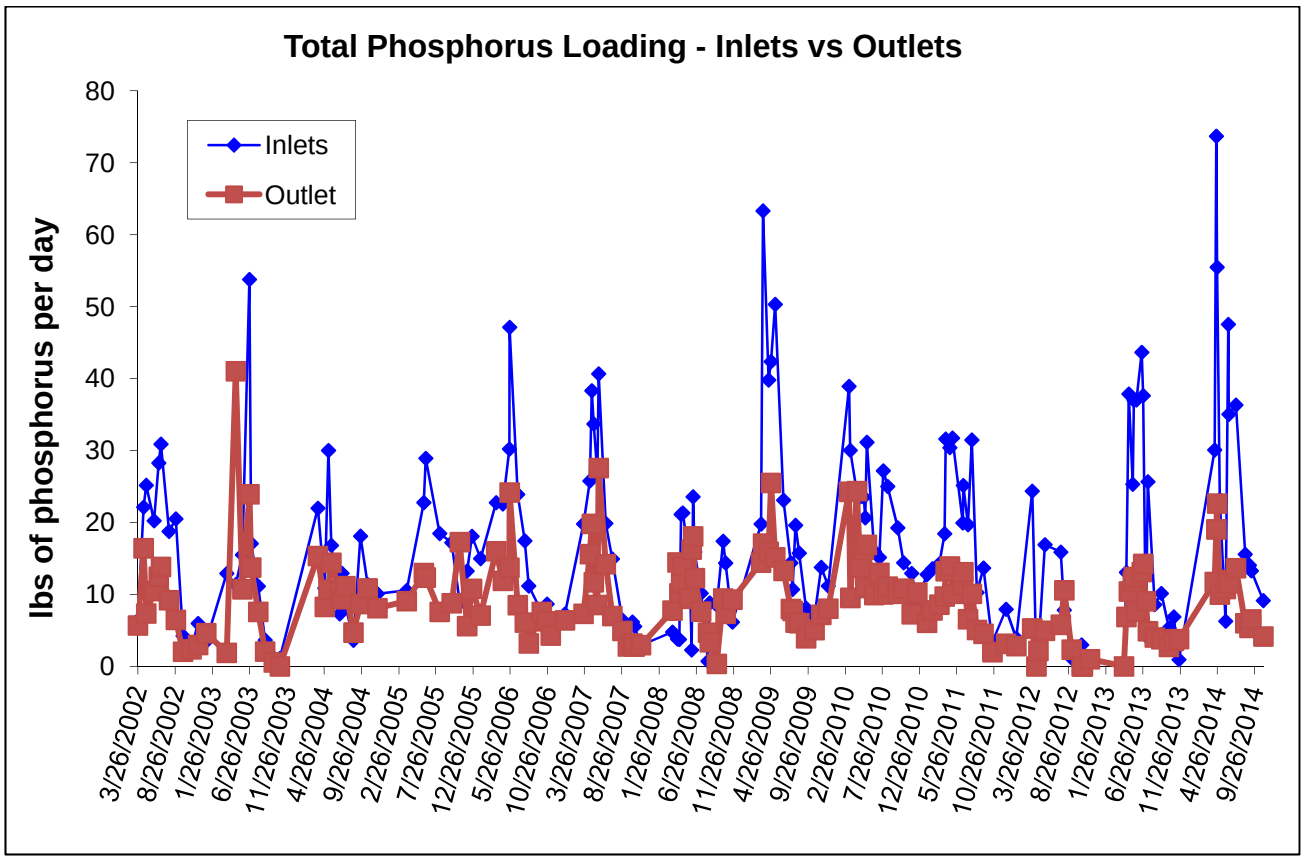


Figure 9. Historical inlet versus outlet phosphorus loading in Pelican Lake.

## Bob Creek Monitoring

Bob creek monitoring in 2014 was consistent with previous years (Figure 10). The high *E.coli* counts were measured during or after large rain events (over 1 inch). Therefore, as far as human safety, residents should not swim in Bob Creek on or 1-2 days after a rain event of over 1 inch. We can't be sure the *E.coli* is from cattle anymore now that there is a beaver dam right at the culvert.

In 2014, the highest rainfall was 2.85 inches on September 4, and the highest recorded E.coli of the year was on that same day (Figure 10).

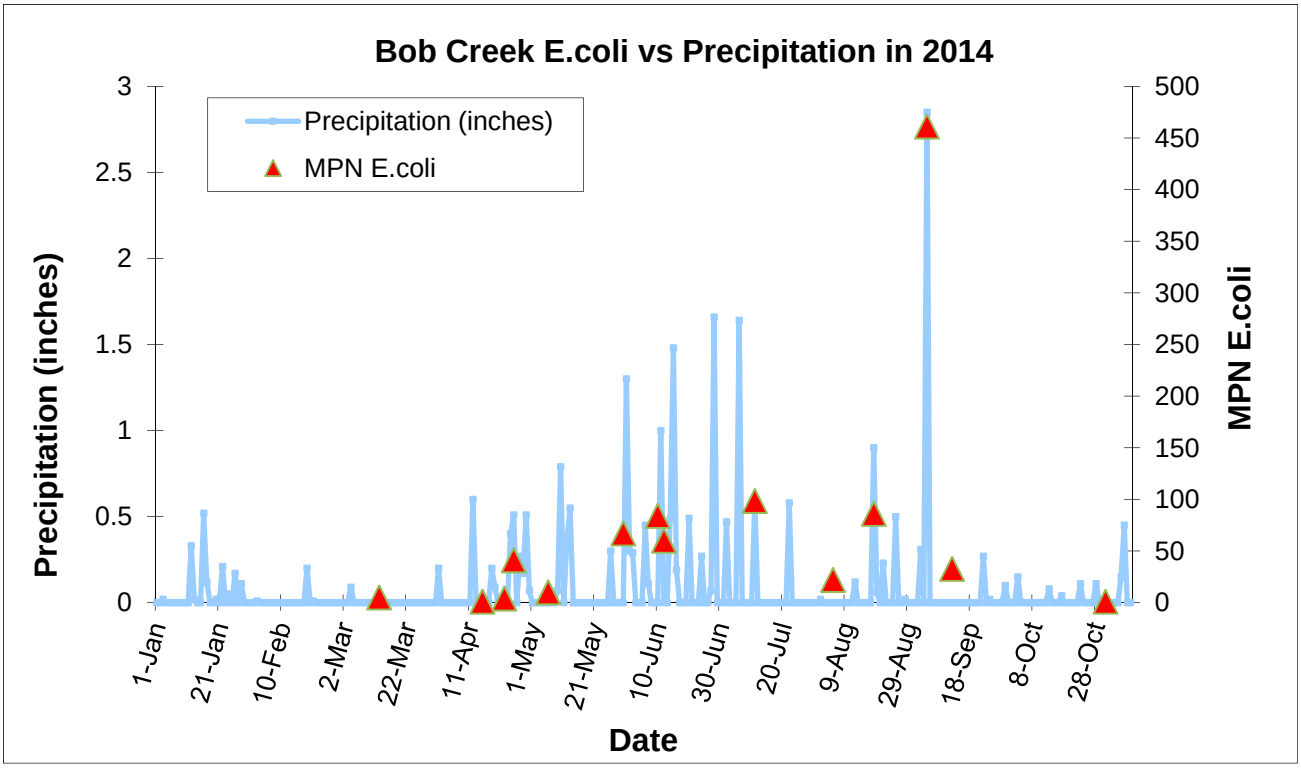


Figure 10. 2014 Burton Lake *E.coli* concentrations compared to precipitation.

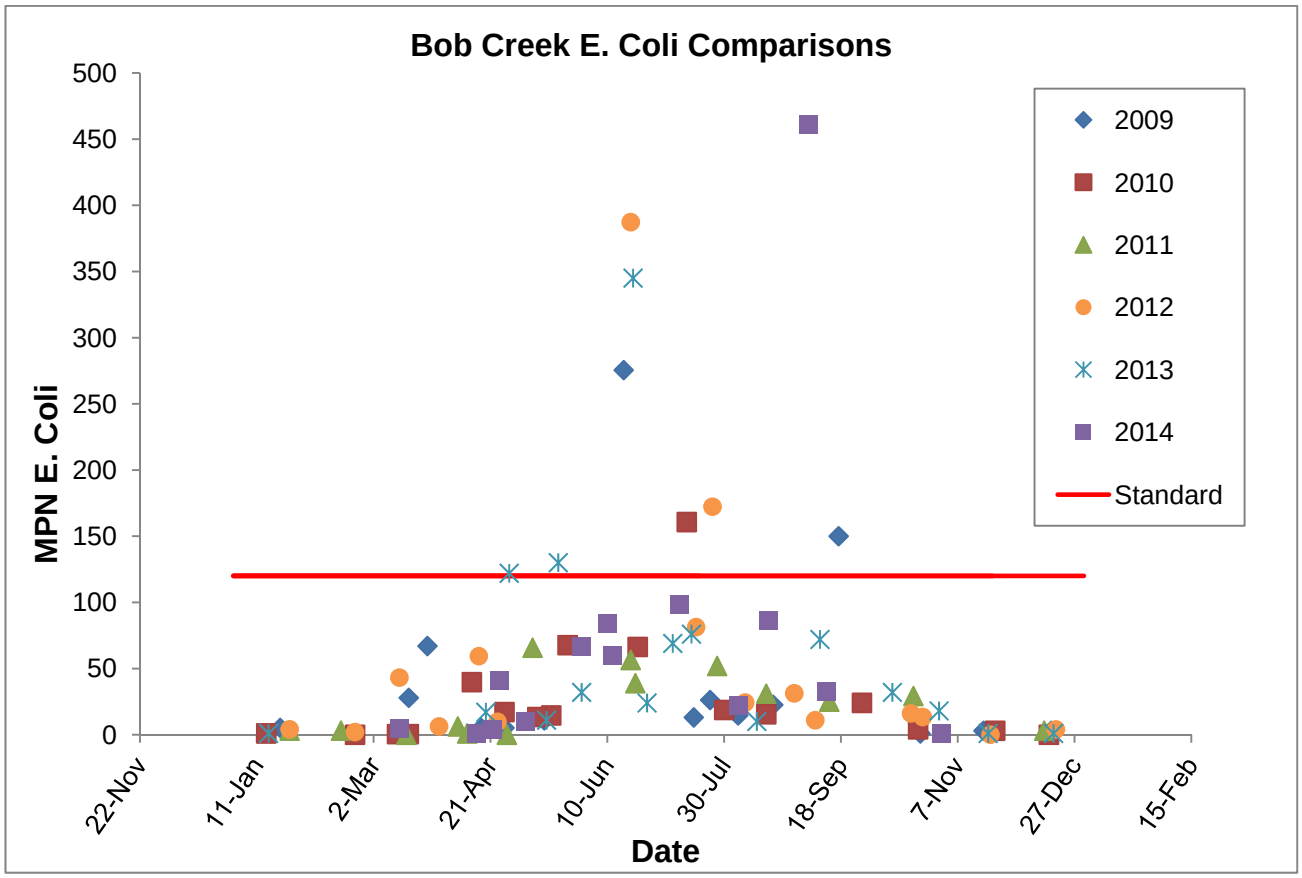


Figure 11. Bob Creek *E.coli* comparisons, 2009-2014.