2010 PGOLID Stream Monitoring Summary

Compiled by Moriya Rufer, PGOLID Water Resource Coordinator

Overall Summary

Overall, 2010 showed no new large problems; however, there some results that stood out in this year's stream monitoring results. The flow from all inlets were up over historical levels. This is most likely due to the fact that we are in a wet cycle in NW Minnesota, and we had a lot of rain this summer. From April-October 2010 we had 32 inches of rain, while in 2009 over those same months we had 25 inches of rain. In addition, the Cormorant Lake outlet control structure discharged water at their full capacity all summer. The increased flow resulted in increased phosphorus and total suspended solids loading from all inlets. The flow at the Pelican Lake outlet also increased, so the overall impact of the higher water did not negatively affect the lakes' water quality (see 2010 Lake Monitoring Summary).

2010 Comparisons to Historical Averages

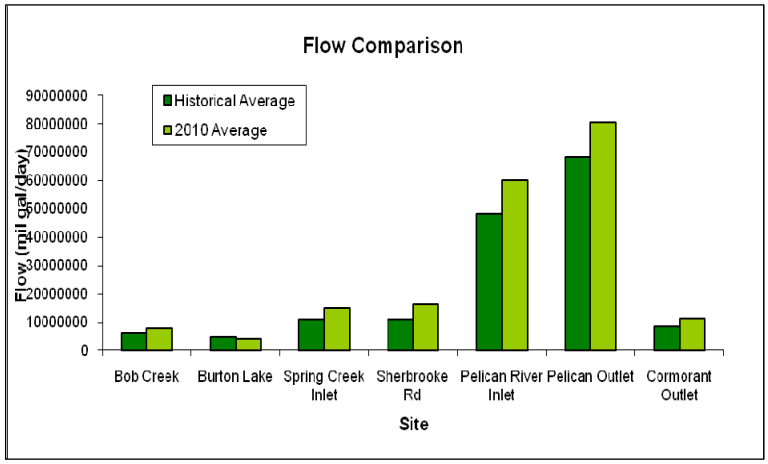

Figure 1. Water flow at each site comparing the historical average to the 2010 average.

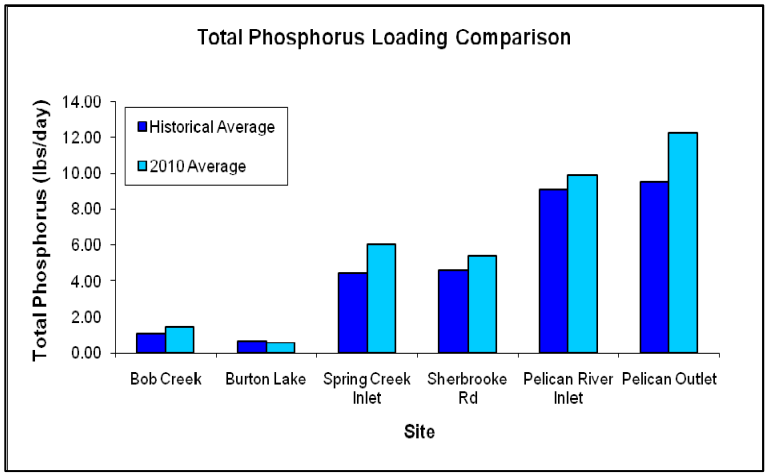

Figure 2. Total phosphorus loading at each site comparing the historical average to the 2010 average.

The nutrient and sediment loading for 2010 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 and the frequent occurrence of storm events in 2010. The outflow at the Pelican River outlet of Fish Lake showed higher loading leaving the lake as well, so there was no negative effect in lake water quality.

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 Pelican River Inlet showed slightly higher water flow in 2010 than historical averages (Figure 1). This resulted in total phosphorus and suspended solids loading that was slightly higher than historical averages (Figures 2 and 3). Precipitation records show higher than average rainfall for 2010, which is most likely the reason for the higher flow.

The Spring Creek Watershed showed higher water flow in 2010 than historical averages (Figure 1). This higher flow in Spring Creek could be due to the fact that Cormorant Lake had their outlet control structure discharging at full capacity all summer in contrast to past summers (see page 4). Figure 1 shows that the Cormorant Outlet flow measured higher than average for 2010. This most likely resulted in the higher phosphorus and suspended solids loading at the Spring Creek Inlet to Pelican Lake.

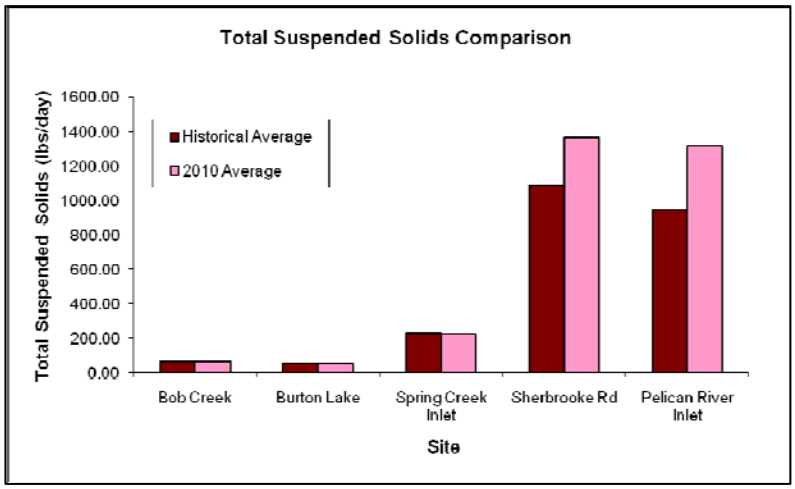

Figure 3. Total suspended solids loading at each site comparing the historical average to the 2010 average.

At the Sherbrooke Road site, phosphorus and suspended solids loading was slightly higher in 2010 than average, which is most likely due to the higher than average flows (Figure 1).

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 2010, Bob Creek contributed 1% increase in water flow historically (Figure 5). Also, Spring Creek, increased 1% of the flow entering Pelican Lake in 2010, causing the Pelican River to decrease to 72% of the flow. This increase in Spring Creek flow is most likely due to the fact that the Cormorant Lake outlet control structure was discharging water all summer, which wasn't the case in the past.

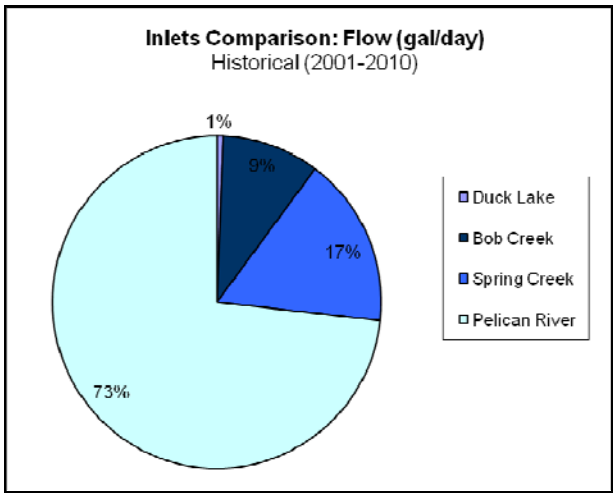

Figure 4. Historical inlet flow proportions for Pelican Lake inlets

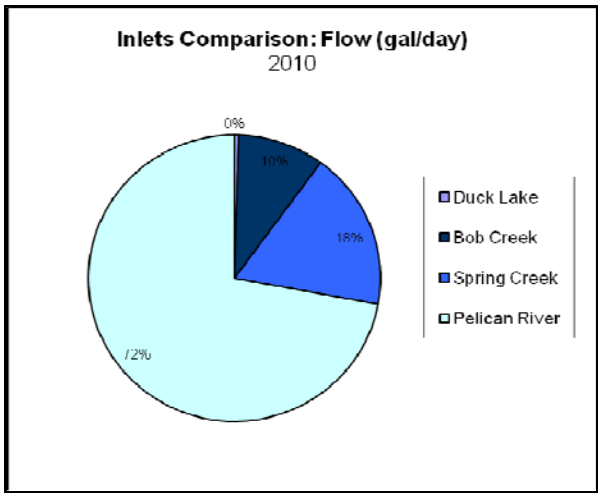

Figure 5. 2010 inlet flow proportions for Pelican Lake inlets

The phosphorus loading into Pelican Lake mirrors the flow in comparing historical phosphorus loading levels to 2010 levels (Figures 6-7). The increase in flow in Spring Creek translated to an increase in phosphorus loading into Pelican Lake from Spring Creek in 2010.

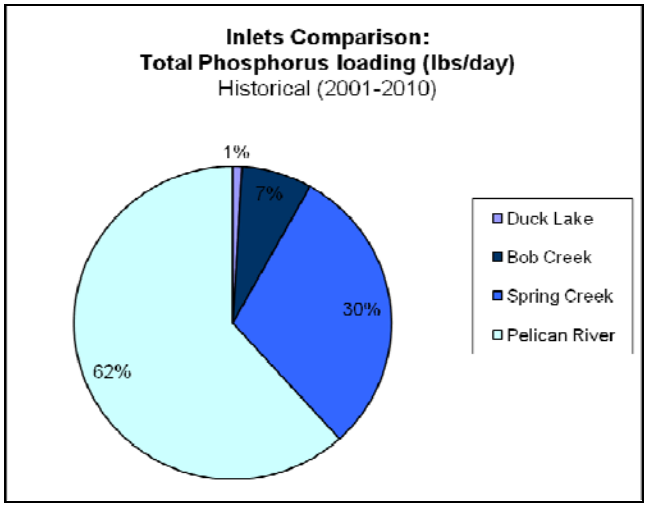

Figure 6. Historical inlet flow proportions for Pelican Lake inlets

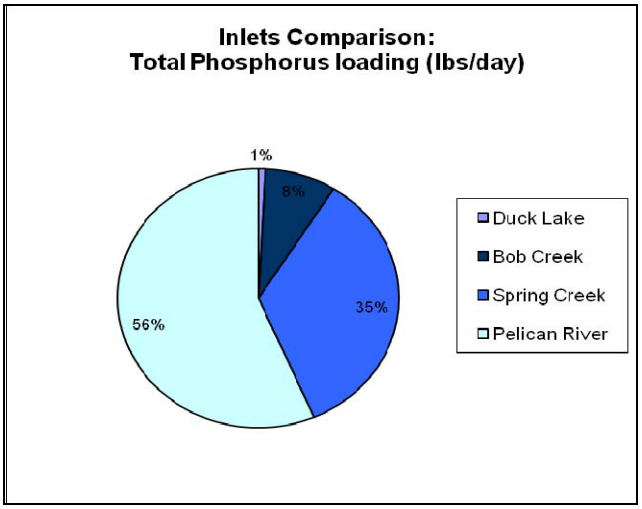

Figure 7. 2010 inlet flow proportions for Pelican Lake inlets

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.

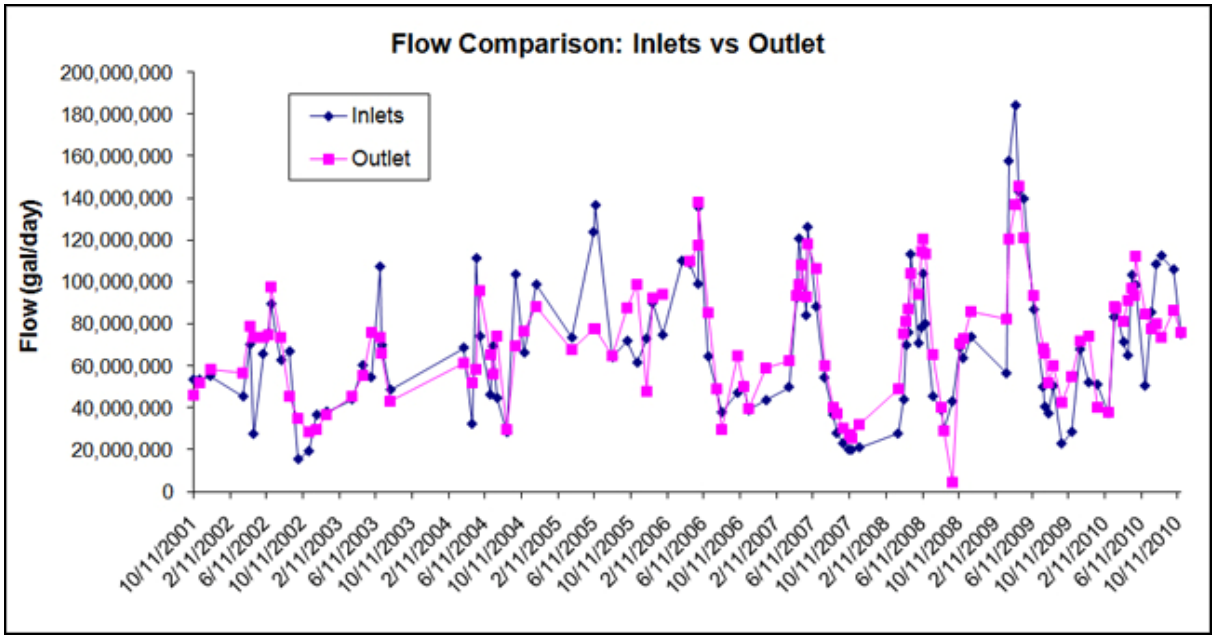

Figure 8. Historical inlet versus outlet flow in Pelican Lake.

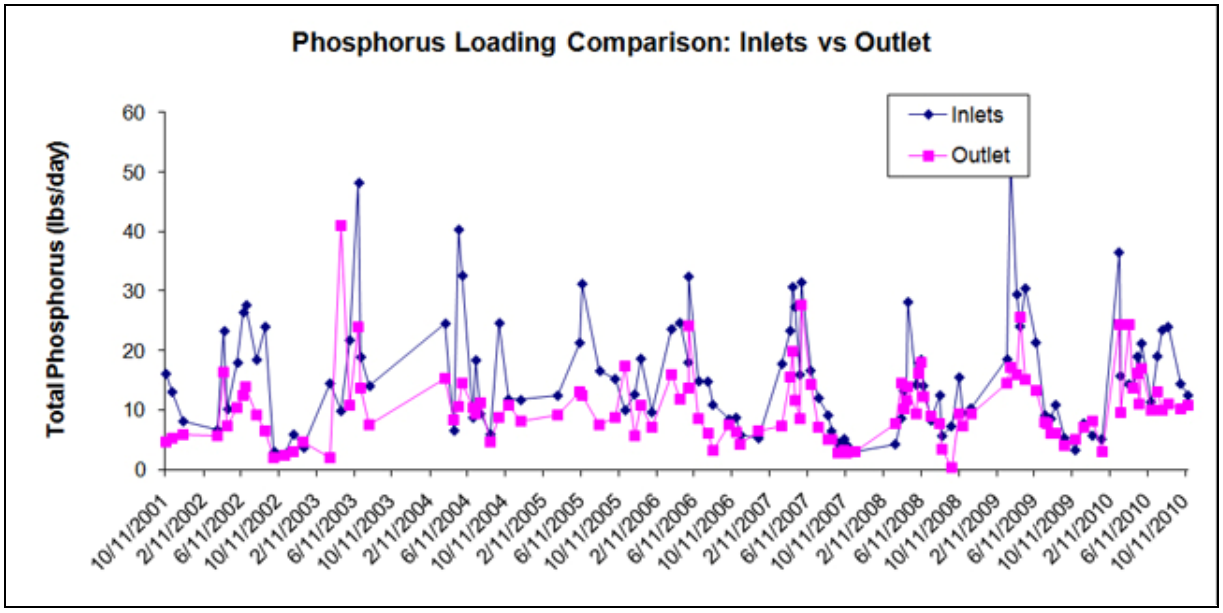

Figure 9. Historical inlet versus outlet phosphorus loading in Pelican Lake.

Big Cormorant Lake Outlet Flow

Figure 10 shows the historical flows at the Big Cormorant Lake outlet. Peak flows are from August 2008-May 2010 when the outlet control structure was flowing at full capacity in relation to the Fargo/Moorhead flooding and the agreement between the Cormorant Lakes Watershed District and PGOLID.

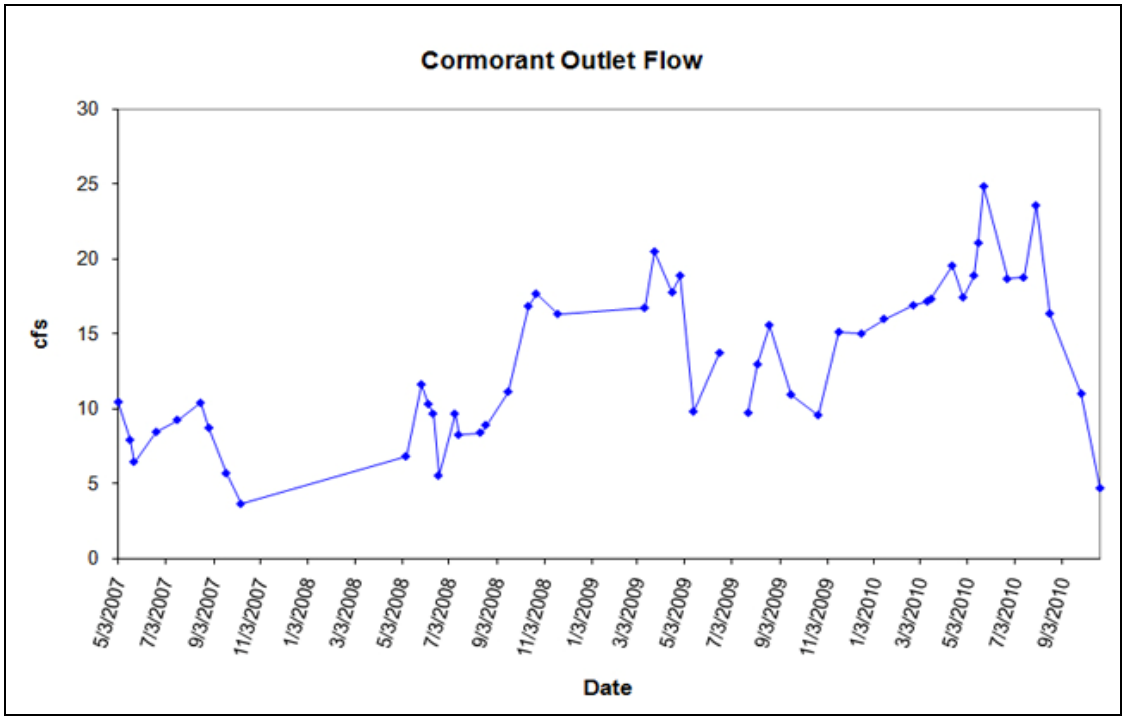

Figure 10. Historical inlet versus outlet phosphorus loading in Pelican Lake.

Bob Creek Monitoring

Bob creek monitoring in 2010 was consistent with previous years, if not slightly better. 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.