

Kalamazoo River/Lake Allegan TMDL Point Source Phosphorus Load Analysis: 1998-2005

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Summary

In 2005, the majority (88%) of point source total phosphorus (TP) discharges to the Kalamazoo River Watershed above Lake Allegan came from municipal wastewater treatment plants and lagoon systems. Approximately 85% of the municipal phosphorus load came from the City of Kalamazoo Water Reclamation Plant (WRP) and the City of Battle Creek Wastewater Treatment Plant (WWTP). Industrial discharges accounted for 12% of the total point source discharges, with Menasha Corp. contributing over 50% of the total industrial load when they were actively discharging.

When 2005 seasonal point source discharges were compared to corresponding loads from the 1998 baseline year of the Kalamazoo River/Lake Allegan TMDL, one third of the listed companies and municipalities show a significant decrease in phosphorus loads. However, seven point sources did not report any data in 2005 while the remaining six point sources showed an increase during either one or both seasons. Overall, recorded monthly seasonal phosphorus discharges from point sources were below wasteload allocation goals for the last four years with the exception of late 2005.

Introduction

The TMDL developed in 1999 for Lake Allegan and portions of the Kalamazoo River upstream of this impoundment determined that point sources accounted for about 35% of the total phosphorus load to the Kalamazoo River. Seasonal wasteload allocation goals were defined as: 8,700 lbs/month for April-June (corresponding to the same wasteload as in 1998), and 6,700 lbs/month for July-September (requiring a 23% reduction compared to 1998 discharges).

As part of a cooperative agreement, most point source dischargers signing on to this agreement, have been recording their total monthly phosphorus load on a web-based TMDL Tracking System¹. This memorandum provides an analysis of point source loading data since 1998 based on data available on this web page. Point source phosphorus loads were compiled for the period 2000-2005 and manipulated using Microsoft Excel© spreadsheets to answer the following questions:

1. What is the current distribution of TP load between point source dischargers?
2. How do current TP loads compare to the 1998 baseline loads, and to wasteload allocations goals?

We address these questions as follows.

¹ http://www.kalamazoosriver.net/cgi/ps_v2/intro.cgi

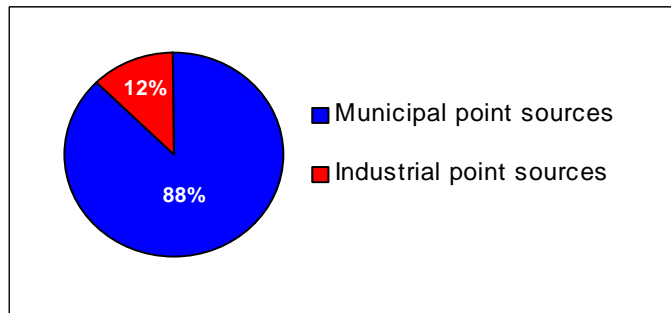
1. Distribution of phosphorus loads among point sources

This section uses available data from the on-line tracking system for three loading comparisons between and amongst current and former dischargers that were signatories to the Cooperative Agreement.

A. Phosphorus load distribution between municipal and industrial dischargers.

The total phosphorus load reported on the www.kalamazooriver.net tracking system for point sources for the period April-September 2005 was 32,833 pounds (lbs), with the majority of the load coming from municipal sources (28,695 lbs) (Figure 1).

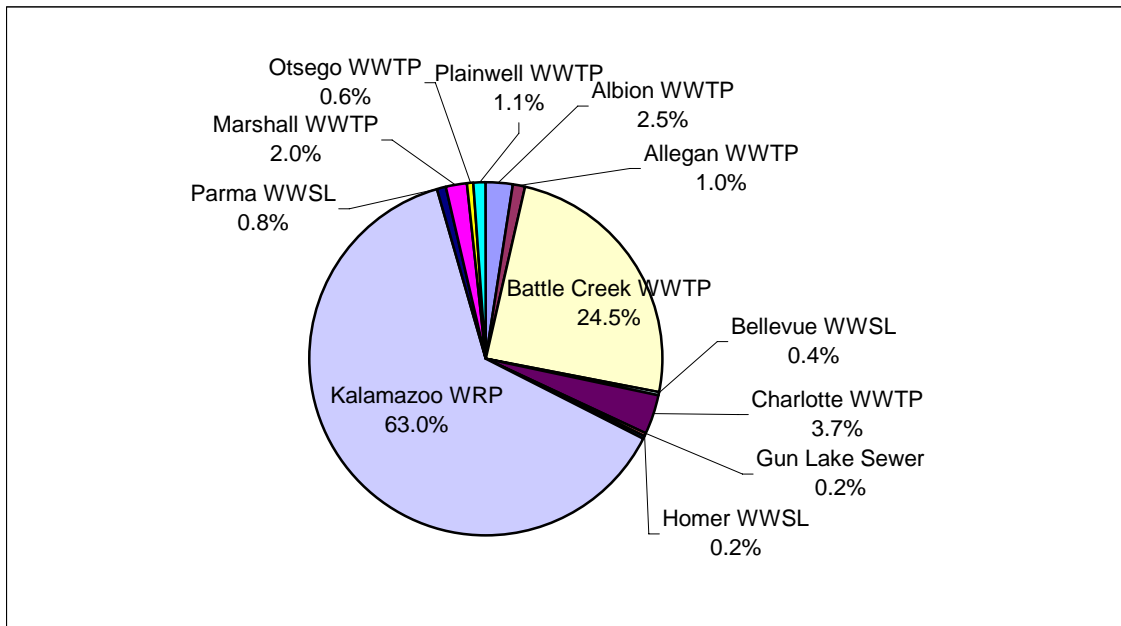
Figure 1. April-September 2005 total phosphorus load distribution among major point source categories.



B. Phosphorus load distribution among municipal point sources.

The two largest municipal dischargers, the Kalamazoo WRP (22,741 lbs) and the Battle Creek wastewater treatment plant (7,032 lbs), accounted for almost 90% of the total municipal phosphorus load from April-September 2005 (Figure 2).

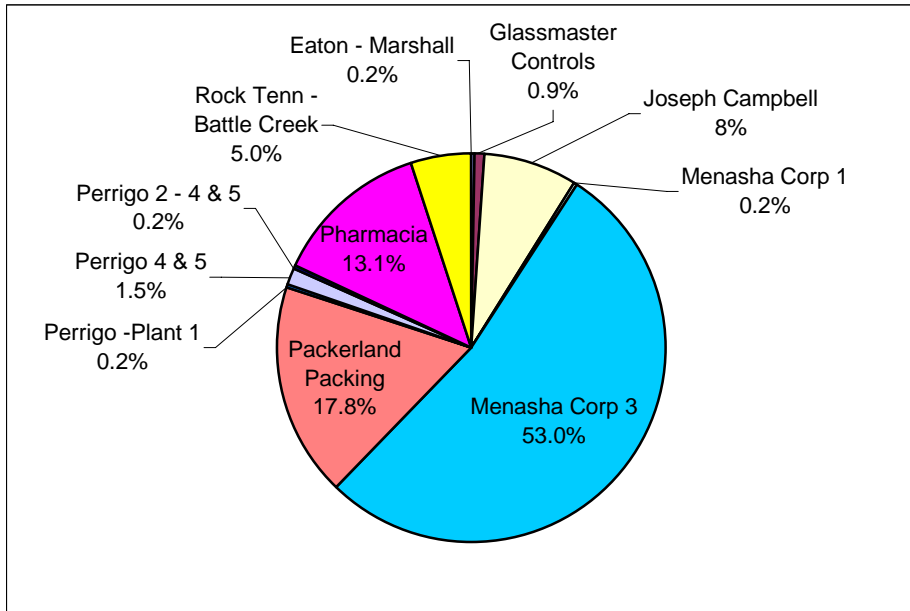
Figure 2. Distribution of TP load amongst municipal point sources for 2005.



C. Phosphorus load distribution amongst industrial point sources.

Menasha Corp. represented over 50% of the total industrial load for April-September 2005 (2,161 lbs)(Figure 3). The majority of the remaining load was largely attributable to four other industrial point sources Packerland Packing, Pharmacia, Rock Tenn and Joseph Campbell).

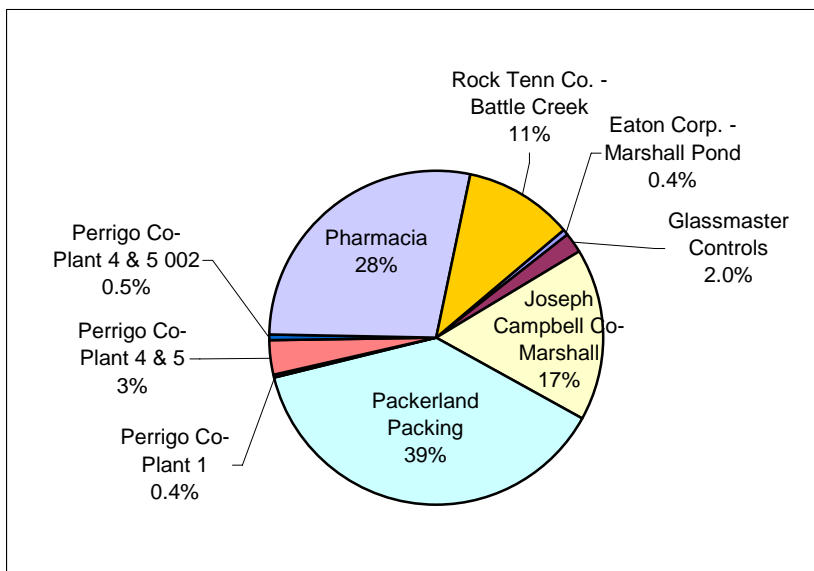
Figure 3. Distribution of TP load among industrial point sources for April-September 2005.



Most of the industrial phosphorus load came from wastewater discharges, i.e., Packerland Packing and Menasha, as opposed to other discharges that were largely cooling water.

Menasha Corporation stopped operating in 2005. Figure 4 illustrates the likely distribution of industrial discharges in 2006 if all others remain similar to 2005. Approximately 67% of the industrial load will be attributable to Packerland Packing and Pharmacia (Figure 5).

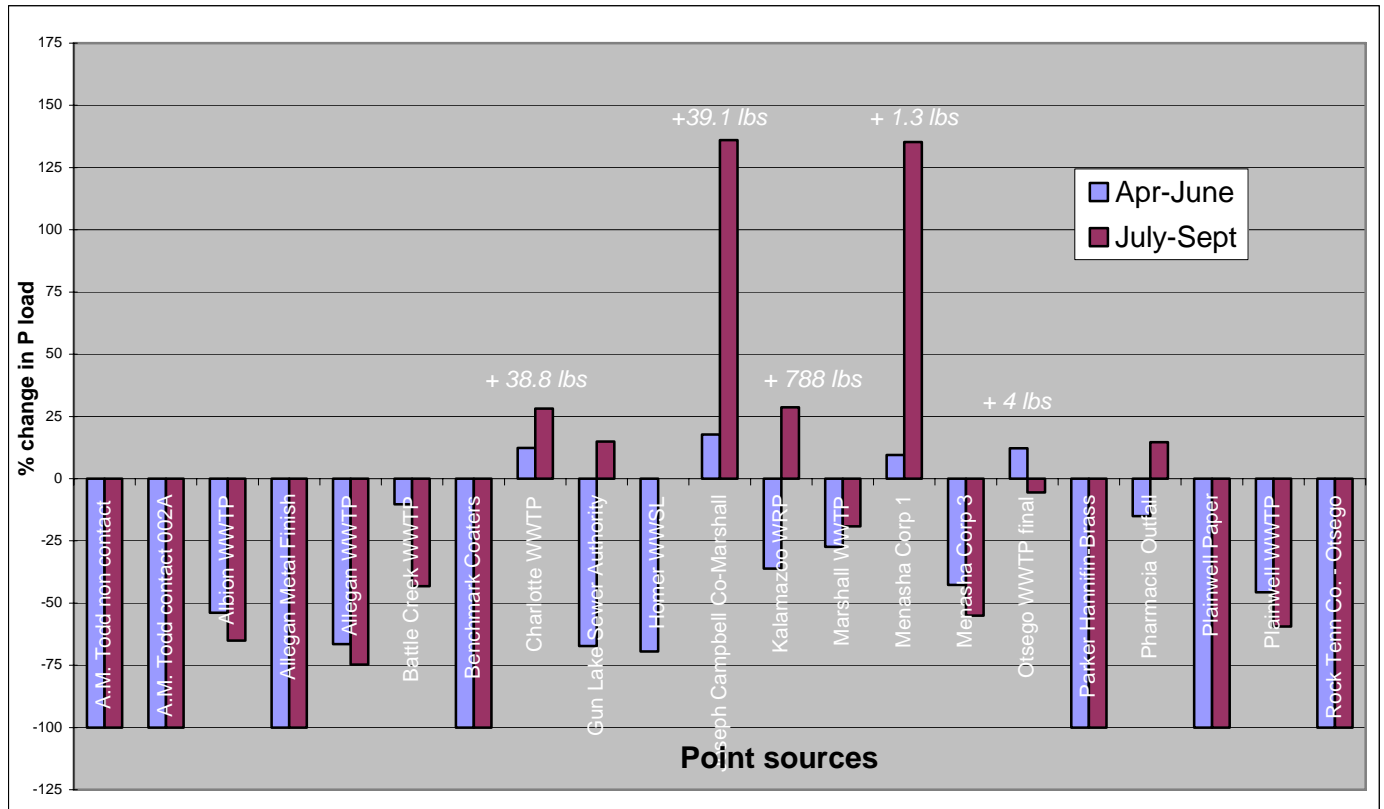
Figure 4: Projection for 2006 TP loads among industrial point sources without Menasha Corp.



2. Change in phosphorus discharge compared to 1998 baseline loads

In Figure 5, the horizontal axis at zero corresponds to 1998 baseline loads for point sources. The seasonal wasteload allocation is denoted at 8,700 lbs/month for April-June and at 6,700 lbs/month for July-September. Histograms illustrate the percentage of how much the point sources have increased (>0) or decreased (<0) phosphorus discharges since their individual 1998 discharge levels. Missing bars indicate that data were not available for the period analyzed. In addition, the graph only takes into account point source dischargers that were recording data both in 1998 and 2005. It does not show any new point sources that came online, or started recording data, after 1998, such as the Bellevue WWSL, Glassmaster Controls and Packerland Packing. In total, nine point source dischargers, representing an average phosphorus load of 268 lbs/month for April-May 2005 and 227 lbs/month for July-September 2005, are not shown in Figure 5.

Figure 5. Change in seasonal load for 2005 compared to 1998 baseline loads.



Note: AM Todd, Allegan Metal Finish, Benchmark Coaters, Parker Hannifin, Plainwell Paper and Rock Tenn Co-Otsego, did not report any data in 2005.

Seven dischargers were recording a reduction in load for both seasons while three were showing an increase for both seasons. Seven companies in 2005 did not report loads, some having previously ceased operations (e.g., Plainwell Paper). In 2005, the total average seasonal wasteloads recorded were: 4,914 lbs/month for April-June and 6,030 in July-September corresponding respectively to a 39% and 15% reduction compared to 1998 recorded loads.

Point source loads averaged over the two 3-month growing seasons in 2000 through 2005 were below TMDL wasteload allocations for all years except 2000 (Figure 6). With the exception of September, monthly WLA goals were achieved in 2005 (Figure 7). It should be noted that some loading data are missing, as they have not always been consistently reported by all point sources.

Figure 6. Average seasonal point source load compared to TMDL wasteload allocation.

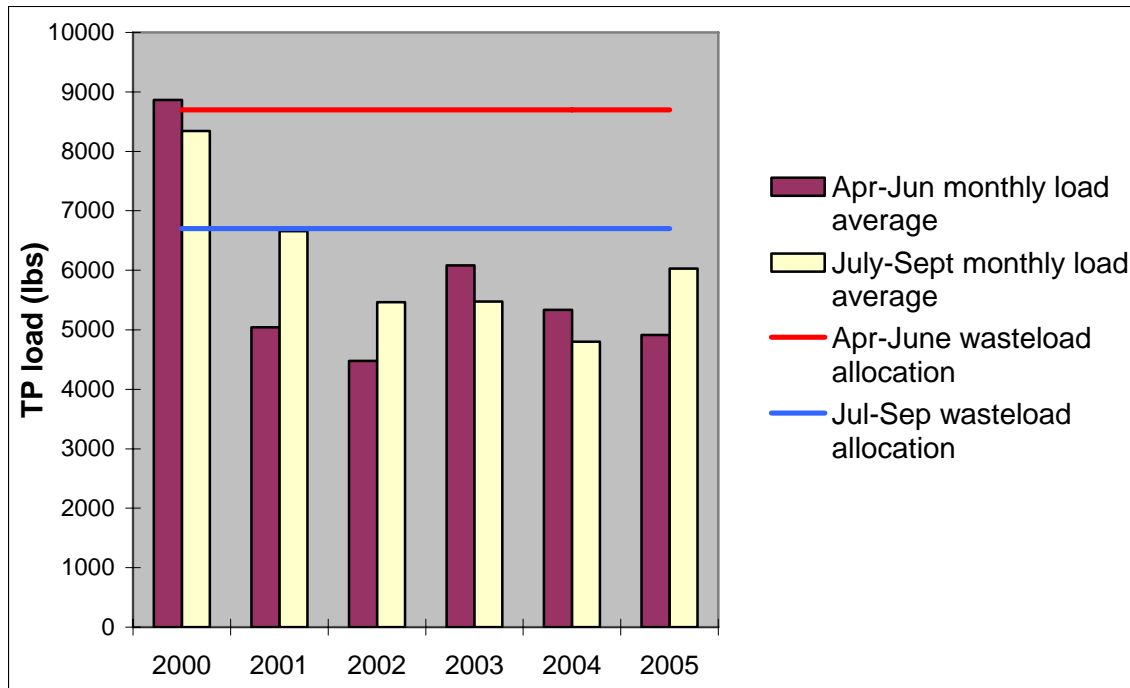


Figure 7. TP load monthly average for point sources, April-September 2005.

