Little Calumet River Watershed-based Plan

Executive Summary

The Watershed-based Plan (WBP) for the Little Calumet River Planning Area is a comprehensive overview of the water quality conditions in the watershed and measures that need to be implemented to restore and protect water quality. The United States Environmental Protection Agency and the Illinois Environmental Protection Agency have identified nine key elements that need to be addressed in watershed plans to achieve improvements in water quality. The WBP addresses these nine elements.

The WBP is a supplement to the Metropolitan Water Reclamation District of Greater Chicago (MWRD) Detailed Watershed Plan (DWP) for the Little Calumet River in Illinois. The DWP focuses on flooding concerns in the watershed. The complementary WBP focuses on water quality.

About the Watershed

The Little Calumet River generally flows from east to west, starting in Indiana and flowing into the Cal-Sag Channel. The total drainage area including the land in Indiana is approximately 265 square miles. The scope of the WBP is limited to the area in Illinois, and excludes the Thorn Creek drainage area for which a WBP has previously been developed and approved. The drainage area addressed in the WBP includes 29 communities, wholly or in part. Based on the 2010 census, the population in the planning area is approximately 310,000.

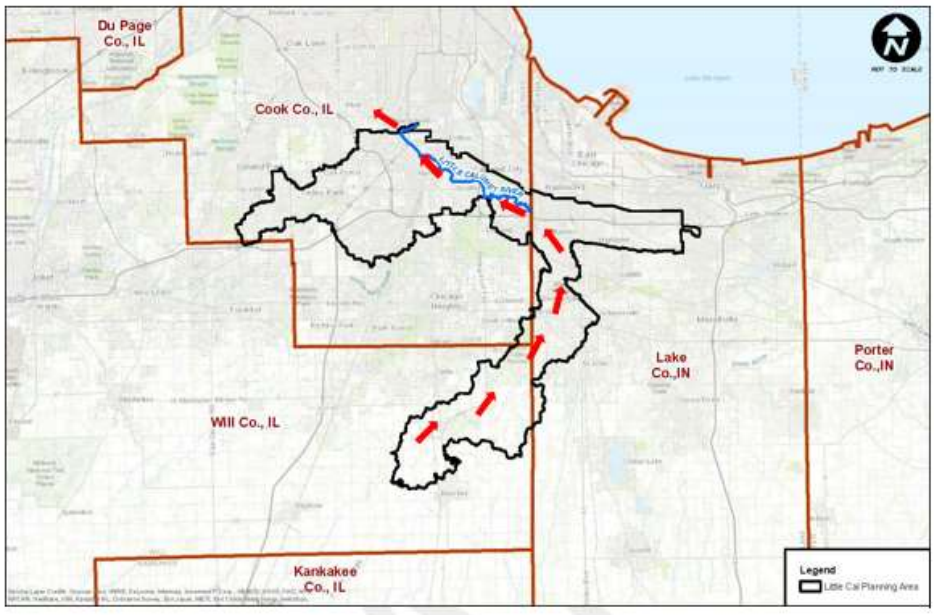

Figure 1 - Little Calumet River WBP Planning Area

The planning area is approximately 90%-95% developed excluding the forest preserves. As would be expected in an urbanized watershed, much of the land area is covered with impervious surfaces. Much of the development in the watershed occurred prior to the 1970's and stormwater control measures such as detention or volume control were not systematically integrated into the areas. The result today is high volumes of stormwater runoff and significant pollutant loadings to the water bodies.

Watershed Goals

The goal for implementation actions in the Little Calumet River watershed is to improve water quality so that designated uses can be supported. The uses to be attained include recreational uses for people and habitat for aquatic species.

To improve water quality in the River and tributaries, pollutant loadings to the watershed need to be reduced. Analyses of the sources of water pollution and pollutant loadings revealed that stormwater runoff is the most significant source of pollutant loadings in the watershed. The plan identifies a target level of Best Management Practices (BMP) implementation which will result in the following load reductions:

Nitrogen Reduction	Phosphorus Reduction	BOD Reduction	Sediment Reduction
(lbs/yr)	(lbs/yr)	(lbs/yr)	(tons/yr)
5%	7%	3%	17%

These loading reductions will noticeably contribute to water quality improvement.

Stormwater BMP Implementation

Reflecting the identified sources of pollutant loadings, the plan recommends types of BMPs to better manage urban runoff and stormwater. Many of the recommended BMPs will have the function of intercepting and treating runoff, including green infrastructure practices. Green infrastructure practices, which include rain gardens, bioswales, permeable pavements and green roofs, capture and treat runoff, resulting in reduced stormwater volumes and reduced pollutant loads. The plan also notes the importance of non-structural controls, including but not limited to measures that communities will carry out in conformance with MS4 permit provisions.

Figure 2 - Rain Garden

An aggressive level of BMP implementation will be needed to achieve substantial pollutant load reductions. The Plan proposes a target degree of BMP implementation. Specifically the Plan recommends that 25% of the land areas with the different land uses/land covers in the watershed will have BMPs applied to reduce runoff volumes and pollutant loads. This is the maximum degree of implementation expected to be practicable, given public vs. private land ownership, budgets, community-buy-in, and other factors.

The plan identifies *types* of BMPs that would address the sources of loadings, but does not list or *prescribe* specific BMPs in specific places. The sizes and designs of BMPs and the optimal places for BMPs will need to be determined by communities and other stakeholders taking into account where benefits will be the greatest but also numerous factors including land ownership, budgets, community buy-in, and how maintenance will be assured. Also, new concepts or designs for BMPs may be

developed during the plan implementation period. The plan intends there be flexibility to incorporate new BMP concepts if they cost-effectively reduce pollutant loadings from urban runoff and stormwater discharges.

Key Pollutants - Sediment

Sediment is one of the most common pollutants in U.S. rivers, streams and lakes. Sediment in stream beds disrupts the natural food chain by destroying the habitat where the smallest stream organisms live and causing declines in fish populations. Sediment also acts as a vehicle for other stormwater pollutants providing a mechanism to transport nutrients, hydrocarbons, metals and pesticides. Sediment is identified on the State list of impaired waters as one of the causes of use impairments in the Little Calumet Watershed. The stormwater BMPs recommended in the plan typically do a very good job of reducing amounts of sediment/total suspended solids.

Key Pollutants - Bacteria

Recreational uses are affected by bacteria in a water body, which can make the water unsafe for wading or swimming or kayaking. Historical monitoring in the Little Calumet River showed elevated levels of bacteria. Much of the data collected was prior to 2015. Since that time, MWRD has made significant strides to address Calumet-area water quality. This includes:

- The Thornton Reservoir, part of the regional Tunnel and Reservoir Plan, came online. This has greatly reduced CSOs to the Chicago Area Waterways System. CSOs can release large amounts of bacteria when events occur.
- MWRD initiated operation of disinfection treatment at the Calumet Water Reclamation Plant. This plant serves more than one million people in a 300-square-mile area covering the south side of Chicago and surrounding south suburbs.

The operation of the Reservoir and improved treatment system at the Calumet plant have greatly reduced bacteria loadings to the Chicago Area Waterways system. Based on MWRD data collected at its Halsted Street monitoring location on the Little Calumet River, where data was collected pre- and post-disinfection between March 2015 and November 2016, the amount of fecal coliform had been reduced 82% - 99% (varying bacteria counts in different months). It is expected that future monitoring data will show the Little Calumet River is achieving its recreation-based designated uses.

Key Pollutants - Chlorides

Another pollutant of concern in the watershed is chlorides. Chlorides can impair uses and in high concentrations are toxic to aquatic ecosystems. The primary source of chloride loadings within the Little Calumet River Planning Area is deicing activities. Following application to a roadway surface, chloride (road salt) will run off into receiving waterbodies where the concentration in the waterbody will increase, particularly throughout the winter months when chloride concentrations spike. Chloride levels in soils and waterbodies can also continue to be elevated several months after winter has ended. In a study conducted by the USGS, chloride concentrations have increased substantially over time with average concentrations approximately doubling from 1990 to 2011.

The highly-urbanized Little Calumet River planning area includes significant roadway and ROW land uses; ROW makes up nearly 20-30% of some of the urbanized watershed planning units. Loading estimates developed as part of the watershed planning work indicate very high amounts of chloride are being released into the watershed each year. Best practices associated with optimizing the use of salt for deicing will be needed to reduce chloride loadings. The plan identifies generally accepted best practices for reducing chloride loadings.

Figure 3 - Using Liquid De-icers

Quantifying Effects

The Plan models and quantifies the loadings being released in the 13 watershed planning units. The pollutants and the loading amounts are closely related to land use. There are high loadings of sediment, chlorides, and other pollutants in areas with residential land use, industrial land use, and road right-of-ways. The plan identifies BMP scenarios or templates that are suitable for the various land uses in the watershed. An aggressive level of BMP implementation will be needed to achieve substantial pollutant load reductions.

The plan sets out a target level of BMP implementation or saturation. Specifically the plan recommends that 25% of the land areas with the different land uses/land covers in the watershed will have BMPs applied. This is the maximum degree of implementation expected to be practicable, given public vs. private land ownership, budgets, community-buy-in, and other factors.

The plan estimates the magnitude of BMPs that would need to be implemented in each watershed planning unit, and the load reductions that will be achieved in each area. Because of the size of the watershed and the amount of developed area, the 25% target implementation level represents a very ambitious scale of BMP implementation.

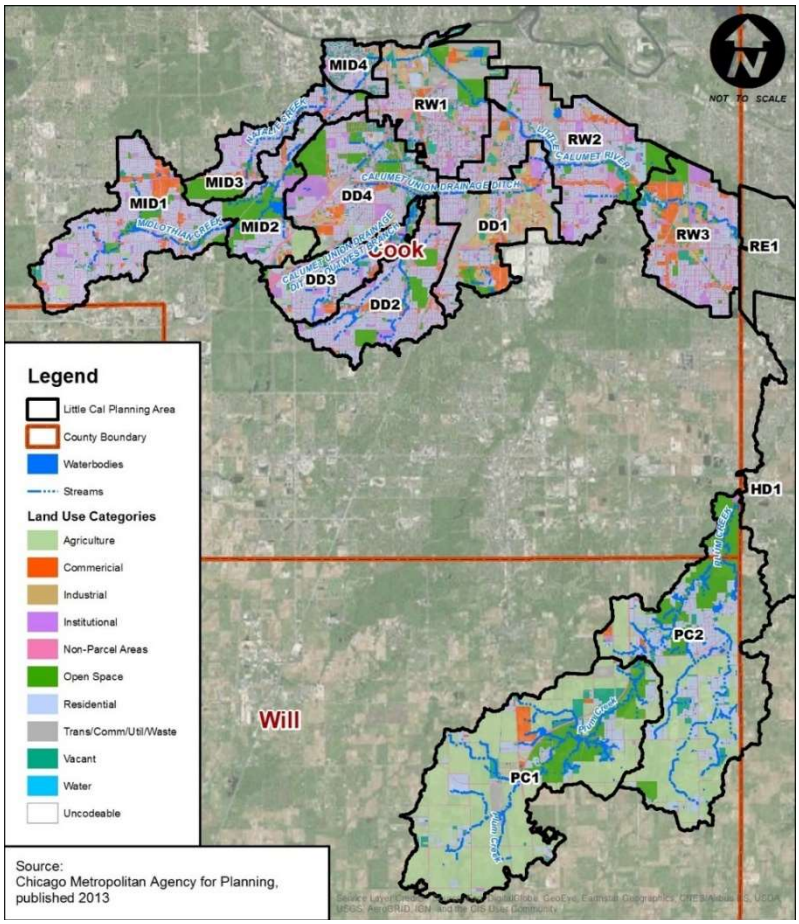

Figure 4 - Watershed Planning Units and Land Use in the Little Calumet River Watershed

Schedule and Implementation Tracking

The plan establishes a 25-year implementation period, and identifies milestones that can be used to gauge progress. Evaluating plan implementation and measuring progress will involve tracking the implementation of BMPs and the estimated loading reductions being achieved.

Water quality monitoring will be needed to assess the water quality changes that occur during the plan implementation period. MWRD has been conducting monitoring in the watershed, and Illinois EPA and Illinois DNR have conducted monitoring when resources allowed. The data produced was critical for the development of the watershed plan. Monitoring efforts will be important for characterizing water quality conditions over time in the watershed.

Costs

The costs to implement urban runoff/stormwater BMPs will be significant—very considerable BMP implementation will be needed to reduce the pollutant loadings to the water bodies and restore and protect water quality. The plan estimates that BMP implementation costs over the 25-year time horizon will be approximately $217 million. The plan identifies funding and financing programs which municipalities and other stakeholders may be able to access to help fund plan implementation.

Conclusion

Implementing the WBP will be a challenging undertaking. However, with creative thinking and strong resolve on the part of watershed decision-makers, businesses, and residents, significant progress can be made toward a healthy watershed that can be appreciated and enjoyed by all.

Figure 5 - Little Calumet River