

Figure 5-13. Project Synopsis: Smetana Lake Use Attainability Analysis

A Use Attainability Analysis (UAA) is a scientific assessment of a water body’s physical, chemical, and biological conditions. This assessment provides the foundation for a lake-specific best management practices (BMPs) plan that is used to maintain or attain the existing and potential beneficial uses of a lake, such as swimming, fishing, or aesthetic viewing.

Goals for Smetana Lake

Nine Mile Creek Watershed District

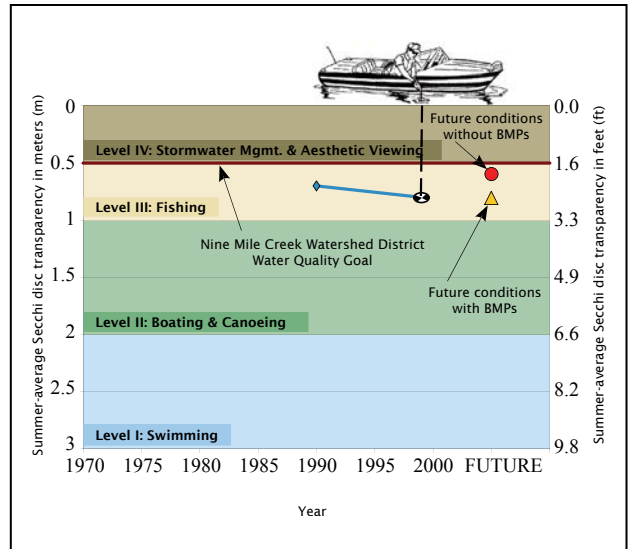
Water Quality Goal:

Level III Classification—partial support of swimmable use and a Secchi disc reading ≥ 0.5 m.

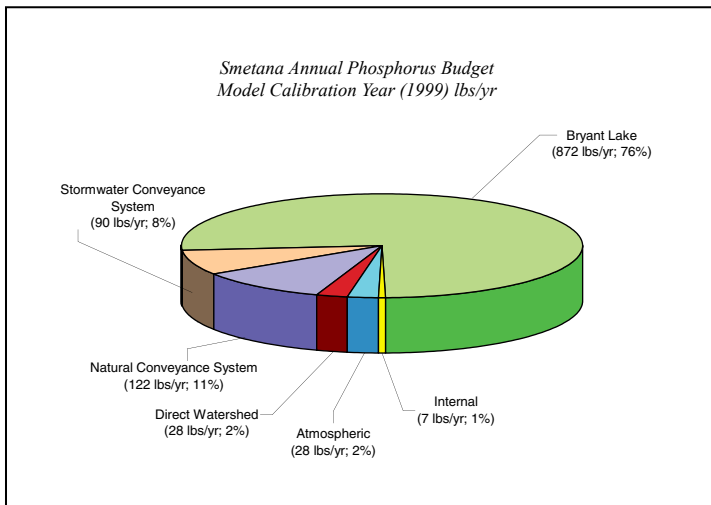
Investigative Techniques

The Smetana Lake UAA includes both a water quality analysis and prescription of protective measures for Smetana Lake and its watershed. This analysis and prescription is based on:

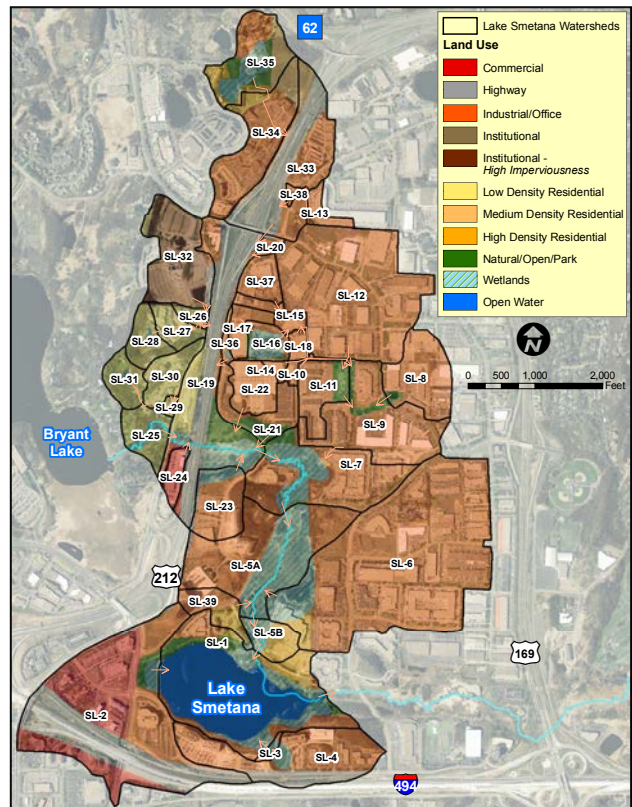
- Historical water quality data
- Intensive lakewater quality study
- P8 computer simulation modeling of runoff water quality
- Lake hydrologic and phosphorus budget analyses (see below)
- Best management practices (BMPs) analysis



This graph illustrates Smetana Lake’s historic and predicted future summer-average water clarity (transparency). Transparency is measured as the depth at which a black-and-white patterned disc (a Secchi disc) disappears from view as it is lowered into the water.



The annual phosphorus budget indicates outflows from Bryant Lake contribute the largest amount of phosphorus to Smetana Lake (~76 percent).



The land use on a lake’s watershed directly impacts the water quality in the lake. Therefore, the Smetana Lake UAA assessed existing and ultimate watershed land-use conditions.



Curlyleaf pondweed is an invasive aquatic plant that releases nutrients into the water when it dies back in early summer.



Purple loosestrife is an exotic species that invades wetlands and lake shorelines. It out-competes native species and, if left unchecked, will eventually become the dominant plant wherever it appears.

Water Quality Problems

- **Swimming Issues**

Problem: Summer algal blooms (caused by high phosphorus levels)

Cause: Urban stormwater runoff conveying large amounts of phosphorus to the lake

- **Biological Issues**

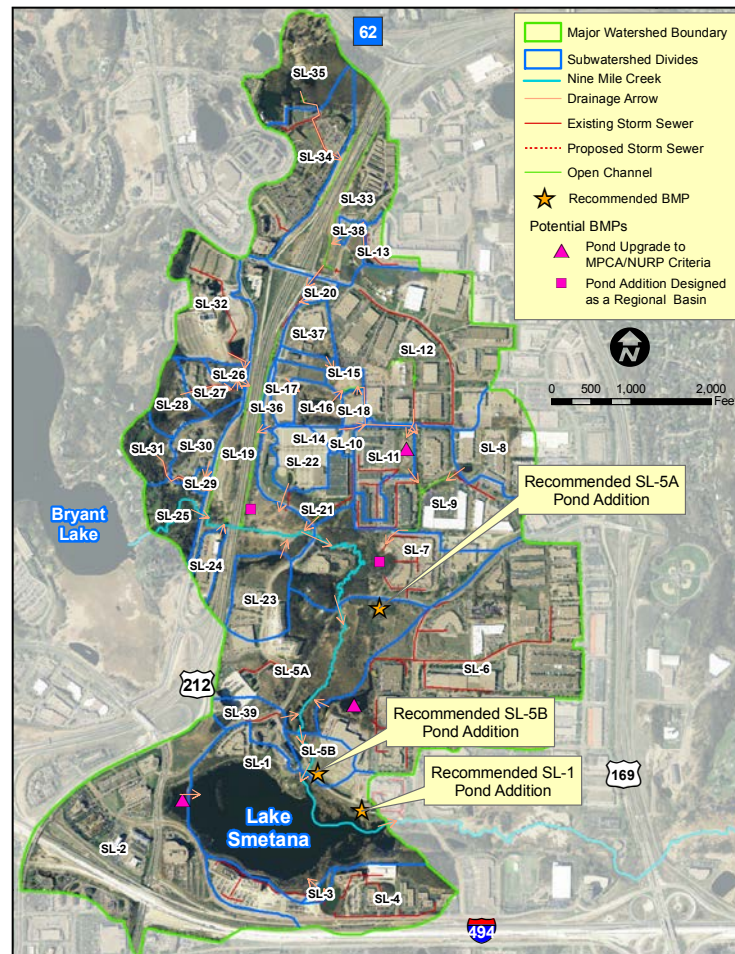
Problem: Exotic lake weed species (see left)

Cause: Curlyleaf pondweed and purple loosestrife

Recommended Remedial Measures*

No additional BMPs are required to meet the district's water quality goal for Smetana Lake (a level III classification). However, additional BMPs could be implemented to enhance the lake's water quality during various climatic conditions.

- Implementation of BMPs on the Bryant Lake watershed will also improve Smetana Lake's water quality.
- Implementation of all the illustrated BMPs, combined with improved Bryant Lake water quality (the analysis assumed Bryant Lake water quality meets the district's goal for that lake), would reduce the annual phosphorus load by 90 to 219 pounds/year (8 to 19 percent).
- Summer average Secchi disc transparency is estimated to improve minorly, by up to 0.2 meters.



* Implementation of remedial measures may change based on municipal petitions.