

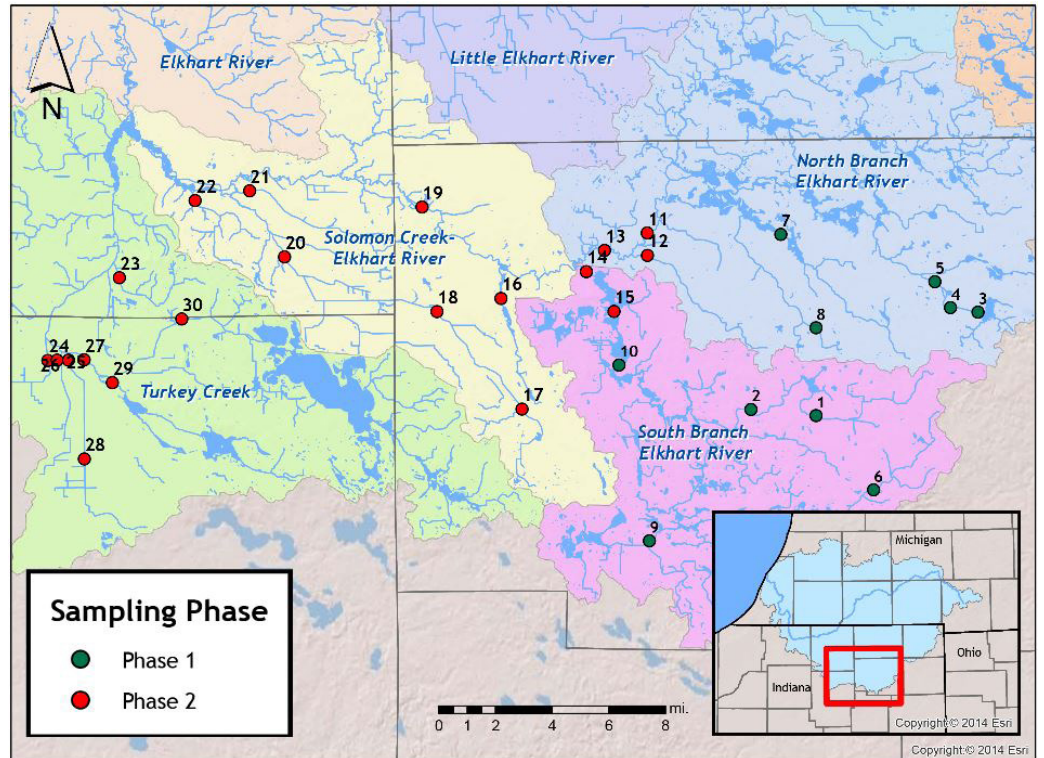


Building a Foundation of Water Quality Data

In 2014 the St. Joseph River Basin Commission began a water quality monitoring program with the goal of compiling water quality data in St. Joseph River Basin waterbodies that lack historic data. Sample sites were selected based on available historical data, significance of drainage within the Basin, proximity to communities and surrounding landuses, and site accessibility. The program samples the following surface water parameters at all sites:

- Biological oxygen demand
- Chlorides
- Conductivity
- Dissolved oxygen
- *Escherichia coli* (*E. coli*)
- Flow
- Nitrate-Nitrite
- pH
- Temperature
- Total dissolved solids
- Total phosphorus
- Total suspended solids
- Turbidity

Each site is sampled monthly for one year and is revisited on a three year cycle. A minimum of four of the twelve samples taken at each site throughout the year are taken during wet weather conditions, which can tell us a lot about how contaminants are entering our waterways via surface water runoff.

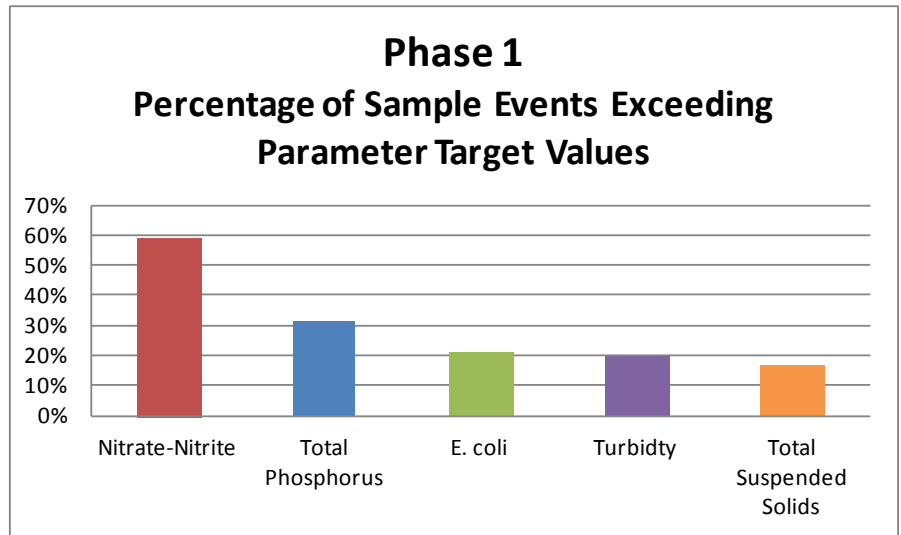


The Commission recently finished sampling Phase 1 and began sampling Phase 2 sites in April of this year. The Commission is confident the three year site rotation will build a robust database of water quality data within the Basin. This will aid the Commission and other organizations in identifying water quality trends and beneficial implementation projects. All water monitoring data can be downloaded from the St. Joseph River Basin Commission's website: www.sjrbc.com.

Phase 1 Results

Phase 1 site sampling ran from April 2014 to March 2015. The ten Phase 1 sites are located in the headwaters of the North Branch & South Branch of the Elkhart River, located in Noble County. The most prominent surface water impairments identified in this region were nutrients. Large live stock operations and non-vegetated ditch banks adjacent to conventional row crop agriculture practices may contribute to consistently high levels of nitrates-nitrites and total phosphorus at nearly all sites. *E. coli*, turbidity, and total suspended solids were also common impairments identified at many sites. Best management practices such as restoring natural vegetation along surface

water banks and restricting live stock access to surface waters and ditch banks up stream, could be first steps to improving water quality not only at these sites, but for downstream tributaries as well.



Water Sampling Parameters

Nitrogen (nitrate-nitrite)

Nitrogen is found in all living things; however, it is considered a common pollutant in our surface waters. High levels of nitrogen, when mixed with sunlight and other nutrients, increases algae growth and may cause the impairment of the ecosystem, also known as eutrophication. Nitrogen makes its way into surface waters through surface water run off from lawns or golf courses, manure runoff on agriculture fields, fertilizer runoff from row-crop fields, as well as from improper maintenance of sewage systems. The St. Joseph River Basin Commission tests for two forms of nitrogen found in water, nitrate (NO_3) and nitrite (NO_2) which were the most common impairments found at Phase 1 sites, exceeding target parameters more than half of the sampling events.



Non-vegetated ditch banks and livestock access to water contributes to many of the water quality impairments at our water monitoring sites

E. coli

Escherichia coli (*E. coli*) is a common form of fecal coliform bacteria that is found in the feces of warm-blooded organisms, such as humans, livestock, and waterfowl. While *E. coli* is naturally present in digestive tracts of animals, it can be very dangerous to human health when present in surface waters. These bacteria typically enter waterways either directly through combined sewer overflows or indirectly via failing septic systems or runoff from agriculture lots. 25 percent of Phase 1 sites consistently demonstrated unhealthy levels of *E. coli* and a few of the sites had isolated spikes in numbers potentially due to large flocks of Canadian Geese gathering on the ditch banks.

Suspended Solids & Turbidity

Suspended solids are particles of organic and inorganic matter that are suspended in the water column that create turbidity, or how “cloudy” the water looks. When a stream becomes very turbid with suspended solids it can cause negative impacts such as increased water temperatures, decreased capacity of necessary chemical reactions in the water column, and even smothering living organisms to death. Suspended solids make their way into ecosystems as a result of soil erosion or runoff in agricultural, urban, and construction settings, algal blooms, and even mechanical disturbance from bottom feeding fish, which may explain a few high turbidity and total suspended solid events at some Phase 1 sites.

Phosphorus

Similar to nitrogen, the presence of phosphorus in water composition is a naturally occurring event that facilitates the growth of plant and algae when found in excessive amounts. Vegetation dies and begins to decompose, using large amounts of oxygen, limiting the amount available for other life forms. Phosphorus is added to our surface waters in ways similar to nitrogen, via organic matter or attached to manmade products, however it is unique in that it does not have a gaseous form, making it unable to naturally remove itself from the ecosystem. The only way to remove phosphorus from an ecosystem is to physically remove it, through a process called dredging. Phosphorus was the second most common impairment at Phase 1 sites.