

SECTION 3: IDENTIFY SOURCES

Summary of Key Pollutants of Concern and Their Sources

It is evident through evaluations of the data that a variety of pollutants are threatening the designated uses in the Elkhart River Watershed. As noted above, sediment, pathogens (*E. coli*), nutrients, have been indicated to be problems this WMP will address, based on stakeholder concerns and both historical and current data. In addition, the WMP will also address issues of preservation, restoration, and appreciation of open space, and will assist in the development of an outreach and education program to keep stakeholders involved in issues in the Watershed.

It is also evident that there are four stakeholder identified conditions that need to be addressed in the Elkhart River Watershed. These conditions are: hydrologic modification, loss of open space and wildlife habitat, degradation of fish populations, and degradation of lakes in the Watershed.

Based on specific landuses, each subwatershed has different challenges to confront regarding these pollutants and concerns. These concerns and their sources are discussed in more detail below.

Sediment

Excess sediment, or high values of TSS, has been a key issue in the Elkhart River Watershed. Extensive sedimentation in the Goshen Dam Pond was the original trigger that encouraged the ERRA to consider watershed planning and to pursue an EPA 319 grant through IDEM. Excess sediment, or high TSS values, cause turbid water; smothers and destroys aquatic habitats necessary for fish and macroinvertebrate growth and development; impedes navigation; changes stream geomorphology; decreases flood storage capacity; and acts as a delivery system for nutrients, pathogens, and other contaminants.

Sediment or TSS can come from instream sources, river bank erosion, and erosion occurring throughout the Watershed. Sources of sediment or TSS in the Elkhart River Watershed include:

- bank erosion due to changes in hydrology caused by increased drainage of agricultural lands or increases in impervious areas due to urban expansion,
- lack of a stable buffer between human activities and the stream itself,
- uncontrolled sheet flow across the land surface,
- livestock with access to the stream,
- conventional tillage practices,
- erosion on agricultural lands,
- sand distributed during the winter for controlling ice,
- runoff from residential lots,
- runoff from existing gravel and dirt parking lots, and
- erosion from active construction sites.

In urban areas, this stormwater flow can include a large variety of pollutants and toxins that are a by-product of urban life. On agricultural lands, a lack of proper erosion control methods contributes to sedimentation and related nutrients in the runoff that flow overland to the Elkhart River and associated lakes, ditches, and tributaries. Specific geographic areas where sediment loading is a concern that will be addressed by this plan are identified as critical areas (see Section 4).

E. coli

Pathogens (disease-causing organisms in the water) include bacteria, viruses, and protozoa. Since *E. coli* bacteria are found in the intestines of humans and other warm-blooded mammals, they are the indicator species used in Indiana to denote the possibility of other pathogens that may be present in the aquatic system. As is apparent from the information above, *E. coli* bacteria have been found to be present in numbers that exceed the State WQS, and thus indicate a potential health risk. *E. coli* have been indicated as a problem in the St. Joseph River TMDL report and the State is scheduled to develop an *E. coli* TMDL report for the Elkhart River if the current situation does not improve.

Sources of *E. coli* include both human and animal origins and can emanate from both point and nonpoint sources of pollution. Sources of *E. coli* in the Elkhart River Watershed include:

- wildlife and pet waste,
- packaging plants (Plumrose USA, Bacon Packaging Plant in Elkhart, Indiana),
- discharge of inadequately treated wastewater from point sources,
- CSOs,
- runoff from impervious surfaces,
- runoff from residential lots,
- failing septic systems,
- livestock with access to the stream,
- stormwater runoff from pasture lands lacking filter strips or other BMPs, and
- improper handling of manure.

Specific geographic areas where pathogens are a concern that will be addressed by this plan are identified as critical areas (see Section 4).

Nutrients

Excess nutrients can cause major problems in aquatic ecosystems. In Indiana, phosphorus is generally considered the limiting nutrient and the one of greatest concern. Excessive amounts can contribute to the illness known as methemoglobinemia in infants. The current USEPA standard of 10 parts per million (ppm) for drinking water is specifically designated to protect infants from this disorder. Present in large amounts, it can cause excessive aquatic plant growth that can lead to large fluctuations in dissolved oxygen (DO). This can alter the aquatic community to favor more tolerant, low quality organisms and decrease biodiversity. The problem is amplified in downstream lakes and reservoirs where the water slows and nutrients drop out with sediments. The sediments then become a major source of nutrient movement throughout the aquatic ecosystem.

Many nutrient sources are the same as those that contribute to sediment and *E. coli* contamination. Sources of nutrients in the Elkhart River Watershed include:

- wildlife and pet waste,
- packaging plants,
- discharge of inadequately treated wastewater,
- over-fertilization (agricultural, residential, and recreational land),
- livestock with access to the stream,
- runoff from agricultural lands without proper erosion control measures,
- improper handling of manure,
- lack of nutrient management practices,
- nitrogen leaching from field tiles,
- failing septic systems,
- lack of a stable buffer between human activities and the stream itself,
- CSOs,
- runoff from developing lands without proper erosion control measures,
- runoff from impervious surfaces, and
- runoff from residential lots.

Specific geographic areas where nutrient loading is a concern that will be addressed by this plan are identified as critical areas (see Section 4).

Hydrologic Modification

The hydrologic systems in the Elkhart River Watershed have been highly modified by ditching and tiling activities that converted many of the region's hydric soils into land capable of supporting valuable crop production. In addition, increases in impervious areas as a result of urban expansion have also resulted in hydrologic modification. Changes in stream flow have the potential for major impacts on aquatic ecosystems by altering the habitat available for the plants and animals that populate these areas.

These changes in stream flow contribute to flooding, erosion, sedimentation, excessive nutrient loading, transport of *E. coli* and other toxicants, habitat destruction, and a decrease in navigability. Sources of hydrologic modification in the Elkhart River Watershed include:

- urban encroachment on the floodplains,
- lack of planning for development,
- lack of a stable buffer between human activities and the stream itself,
- runoff from lands without proper erosion control measures,
- loss of wetlands throughout the Watershed, and
- alterations to flood storage and flow conveyance through the impacts of log jams and beaver activities.

Specific geographic areas where hydrologic modification is a concern that will be addressed by this plan are identified as critical areas (see Section 4).

Loss of Open Space and Wildlife Habitat

Loss of open space and wildlife habitat are evident throughout the Elkhart River Watershed. This impacts the survival of wildlife species and the quality of water. Open spaces allow greater stormwater infiltration because vegetation can filter pollutants from the water before it enters the waterway. The vegetation in turn provides needed habitat for wildlife.

The loss of open space increases the quantity of water in waterways, and reduces the quality of that water. When open space is lost, biodiversity is diminished. Sources of loss of open space and wildlife habitat include:

- urban encroachment on open space,
- lack of planning for development,
- lack of a stable buffer between human activities and the stream itself, and
- loss of wetlands throughout the Watershed.

Specific geographic areas where loss of open space is a concern that will be addressed by this plan are identified as critical areas (see Section 4).

Degradation of Fish Populations

Stakeholders have noted a decline in fish species throughout the Elkhart River Watershed. These species include highly desired game fish and threatened and endangered species. This can be attributed to many of the pollutants and conditions already noted in this document.

The degradation of fish populations diminishes biodiversity and decreases the recreational value of the Watershed. Sources of degradation of fish populations include:

- excess sediment in the stream,
- excess nutrients in the stream,
- toxins in the stream,
- loss or degradation of fish habitat, and
- barriers to migration.

Specific geographic areas where the degradation of fish populations are a concern that will be addressed by this plan are identified as critical areas (see Section 4).

Degradation of Lakes

The many lake associations in the Elkhart River Watershed which have conducted LARE studies and applied for EPA 319 grants have shown the desire and need to address lake issues in this Watershed. Many lakes are directly connected to the stream system while others contribute indirectly through the groundwater system. When lakes become degraded, the overall Watershed is degraded. Degradation of lakes can be attributed to many of the pollutants and conditions already noted in this document.

The degradation of lakes affects the biodiversity of the associated aquatic community and decreases the recreational value of the resource. Sources of degradation of lakes include:

- excess sediment from inlet streams, surface runoff, and bank erosion;
- excessive *E. coli* from inlet streams, septic contamination, and animal waste;
- excess nutrients from inlet streams, over-fertilization, septic contamination;
- toxins from inlet streams, pesticide applications, and other sources; and
- inappropriate human activity, including discharge of human waste from boats and/or litter.

Specific geographic areas where the degradation of lakes are a concern that will be addressed by this plan are identified as critical areas (see Section 4).