

## Executive Summary

According to the Upper Iroquois Watershed Initiative (UIWI) 2012 Social Indicators Survey (UIWI-SIS), the top two most important activities in the Iroquois watershed related to local streams are scenic beauty and fishing. The Indiana Department of Natural Resources (IDNR) considers the Iroquois River a navigable waterway and part of the state canoe trail system. Despite these local values and designations, a number of water quality problems are apparent. The water quality problems are directly connected to concerns in the UIWI watershed management plan (UIWI-WMP) which include flashiness and flooding, loss of fish habitat, excessive sediment, lack of recreation access, elevated E.coli levels, excess nutrients, and impaired biological communities.

The Upper Iroquois Watershed (Jasper, Newton, Benton, White, Pulaski, and Starke Counties) is made up of 438,332 acres; 368,198 acres (84%) of that is agricultural land, with approximately 75% of that land in corn and soybean production. A majority of the rural areas are farmland, which is extensively drained due to the fact that the area was part of the former "Grand Kankakee Marsh," once the second largest wetland in the nation. Developed and forested lands make up 6 % or 53,872 acres of the total watershed area. Land use in the remaining 10% of the watershed is split between pasture, grassland, wetland, and open water. Being largely agricultural, non-point source pollution is a major concern from row crop and animal farmland, including sediment loading, E.coli, and nutrient runoff.

Water quality problems associated with rural areas are very evident by the large number of impaired streams. According to the 303d list, 83% of the first and second order tributaries into the Iroquois River and the Iroquois River itself are listed on the 303d list and many of these streams are in the TMDL classed as 4A and/or 5A. UIWI-WMP efforts calculated from 2010-2012 UIWI water quality testing confirmed these impairments as well, because on average, all sampling sites exceeded water quality targets more than 50% of the time (sampled for orthophosphates, nitrates, turbidity, and E.coli). UIWI-WMP efforts discovered that according to the EPA, this region is in the top 25% of contributors to the zone of hypoxia in the Gulf of Mexico. Also discovered, that Indiana NRCS State Resource Assessment Report from 2011 ranks the Iroquois watershed as the 4<sup>th</sup> highest in untreated or at risk acres of contributing excess nutrients to surface and groundwater in the state. According to the 2012 UIWI-SIS, the top perceived source of pollution are soil erosion from farm fields and manure from farm animals. The reasons behind these impairments and concerns are complex, interrelated and will take a similar approach to address the problems. The Action Register in the UIWI-WMP outlines such an approach based on some of the possible sources of water quality problems.

According to the 2011 Conservation Tillage Survey for Jasper and Newton Counties (these counties cover a majority of watershed), approximately 9.5% of corn and 48.5% of soybean acres are practicing no-till production. No-till is well documented to have less negative impact on water quality than conventional tillage. This indicates many farmers have yet to implement a conservation tillage system. With current trends in crop prices (more corn after corn) and farms becoming larger, an increase in conventional tilled fields is evident. This means more wind erosion (UIWI-WMP observed that 40% of the acres in the watershed have soils that are of high concern for wind erosion) and water erosion resulting in sediment

and nutrient loading. Extensive tile drainage in the critical areas is greater than 46% as identified by the UIWI-WMP. Artificially drainage and sandy soils are vulnerable to leaching (UIWI-WMP calculated 30% of watershed soil acres are high concern for nitrate leaching). Many non-buffered tile risers create a direct conduit for excess nutrients and sediments to travel into streams. Within the last five years, 30,000+ dairy cows have been added to the watershed, with a total of 47 CFOs operating in the watershed. This intensive land use combined with vulnerable soil types could present a significant threat to water quality, if the amount of manure exceeds the available land to spread it on, or if it is mismanaged. This increases the risk of manure spills, such as occurred on Curtis Creek in 2003. Farmland is often left bare during the non-growing season, which increases overland flow and erosion. This leads to excessive run-off and leaching of nutrients, especially where manure has been applied. This runoff and leaching could be significantly addressed by the use of cover crops. Cover crops are not widely adopted. According to the 2013 Conservation Tillage Transect and the 2012 Clean Water Indiana NW Indiana Cover Crop Program. Cover crops would help mitigate the negative impact of wind, water, and nitrate leaching upon water quality associated with farming.

Establishment and protection of wetlands and riparian buffers is lacking. UIWI-WMP efforts calculated the average area of wetlands is less than 1.5% across the watershed and riparian areas is less than 20% across the watershed. This lack of riparian buffers in low lying areas adjacent to streams and directly along streams has allowed sediment, E.coli, and nutrients to move into streams. The UIWI-WMP reveals 48 direct cattle access points exist which have allowed rapid runoff with the water carrying E. coli and increased sedimentation into streams. Also discovered were 48 active erosion sites (separate from livestock sites) which are likely contributing to elevated turbidity levels during storm events. UWI-WMP 2010 and 2013 citizen level habitat and biological evaluations across the watershed show "fair to unhealthy" rankings that are dominated by low diversity macro invertebrates and poor quality fish habitat, which are indicators of poor water quality. In addition, a 14 year on-going study of amphibians by Dr. Brodman from Saint Joseph's College suggests that amphibian numbers and key habitats are in decline in the watershed. Several key areas for restoration have been identified within the Upper Iroquois watershed. A 2003 LARE study of Curtis Creek confirms the UIWI-WMP findings that the biotic Integrity (mIBI) was rated at "moderately impacted to slightly impaired" and the habitat rating (QHEI) was less than optimal for aquatic life. All the above are contributing to the current problems of elevated levels of E.coli, which limits bodily contact for recreational purposes, decreased dissolved oxygen levels, and excess nutrients which have negatively impacted the biological communities and aesthetics of the watershed streams.

Water quality problems associated with urban non-point source pollution are also contributing to the impaired waterways. Rapid unplanned urban development is a concern as growth in the region is twice the rate of the statewide average since the last census. Jasper County is ranked 7th in the state for growth by population. This will lead to more impervious surfaces and sources of non-point pollution. Increasing the use of low impact design could address some of the negative impacts of this rapid growth. The 2003 LARE study of Curtis Creek found water quality samples taken during storm events exceeded state standards for some chemical parameters and E.coli at many of the sample sites,

confirmed by UIWI-WMP water quality testing as discussed above. According to the 303d list, of the 208 miles of streams, 72 miles of the 208 miles are E. coli impaired in the project area. The main branch of the Iroquois flows through Rensselaer. Rensselaer has 9 combined sewer overflow (CSO) sites, but is not a MS4 community. A long term control plan (LTCP) does exist to separate the CSO, but lacks adequate funding. According to Tony Carroll, Wastewater Treatment plant foreman, it is not uncommon for a 1/2 inch rain to result in overflow, which adds to the E.coli and nutrient loading on the Iroquois ( T.Carroll, pers. comm. June 30th, 2012). Many unsewered communities exist in the watershed, so septic systems that are improperly designed, installed and/or maintained could be allowing untreated or improperly treated effluent to reach streams and groundwater supplies. According to the 2012 UIWI-SIS, 40% of respondents were not willing to service their septic systems. Many of the soil types in the watershed have severe limitations for septic suitability as cited in the UIWI-WMP and the 2003 LARE study of Curtis Creek Watershed. According to Sandra Parks, former Jasper County Health Sanitarian, septic systems have been found to be directly tiled into field drains or discharge directly into streams (S.Parks, pers. comm. July 29, 2009). In addition, numerous abandoned wells have not been properly sealed in the area. This presents a contamination risk to surface water and groundwater supplies, which is a public health risk.

The Upper Iroquois Watershed has significant water quality problems from non-point rural and urban sources. Stakeholders' concerns as identified in the UIWI-WMP are directly connected to these water quality problems and must be addressed to improve water quality. The UIWI-WMP, the Iroquois TMDL and 303d list will serve as a guide as the UIWI-WMP is implemented. High E.coli counts, excess nutrients, and excessive sediment loading must be addressed if water quality is to be improved. Farmers, homeowners, land owners, county and town leaders, and developer involvement in implementing BMPs and educational outreach will be critical to improving overall water quality. In general, a lack of knowledge and information and actual use of BMPs to address the water quality issues exists and needs to be addressed to ensure an ecological and economically healthy watershed for today and generations to come.