Total Maximum Daily Load Report for the Kankakee/Iroquois Watershed

REVISED FINAL DRAFT

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Prepared for

U.S. Environmental Protection Agency Region 5, Illinois Environmental Protection Agency, and the Indiana Department of Environmental Management

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Contents

Tables

Figures

EXECUTIVE SUMMARY

The Kankakee/Iroquois River watershed is located on both sides of the Indiana and Illinois border and drains a total of 5,153 square miles. The watershed drains almost 3,000 square miles in northwest Indiana, 2,170 square miles in northeast Illinois, and about 7 square miles in southwest Lower Michigan. The Kankakee River originates near South Bend, Indiana, and then flows westward into Illinois, where it joins with the Des Plaines River to form the Illinois River. The Iroquois River originates in the southern portion of the watershed in Indiana, and is a major tributary to the Kankakee River. It empties into the Kankakee near Kankakee, Illinois. Land use throughout the watershed is predominantly cultivated crops.

The Clean Water Act and U.S. Environmental Protection Agency (EPA) regulations require that states develop Total Maximum Daily Loads (TMDLs) for waters on the Section 303(d) lists. A TMDL is defined as "the sum of the individual wasteload allocations for point sources and load allocations for nonpoint sources and natural background" such that the capacity of the waterbody to assimilate pollutant loadings is not exceeded. A TMDL is also required to be developed with seasonal variations and must include a margin of safety that addresses the uncertainty in the analysis.

Both historical and sampling data from the summer of 2008 by Illinois and Indiana were used for the TMDL analysis. The data indicate that most sites that were sampled experienced at least one violation of water quality standards with the reductions needed to achieve water quality standards range from zero to 99 percent.

Potential sources of *E. coli* and fecal coliform in the watershed include regulated point sources such as wastewater treatment plants, concentrated animal feeding operations, storm water runoff from Municipal Separate Storm Sewer Systems (MS4s); and illicitly connected "straight pipe" discharges of household waste. Point sources are regulated through the National Pollutant Discharge Elimination System (NPDES). Potential sources also include unregulated nonpoint sources such as runoff from agricultural fields, forests, and undeveloped areas; leaking or faulty septic systems; runoff from lawn fertilizer applications; pet waste; and storm water runoff from outside of MS4 communities.

Determining the specific reasons for high bacteria counts in any given waterbody is challenging because there are so many potential sources and because bacteria counts have a high degree of variability. Within the Kankakee/Iroquois watershed, subwatersheds with relatively high animal unit densities also have the highest average *E. coli* counts. It is therefore possible that waste generated by livestock in these subwatersheds is contributing to the elevated bacteria counts. However, other factors could also explain this correlation, such as the fact these subwatersheds also tend to experience smaller flows and thus have less dilution. Specific sources of bacteria to each impaired waterbody should be further evaluated during follow-up implementation activities.

An important step in the TMDL process is the allocation of the allowable loads to individual point sources as well as unregulated sources. The Kankakee/Iroquois watershed TMDL includes these allocations, which are presented for each of the HUC 10 subwatersheds.

Nonpoint sources are considered to be the primary sources of the impairments in the Kankakee/Iroquois watershed. Although several NPDES facilities have been found to be in violation of their permit limits for bacteria, the majority of facilities discharge effluent that meets water quality standards. Nonpoint source pollution can be reduced by the implementation of Best Management Practices (BMPs). BMPs are practices used in agriculture, forestry, urban areas, and industry to reduce the potential for damage to natural resources from human activities. A BMP may be structural, that is, something that is built or involves changes in landforms or equipment, or it may be managerial, that is, changing a specific way of using or handling infrastructure or resources. BMPs should be selected based on the goals of a watershed management plan. Landowners and urban planners can implement BMPs outside of a watershed management plan, but the overall success of BMPs is typically enhanced if it is coordinated through a planning process. Potential implementation plans are outlined in Section 9.0 of the report.

1.0 INTRODUCTION

The Kankakee/Iroquois River watershed is located on both sides of the Indiana and Illinois border and drains a total of 5,153 square miles. The watershed drains almost 3,000 square miles in northwest Indiana, 2,170 square miles in northeast Illinois, and about 7 square miles in southwest Lower Michigan. The Kankakee River originates near South Bend, Indiana, and then flows westward into Illinois, where it joins with the Des Plaines River to form the Illinois River (Figure 1). The Iroquois River originates in the southern portion of the watershed in Indiana, and is a major tributary to the Kankakee River. It empties into the Kankakee near Kankakee, Illinois. Land use throughout the watershed is predominantly cultivated crops.

The Kankakee River, the Iroquois River, and a number of tributaries are listed as impaired for *Escherichia coli* (*E. coli*) in Indiana. The Kankakee and Iroquois Rivers, as well as Sugar Creek, are listed as impaired for fecal coliform bacteria in Illinois (Table 1). A total of thirty-four waterbody segments within the watershed are cited as impaired for fecal coliform and *Escherichia coli* (*E. coli*) on the Illinois and Indiana 2006 303 (d) lists. In Indiana and Illinois, these impaired segments account for approximately 327 and 186 miles, respectively.

Because of the size of the Kankakee/Iroquois watershed, it has been divided into six major subwatershed groups. This helps facilitate a better understanding of characteristics, which uniquely affect water quality within each area. The use of subwatershed groups also enables a closer examination of key factors that affect water quality. The subwatershed groups, shown in Figure 1, include:

- Upper Kankakee
- Lower Kankakee
- Middle Kankakee
- Yellow River
- Upper Iroquois
- Lower Iroquois

The Clean Water Act and U.S. Environmental Protection Agency (EPA) regulations require that states develop Total Maximum Daily Loads (TMDLs) for waters on the Section 303(d) lists. A TMDL is defined as "the sum of the individual wasteload allocations for point sources and load allocations for nonpoint sources and natural background" such that the capacity of the waterbody to assimilate pollutant loadings is not exceeded. A TMDL is also required to be developed with seasonal variations and must include a margin of safety that addresses the uncertainty in the analysis.

The overall goals and objectives of the TMDL study for the Kankakee/Iroquois watershed were to:

- Assess the water quality of the impaired waterbodies and identify key issues associated with the impairments and potential pollutant sources.
- Use the best available science and available data to determine the maximum load the waterbodies can receive and fully support all of their designated uses.
- Determine current loads of pollutants to the impaired waterbodies.
- If current loads exceed the maximum allowable loads, determine the load reduction that is needed.
- Inform and involve the public throughout the project to ensure that key concerns are addressed and the best available information is used.

- Submit a final TMDL report to the U.S. Environmental Protection Agency (USEPA) for review and approval.

This report describes the entire analysis and, once finalized, will be submitted to EPA for approval as required by the Clean Water Act.

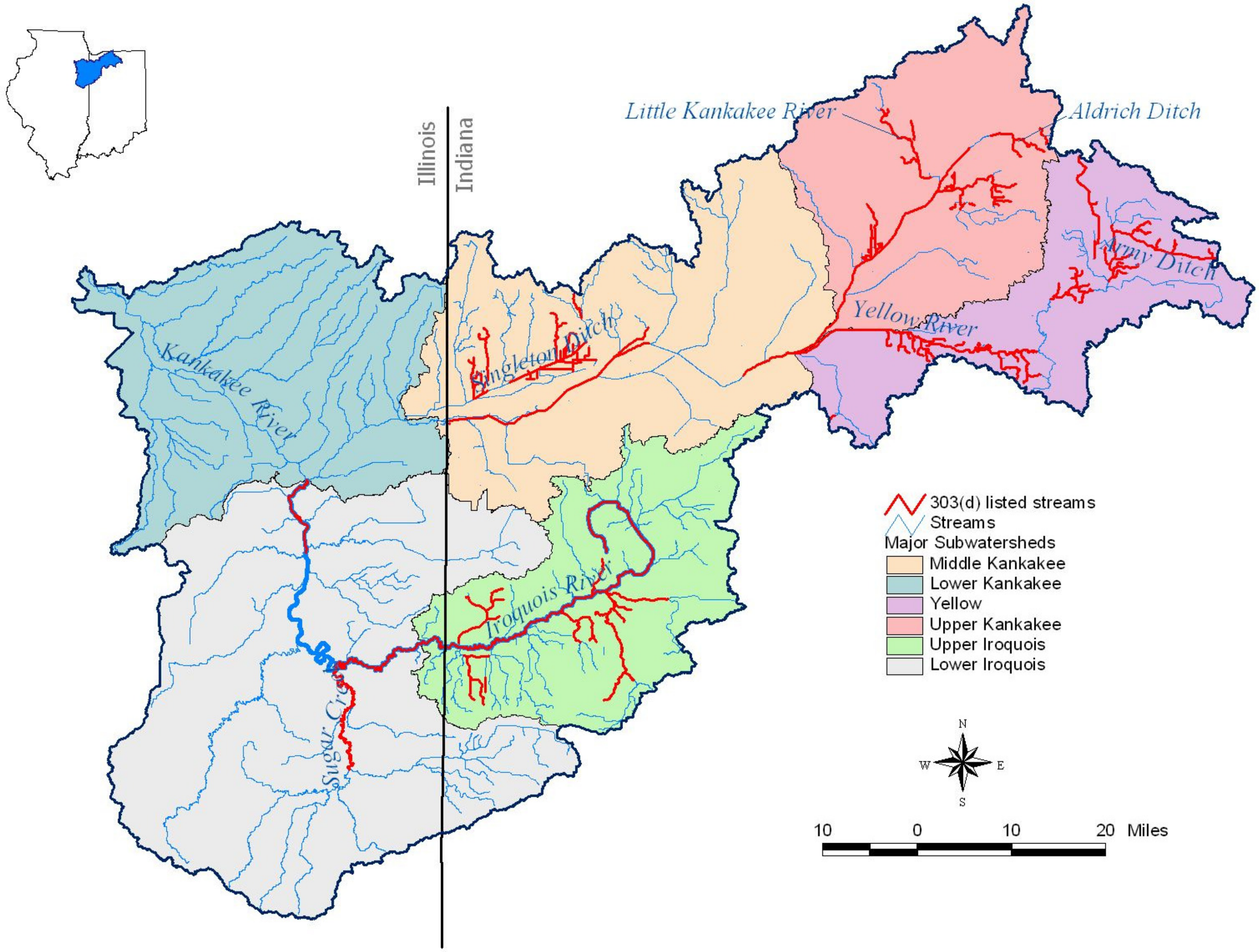

Figure 1. Location of Kankakee/Iroquois Watershed and streams listed on the 2006 Section 303(d) lists.

Table 1. 2006 303(d) List Information for the Kankakee/Iroquois Watershed.

State	Major Subwatershed	HUC	Waterbody	Segment ID	Parameter
Indiana	Upper Kankakee	101	Pine Creek-Horace Miller Ditch	INK0126_00	*E. coli*
			Potato Creek-Kartoffel Creek	INK0125_00	*E. coli*
		102	Kankakee River-Mainstem	INK011A_T1001	*E. coli*
			Little Kankakee River Byron	INK011C_00	*E. coli*
			Kankakee River	INK011D_T1002	*E. coli*
			Aldrich Ditch-Schang Ditch	INK0112_00	*E. coli*
		104	Kankakee River-Mainstem	INK0131_T1003	*E. coli*
			Kankakee River Mainstem	INK0133_T1004	*E. coli*
			Kankakee River Mainstem	INK0134_T1005	*E. coli*
			Kankakee River-Long Ditch	INK0138_00	*E. coli*
			Kankakee River -Mainstem	INK0138_T1006	*E. coli*
			Kankakee River Mainstem	INK013C_T1007	*E. coli*
		107	Kankakee River	INK0147_T1009	*E. coli*
			Kankakee River	INK0146_T1008	*E. coli*
	Middle Kankakee	108	Kankakee River-English Lake	INK0183_M1011	*E. coli*
		110	Kankakee River	INK019F_M1113	*E. coli*
			Kankakee River	INK019F_M1104	*E. coli*
		113	Singleton Ditch-Bryant Ditch	INK01D3_00	*E. coli*
	Yellow	103	Armey Ditch-Headwaters	INK0154_00	*E. coli*
			Yellow River-Armey Ditch-Albert Zeiger Ditch	INK0155_00	*E. coli*
			Stock Ditch-Bunch Branches	INK0157_00	*E. coli*
			Yellow River-Riverside Church	INK0158_00	*E. coli*
			Yellow River-Milner Seltenright Ditch	INK015F_00	*E. coli*
			Unnamed Ditch	INK0153_T1016	*E. coli*
		105	Yellow River-Listenber/Cliffton Ditches	INK0165_00	*E. coli*
			Yellow River-Ober	INK0166_00	*E. coli*
			Yellow River-Knox	INK016A_00	*E. coli*
	Upper Iroquois	202	Slough Creek	INK0235_T1019	*E. coli*
			Slough Creek-Carpenter Creek (Lower)	INK0238_00	*E. coli*
		203	Iroquois River	INK0223_T1003	*E. coli*
			Iroquois River	INK0226_T1004	*E. coli*
Illinois	Lower Iroquois	214	Iroquois River	FL-02	Fecal Coliform
		207	Sugar Creek	FLI-02	Fecal Coliform
		210	Gofield Creek-Iroquois River	FL-04	Fecal Coliform

2.0 DESCRIPTION OF THE WATERSHED

The Kankakee/Iroquois watershed drains 5,153 square miles. It is a part of the upper Illinois River and is comprised of thirty-two 10-digit Assessment Units (AUs) as shown in Table 2 and Figure 2. The watershed drains approximately 2,958 square miles in northwest Indiana and 2,168 square miles in northeast Illinois (a small portion (<1%) of the watershed also lies in Michigan, this portion will not be addressed in the TMDL).

The Kankakee River originates near South Bend, Indiana and flows in a general southwest direction until it turns westward at the confluence of the Iroquois River. The Kankakee River joins with the Des Plaines River to form the Illinois River. The Iroquois River is located in Indiana and Illinois and originates south of the Kankakee River watershed and meets with the Kankakee River in the Lower Kankakee subwatershed. It flows in a northeast to southwest pattern and turns westward where it meets with the Kankakee River. Major tributaries to the Kankakee River include the Iroquois River, the Little Kankakee River, and the Yellow River. The Kankakee/Iroquois watershed includes portions of 19 different counties in Indiana and Illinois (Figure 2).

Table 2. Assessment Units in Kankakee/Iroquois River Watershed

Subwatershed	HUC 10	HUC 10 Name (*State*)	Drainage area (sq. miles)	Percent of Total Drainage area
Upper Kankakee	101	Pine Creek *(IN)*	114.71	2.23
	102	Little Kankakee River-Kankakee River *(IN)*	233.32	4.53
	104	Mill Creek-Kankakee River *(IN)*	202.94	5.68
	107	Robbins Ditch-Kankakee River *(IN)*	118.20	3.94
Yellow	103	Headwaters Yellow River *(IN)*	292.65	2.83
	105	Yellow River *(IN)*	145.79	1.94
	106	Kline Arm *(IN)*	100.08	2.29
Middle Kankakee	108	Pitner Ditch-Kankakee River *(IN)*	193.65	3.76
	109	Hodge Ditch *(IN)*	84.14	1.63
	110	Crooked Creek-Kankakee River *(IN)*	243.35	4.72
	111	Knight Ditch-Kankakee River *(IN)*	109.11	2.12
	112	Beaver Lake Ditch-Kankakee River *(IL/IN)*	98.59	1.91
	113	Singleton Ditch *(IL/IN)*	254.29	4.93
Lower Kankakee	114	Spring Creek-Kankakee River *(IL/IN)*	186.66	3.62
	115	Rock Creek *(IL)*	121.20	2.35
	116	Horse Creek *(IL)*	128.32	2.49
	117	Forked Creek *(IL)*	135.64	2.63
	118	Kankakee River *(IL)*	263.90	5.12
Upper Iroquois	201	Oliver Ditch *(IN)*	82.35	1.60
	202	Slough Creek *(IN)*	145.10	2.82
	203	Bruner Ditch-Iroquois River *(IN)*	135.58	2.63
	204	Curtis Creek-Iroquois River *(IN)*	161.72	3.14
	205	Montgomery Ditch-Iroquois River *(IL/IN)*	160.46	3.11
Lower Iroquois	206	Mud Creek *(IL)*	286.01	5.55
	207	Sugar Creek *(IL/IN)*	277.05	5.38
	208	Spring Creek *(IL)*	253.22	4.91
	209	Prairie Creek *(IL)*	89.41	1.74
	210	Gofield Creek-Iroquois River *(IL)*	110.06	2.14
	211	Pike Creek *(IL)*	71.00	1.38
	212	Langan Creek *(IL)*	107.33	2.08
	213	Beaver Creek *(IL/IN)*	186.63	3.62
	214	Iroquois River *(IL)*	69.33	1.35

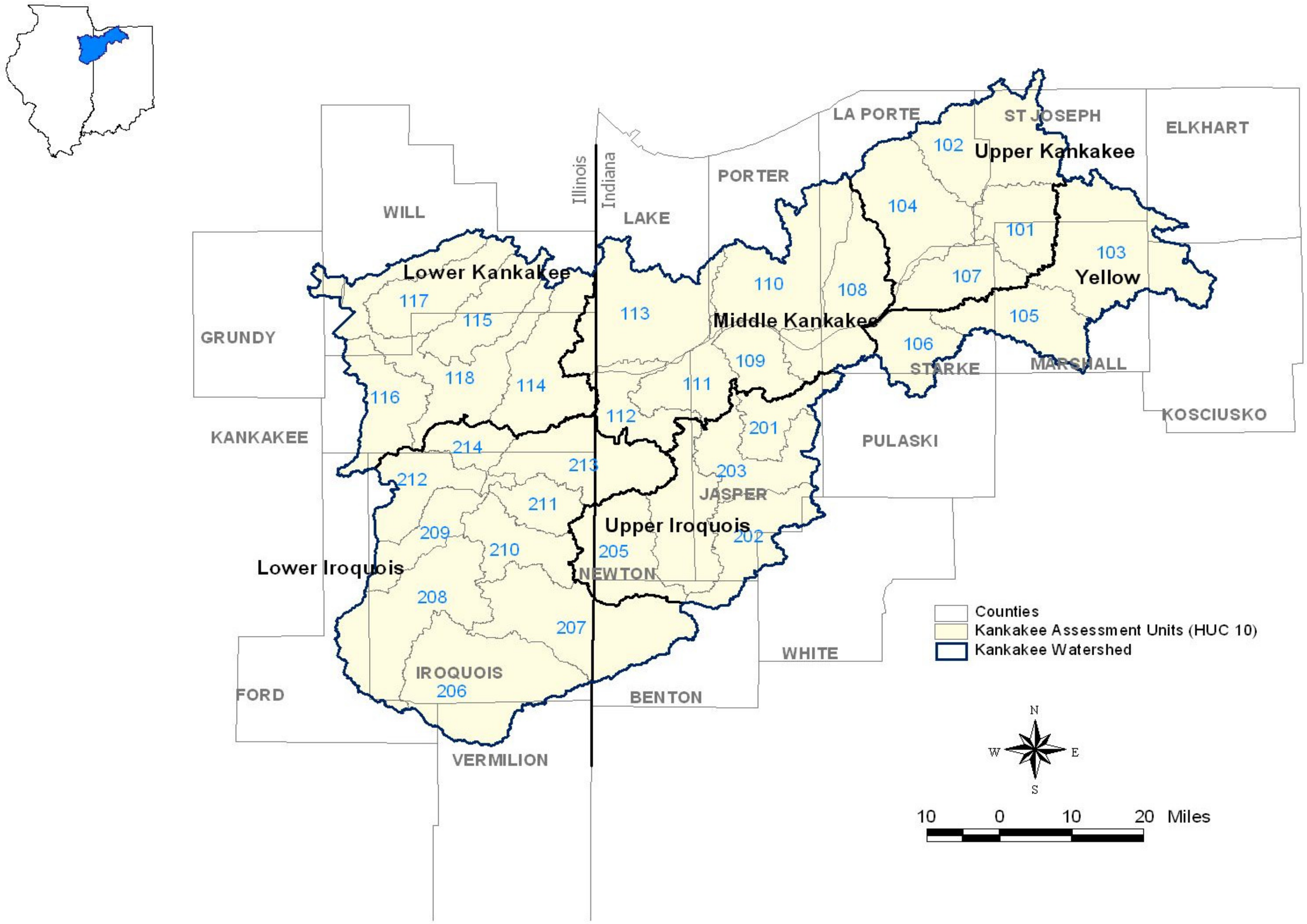

Figure 2. **Assessment Units in the Kankakee/Iroquois Watershed. Numbers refer to the HUC 10 Assessment Unit Code.**

2.1 Human Population

The human population of the Kankakee/Iroquois River watershed is not directly available but was estimated based on US Census data and the percentage of the total county and urban area that is within the watershed. The estimated population of the watershed is just over 1 million with approximately 77 percent of the population classified as rural residents and 23 percent classified as urban residents. Cities with a population of at least 1,000 are labeled in Figure 3.

Figure 3. Cities in the Kankakee/Iroquois Watershed. Only cities with population greater than 1,000 are labeled.

2.2 Land Use/Land Cover

Land use/land cover patterns provide important clues as to the potential sources of bacteria in a watershed. Land use/land cover in the Kankakee/Iroquois River watershed is primarily agriculture, with crop production (primarily corn and soybeans) comprising 77 percent. Corn and soybean crops are not typically associated with high bacteria loads, unless they have been fertilized with manure. Approximately eight percent of the land is forested and an additional eight percent is developed. Developed lands are characterized by impervious surfaces that increase the potential of storm water events during high flow periods delivering bacteria to downstream streams and rivers. Forested land and wetlands allow water to infiltrate slowly thus reducing the risks of bacteria contaminated water to be washed-off to waterbodies. Pasture/hay represents three percent of the watershed and indicates the presence of animal feedlots that can be significant sources of bacteria. The remaining land categories represent less than 4 percent of the total land area (Table 3 and Figure 4).

Table 3. Land Use and Land Cover of Kankakee/Iroquois Watershed

Land Use/Land Cover	Watershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Lands	2,531,747	3955	76.65
Developed Land	273,270	427	8.29
Forested Land	268,995	420	8.16
Pasture/Hay	96,702	151.10	2.93
Grasslands and Shrubs	67,458	105	2.05
Wetlands	37,780	59	1.15
Open Water	22,585	35	0.69
Total	**3,298,537**	**5153.96**	**100**

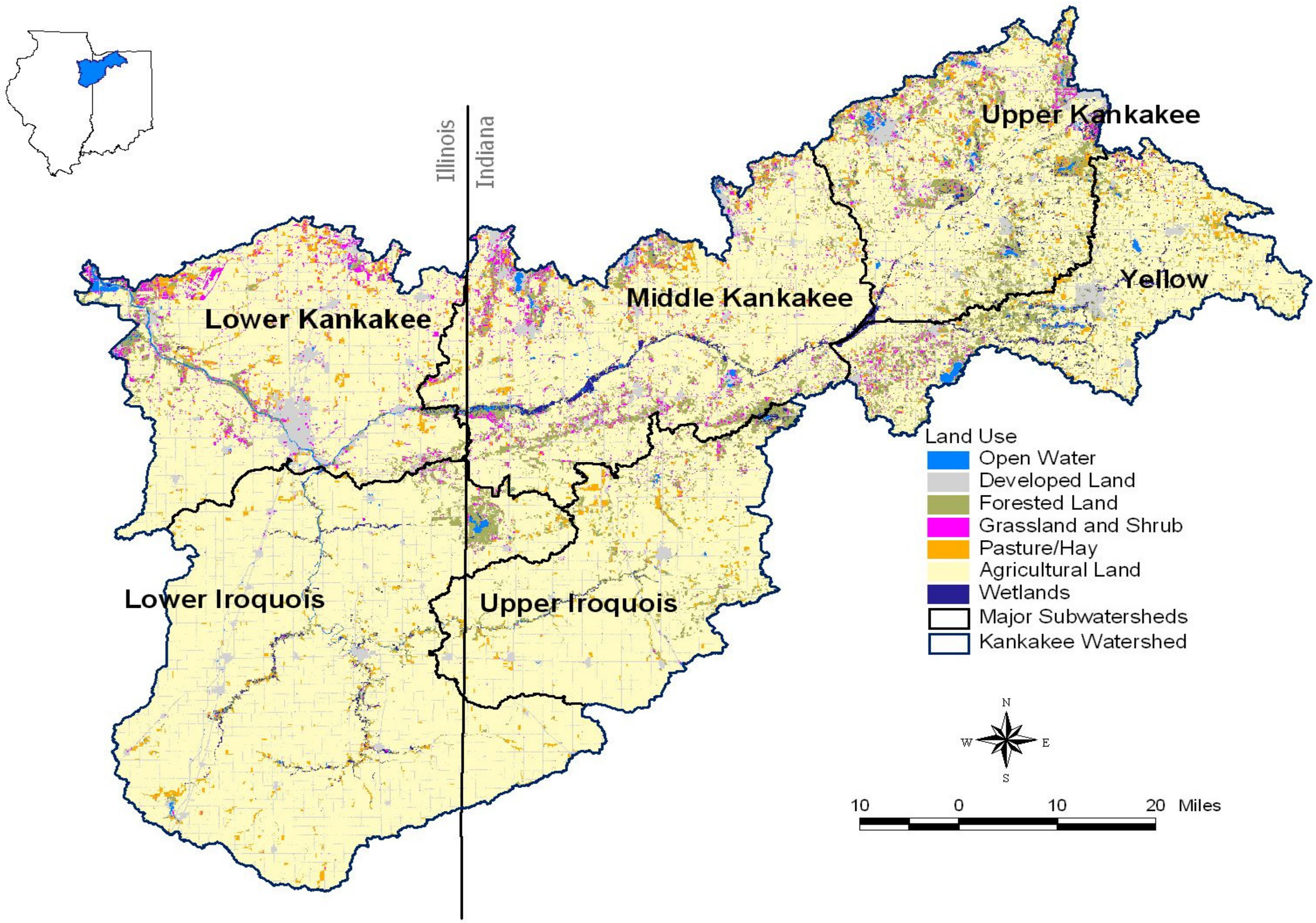

Figure 4. Land Use in the Kankakee/Iroquois River Watershed

2.3 Soils

The hydrologic soil group classification is a means for categorizing soils by similar infiltration and runoff characteristics during periods of prolonged wetting. Typically, clay soils that are poorly drained have lower infiltration rates, while well-drained sandy soils have the greatest infiltration rates. The Natural Resources Conservation Service (NRCS) has defined four hydrologic groups for soils (Table 4) (NRCS, 2001) and data for the Kankakee/Iroquois watershed were obtained from the Soil Survey Geographic (SSURGO) database. Downloaded data were summarized based on the major hydrologic group in the surface layers of the map unit and are displayed in Figure 5.

The majority of the watershed is covered by B soils (29%) followed by A soils (26%), C soils (21%) and D soils (11%). Combination of A/D, B/D and C/D soils represent 0.7 percent, 9.5 percent and 3 percent of the watershed respectively. Although Figure 6 suggests that there might be distinct differences in the soil categories of Indiana and Illinois, this is actually due more to differences in the way the soils were mapped or processed in the SSURGO databases than to actual differences in soils between the two states. For example, the Indiana data rely solely on the four categories shown in Table 4 whereas the Illinois data include grouped categories such as A/D, B/D, and C/D.

Soil infiltration rates can affect bacteria loading within a watershed. During high flows, areas with low soil infiltration capacity can flood and therefore discharge high bacteria loads to nearby waterways. In contrast, soils with high infiltration rates can slow the movement of bacteria to streams and act as a filter

Table 4. Hydrologic Soil Groups

Hydrologic Soils Group	Description
A	Soils with high infiltrations rates. Usually deep, well drained sands or gravels. Little runoff.
B	Soils with moderate infiltration rates. Usually moderately deep, moderately well drained soils.
C	Soils with slow infiltration rates. Soils with finer textures and slow water movement.
D	Soils with very slow infiltration rates. Soils with high clay content and poor drainage. High amounts of runoff.

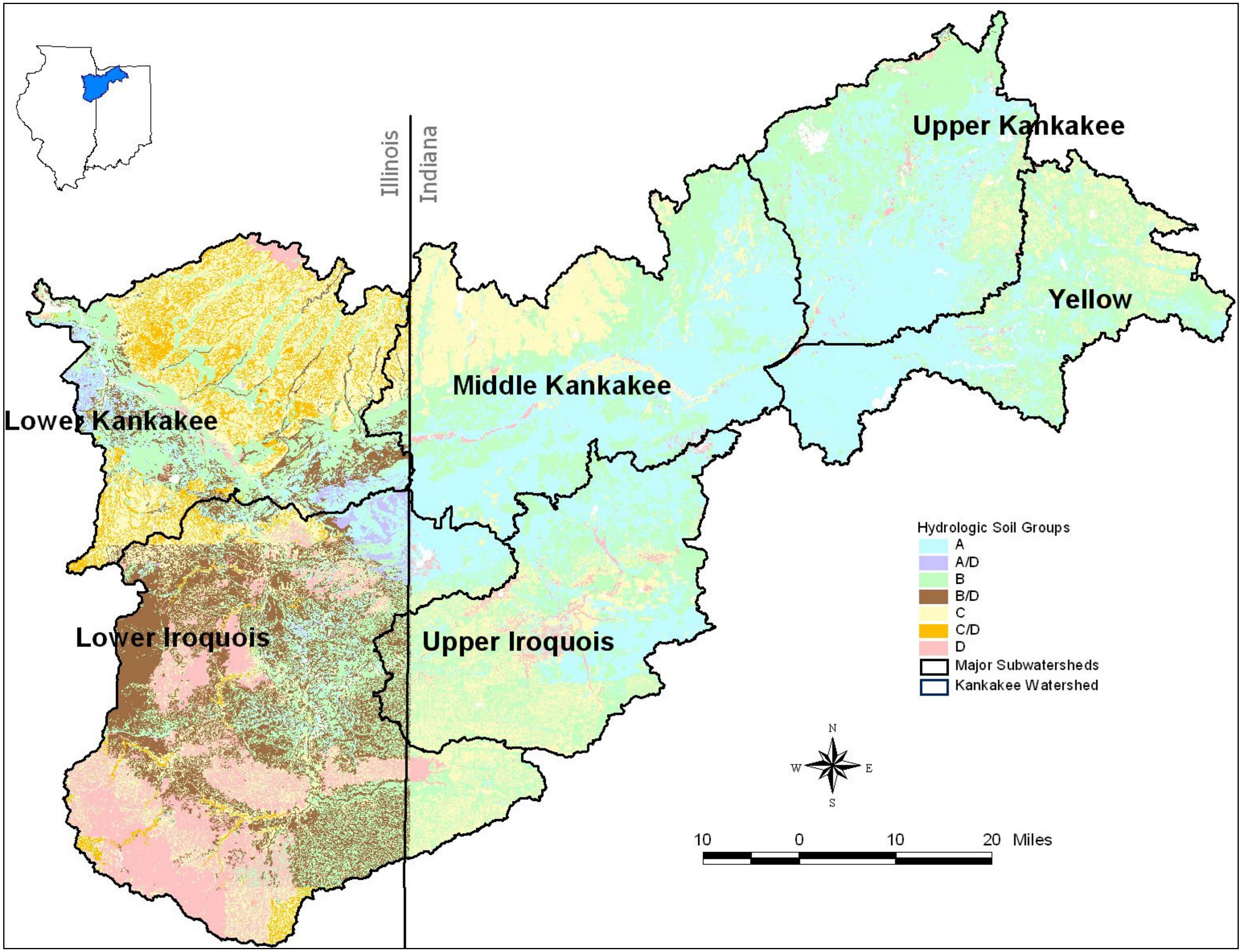

Figure 5. Hydrologic Soil Groups in the Kankakee/Iroquois River Watershed

2.4 Hydrology

Select US Geological Survey (USGS) gages in the Kankakee/Iroquois watershed are listed in Table 5 and shown in Figure 6. The USGS gages were used to estimate flow at ungaged locations during the development of the TMDLs (see Section 5.1.1 for additional information).

Table 5. Key USGS Sites in the Kankakee/Iroquois Watershed

Gage ID	Drainage Area	Period of Record	Active	Site Name
5515000	174	*1951-2003*		Kankakee River near North Liberty
5515400	3	*1970-86*		Kingsbury Creek near LaPorte
5515500	537	*1925-2008*	X	Kankakee River at Davis
5516000	135	*1955-73*		Yellow River at Bremen
5516500	294	*1948-2008*	X	Yellow River at Plymouth
5517000	435	*1943-2008*	X	Yellow River at Knox
5517120	44.5	*1998-99*		Pitner Ditch near LaCrosse
5517500	1,352	*1948-2008*	X	Kankakee River at Dunns Bridge
5517530	1,376	*1974-2008*	X	Kankakee River near Kouts
5517900	30.3	*1968-2003*		Cobb Ditch near Kouts
5518000	1,779	*1923-2008*	X	Kankakee River at Shelby
5518500	34.2	*1949-51*		Singleton Ditch near Hebron
5519000	123	*1948-2001*		Singleton Ditch at Schneider
5519500	54.7	*1948-72*		West Creek near Schneider
5520500	2,294	*1905-2008*	X	Kankakee River at Momence
5521000	35.6	*1948-2003*		Iroquois River at Rosebud
5521500	66.3	*1948-51*		Oliver Ditch near Aix
5522000	144	*1949-93*		Iroquois River near North Marion
5522500	203	*1948-2008*	X	Iroquois River at Rensselaer
5523000	21.8	*1949-93*		Bice Ditch near South Marion
5523500	83.7	*1948-82*		Slough Creek near Collegeville
5524000	44.8	*1948-82*		Carpenter Creek at Egypt
5524500	449	*1949-2008*	X	Iroquois River near Foresman
5525000	686	*1944-2008*	X	Iroquois River at Iroquois
5525500	446	*1948-2008*	X	Sugar Creek at Milford
5526000	2,091	*1923-2008*	X	Iroquois River near Chebanse
5526500	4,810	*1914-33*		Kankakee River at Custer Park
5526500	12.1	*1949-75*		Terry Creek near Custer Park
5527500	5,150	*1914-2008*	X	Kankakee River near Wilmington

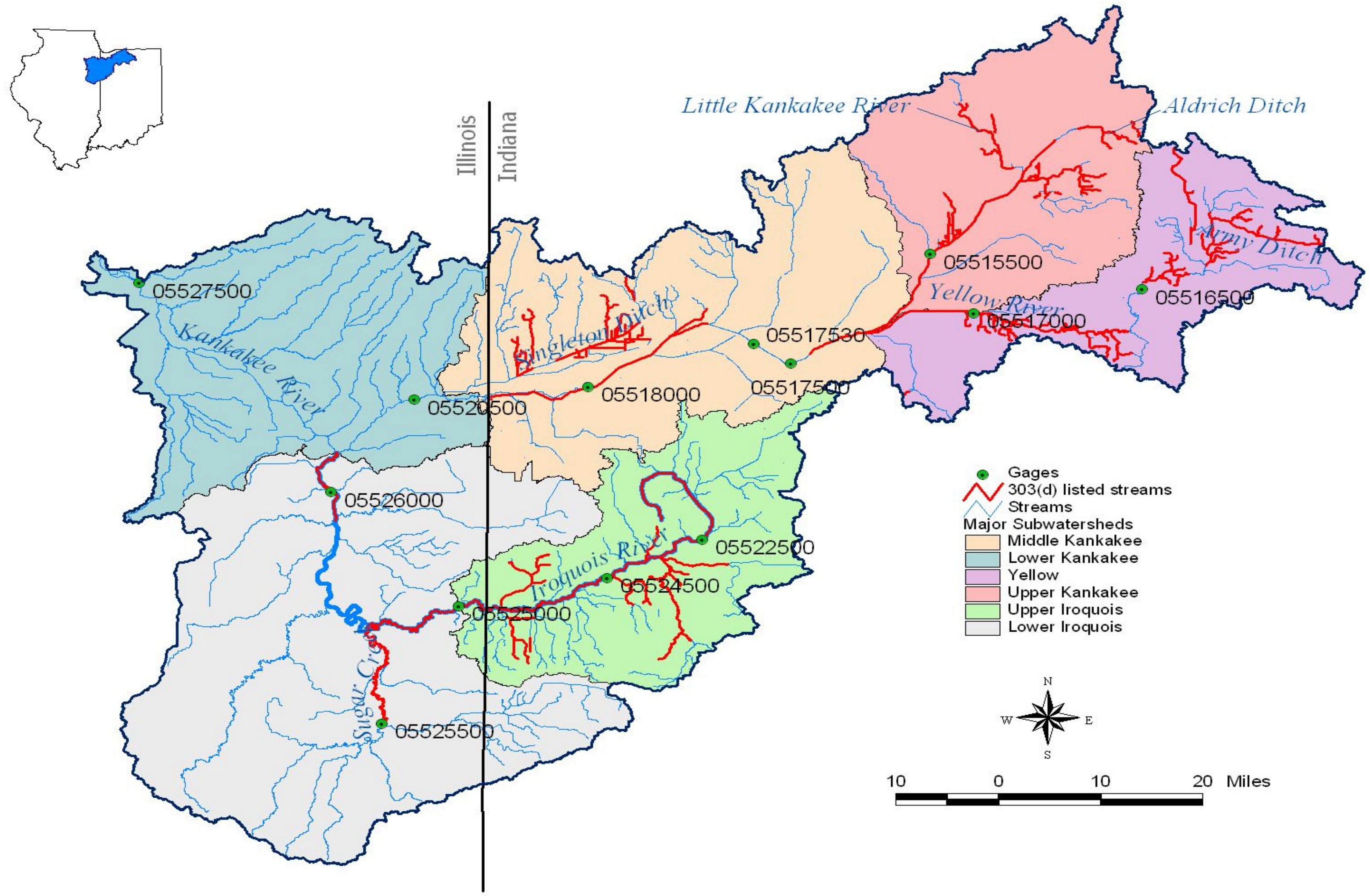

Figure 6. Active USGS Sites in the Kankakee/Iroquois Watershed

Figure 7 illustrates the monthly variation in flow patterns in the Kankakee/Iroquois watershed. Flows in general are greatest during April and May and least in August and September. These two sites also reflect the diverse, complex nature of hydrology in the basin. Both sites are comparable in drainage area but the Kankakee River at Davis is in the northern part of the watershed that is historically rich in wetlands that provide good base flows. These wetland areas also act to buffer wide variations in flow conditions that result from storm events. The Sugar Creek site, on the other hand, is in the southwestern part of the watershed. Soil conditions here do not provide the high base flows observed in the upper Kankakee. Land use in this drainage area is also dominated by row crop agriculture. Many of these fields are tile drained, one factor that contributes to the flashier flows in response to storm events that are evident in Figure 7.

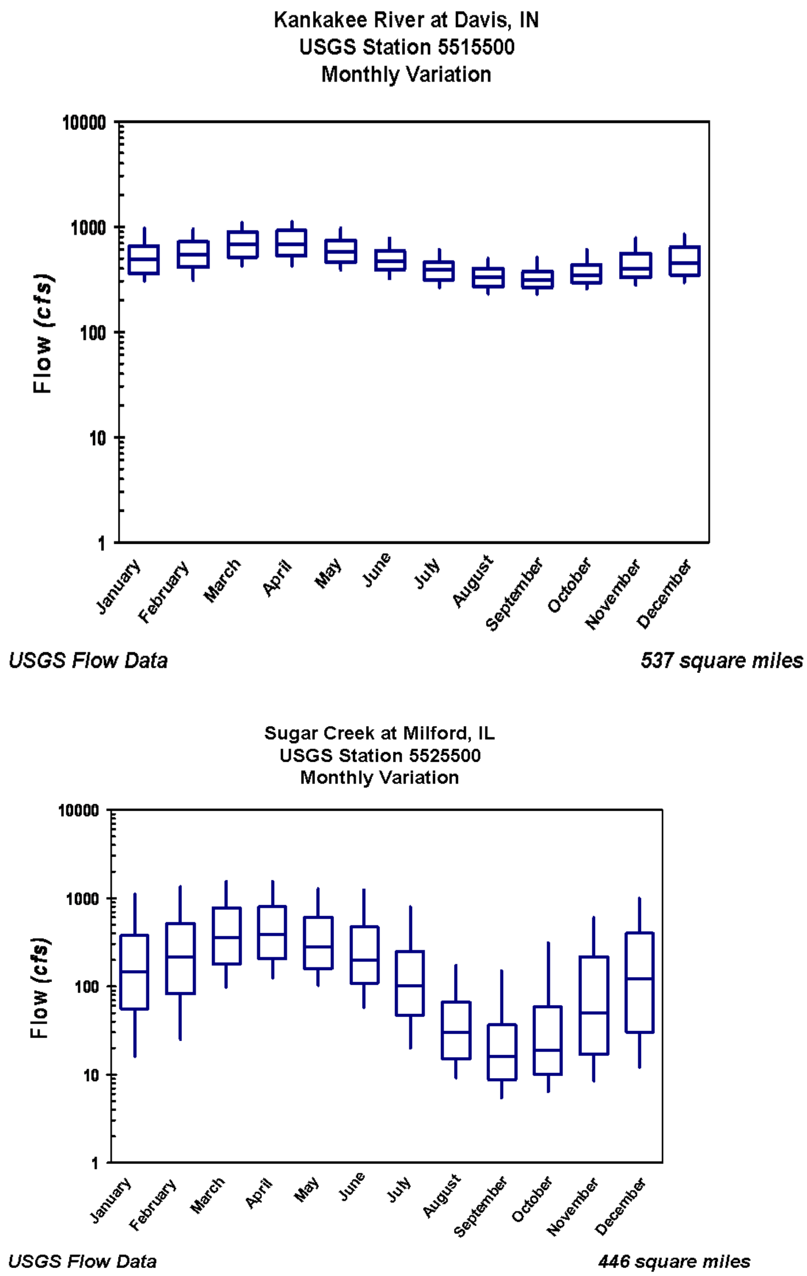

Figure 7. Monthly flow patterns for two sites in the Kankakee/Iroquois watershed.

3.0 INVENTORY AND ASSESSMENT OF WATER QUALITY INFORMATION

This section of the report provides information on the water quality standards that apply to the impaired streams in the Kankakee/Iroquois Creek watershed. A unique aspect of this TMDL is that Illinois and Indiana use different pathogen indicators to assess their water quality.

An assessment of the available bacteria data for the watershed is also presented in this section of the report.

3.1 Water Quality Standards and TMDL Target Values

Under the Clean Water Act, every state must adopt water quality standards to protect, maintain, and improve the quality of the nation's surface waters. These standards represent a level of water quality that will support the Clean Water Act's goal of "swimmable/fishable" waters. Water quality standards consist of several different components:

- **Designated uses** reflect how the water can potentially be used by humans and how well it supports a biological community. Examples of designated uses include aquatic life support, drinking water supply, and full body contact recreation. Every waterbody in Indiana and Illinois has a designated use or uses; however, not all uses apply to all waters. The Kankakee/Iroquois River TMDLs focus on protecting the designated recreational uses of the waterbodies.
- Criteria express the condition of the water that is necessary to support the designated uses. **Numeric criteria** represent the concentration of a pollutant that can be in the water and still protect the designated use of the waterbody. **Narrative criteria** are the general water quality criteria that apply to all surface waters. Numeric criteria for E. coli and fecal coliform were used as the basis of the Kankakee/Iroquois River TMDLs.

3.1.1 Indiana Water Quality Standards

The Kankakee and Iroquois Rivers in Indiana is listed as impaired for *E. coli*. The water quality standard pertaining to *E. coli* in Indiana is described below.

> *"This subsection establishes bacteriological quality for recreational uses. In addition to subsection (a), the criteria in this subsection are to be used to evaluate waters for full body contact recreational uses, to establish wastewater treatment requirements, and to establish effluent limits during the recreational season, which is defined as the months of April through October, inclusive. E. coli bacteria, shall not exceed one hundred twenty-five (125) per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor exceed two hundred thirty-five (235) per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period." [Source: Indiana Administrative Code Title 327 Water Pollution Control Board. Article 2. Section 1-6(a).]*

3.1.2 Illinois Water Quality Standards

The Kankakee and Iroquois Rivers in Illinois are listed as impaired for fecal coliform. The water quality standard pertaining to fecal coliform in Illinois is described below.

Illinois' General Use Water Quality Standard for fecal coliform bacteria specifies that during the months of May through October, based on a minimum of five samples taken over not more than a 30 day period, fecal coliform bacteria counts shall not exceed a geometric mean of 200 cfu (colony forming units)/100 ml, nor shall more than 10 percent of the samples during any 30 day period exceed 400 #/100 mL (35 Ill. Adm. Code 302.209 [2003]). This standard protects for Primary Contact (i.e., swimming) use of Illinois waters by humans.

3.2 Assessment of Water Quality Data

Table 6 and Table 7 summarize the bacteria data by displaying the maximum and geometric mean concentrations at all stations along with the reduction needed to meet the TMDL target values. Both historical and sampling data from the summer of 2008 by Illinois and Indiana were used for the TMDL analysis. At the Stage 1 meeting in Kankakee, the Iroquois/Ford County Department of Health suggested that additional data be collected for the tributaries to Sugar Creek. Since Illinois EPA could not support the level of sampling suggested, the Department of Health worked in conjunction with the Illinois EPA to monitor 17 additional stations in the watershed.

The percent reductions were calculated as follows:

$$\%\ \text{Reduction} = \frac{(\text{Target Value} - \text{Observed Maximum})}{\text{Observed Maximum}}$$

$$\%\ \text{Reduction} = \frac{(\text{Target Value} - \text{Observed Geomean})}{\text{Observed Geomean}}$$

The table indicates that most sites that were sampled experienced at least one violation of water quality standards with the reductions needed to achieve water quality standards ranging from zero to 99 percent. More site-specific information regarding existing water quality and the results of the TMDL analysis are presented in Sections 6 and 7.

Table 6. Summary of *E. coli* Data within the Kankakee/Iroquois Watershed

Major Subwatershed	Site Name	Station	Period of Record	# Samples	Geomean (#/ 100 mL)	Maximum (#/ 100 mL)	Geomean Percent Reduction (125/ 100mL)	Maximum Percent Reduction (235/ 100mL)
Lower Iroquois	Beaver Creek	48	6/2/2008 - 6/30/2008	5	330	1,986	62%	88%
	Beaver Creek	46	6/2/2008 - 6/30/2008	5	439	727	72%	68%
	Finigan Ditch	91	6/2/2008 - 6/30/2008	5	237	326	47%	28%
	Iroquois River near Chebanse	05526000	8/4/1988 - 8/9/1990	26	126	8,000	1%	97%
	Mud Creek	92	6/2/2008 - 6/30/2008	5	272	579	54%	59%
	Salisbury Ditch	44	6/2/2008 - 6/30/2008	5	156	196	20%	0%
	Sugar Creek	88	6/2/2008 - 6/30/2008	5	381	727	67%	68%
	Sugar Creek	90	6/2/2008 - 6/30/2008	5	249	687	50%	66%
Lower Kankakee	Kankakee River at Momence	05520500	8/3/1988 - 8/9/1990	22	138	8,000	10%	97%
Middle Kankakee	Beaver Lake Ditch	42	6/3/2008 - 7/1/2008	5	222	308	44%	24%
	Beaver Lake Ditch	38	6/3/2008 - 7/1/2008	5	560	866	78%	73%
	Brown Ditch	22	6/3/2008 - 7/1/2008	5	125	291	0%	19%
	Cedar Creek	26	6/3/2008 - 7/1/2008	5	485	687	74%	66%
	Cedar Creek	28	6/3/2008 - 7/1/2008	5	426	1,553	71%	85%
	Cobb Ditch	6	6/3/2008 - 7/1/2008	5	64	435	0%	46%
	Crooked Creek	27	6/2/2008 - 7/14/2008	6	689	1,986	82%	88%
	Dehaan Ditch	20	6/3/2008 - 7/1/2008	5	602	1,300	79%	82%
	Pitner Ditch	7	6/2/2008 - 6/30/2008	5	122	142	0%	0%
	Greiger Ditch	25	6/2/2008 - 7/14/2008	6	284	488	56%	52%
	Griesel Ditch	24	6/3/2008 - 7/1/2008	5	429	1,046	71%	78%
	Heinold Ditch	4	6/2/2008 - 6/30/2008	5	321	649	61%	64%
	Hodge Ditch	12	6/3/2008 - 7/1/2008	5	195	285	36%	18%
	Hunsley Ditch	31	6/4/2008 - 6/30/2008	5	1,079	2,420	88%	90%
	Kankakee River	36	6/3/2008 - 7/1/2008	5	175	249	29%	6%
	Kankakee River	5	6/2/2008 - 6/30/2008	5	338	488	63%	52%
	Kankakee River	2	6/3/2008 - 7/1/2008	5	241	411	48%	43%
	Kankakee River	16	6/3/2008 - 7/1/2008	5	239	525	48%	55%
	Kankakee River	14	6/3/2008 - 7/1/2008	5	198	285	37%	18%

Table 6. Summary of *E. coli* Data within the Kankakee/Iroquois Watershed

Major Subwatershed	Site Name	Station	Period of Record	# Samples	Geomean (#/ 100 mL)	Maximum (#/ 100 mL)	Geomean Percent Reduction (125/ 100mL)	Maximum Percent Reduction (235/ 100mL)
Middle Kankakee	Kankakee River at Dunns Bridge	KR-91	6/30/1999 - 8/25/1999	6	221	720	43%	67%
	Kankakee River at Dunns Bridge	3	6/2/2008 - 6/30/2008	5	307	461	59%	49%
	Kankakee River at Lake/Newton Co, State Line Rd - arbitrary County assignment	UMK120-0001	6/29/1999 - 7/27/1999	5	163	390	23%	40%
	Kankakee River at Shelby (SR 55)	KR-68	4/29/1988 - 8/26/1999	78	119	6,000	0%	96%
	Kankakee River at US 231, Porter and Jasper Co Line	UMK090-0011	6/30/1999 - 8/26/1999	6	258	1,300	51%	82%
	Lawler Ditch	40	6/3/2008 - 7/1/2008	5	204	411	39%	43%
	Phillips Ditch	8	6/3/2008 - 7/1/2008	5	522	866	76%	73%
	Singleton Ditch near Schneider	34	6/3/2008 - 7/1/2008	5	379	517	67%	55%
	Singleton Ditch near Schneider	SD-10	6/29/1999 - 8/23/1999	6	427	870	71%	73%
	Singleton D at SR 55	UMK130-0021	6/29/1999 - 7/27/1999	5	370	600	66%	61%
	Slocum Ditch	29	6/4/2008 - 6/30/2008	5	949	2,419	87%	90%
	Stony Run Ditch	18	6/3/2008 - 7/1/2008	5	635	770	80%	69%
	West Creek	30	6/3/2008 - 7/1/2008	5	509	1,120	75%	79%
	West Creek	32	6/3/2008 - 7/1/2008	5	561	1,733	78%	86%
	Wolf Creek	10	6/3/2008 - 7/1/2008	5	215	291	42%	19%
Upper Iroquois	Carpenter Creek	68	6/4/2008 - 7/2/2008	5	919	2,419	86%	90%
	Carpenter Creek	70	6/4/2008 - 7/2/2008	5	253	2,419	51%	90%
	Carpenter Cr @ Jasper CR 850 S	UMI030-0014	7/1/1999 - 8/25/1999	6	371	8,000	66%	97%
	Curtis Creek	62	6/4/2008 - 7/2/2008	5	649	2,419	81%	90%
	Darroch Ditch	78	6/2/2008 - 6/30/2008	5	755	1,300	83%	82%

Table 6. Summary of *E. coli* Data within the Kankakee/Iroquois Watershed

Major Subwatershed	Site Name	Station	Period of Record	# Samples	Geomean (#/ 100 mL)	Maximum (#/ 100 mL)	Geomean Percent Reduction (125/ 100mL)	Maximum Percent Reduction (235/ 100mL)
Upper Iroquois	Hunter Ditch	76	6/2/2008 - 6/30/2008	5	1,122	1,414	89%	83%
	Iroquois River	60	6/4/2008 - 7/2/2008	5	631	1,120	80%	79%
	Iroquois River	74	6/2/2008 - 6/30/2008	5	495	2,419	75%	90%
	Iroquois River	80	6/2/2008 - 6/30/2008	5	211	488	41%	52%
	Iroquois River @ US 231	UMI020-0011	6/30/1999 - 7/28/1999	5	164	730	24%	68%
	Iroquois River @ US 41	UMI050-0015	7/1/1999 - 8/24/1999	6	156	1,500	20%	84%
	Iroquois River near Kentland (I-62)	I-62	7/1/1999 - 7/29/1999	5	1,092	3,600	89%	93%
	Jungle Ditch	52	6/2/2008 - 6/30/2008	5	628	866	80%	73%
	Montgomery Ditch	86	6/2/2008 - 6/30/2008	5	581	1,046	78%	78%
	Montgomery Ditch	84	6/2/2008 - 6/30/2008	5	813	1,300	85%	82%
	Mosquito Creek	72	6/2/2008 - 6/30/2008	5	544	1,120	77%	79%
	Oliver Ditch	56	6/2/2008 - 6/30/2008	5	325	1,046	62%	78%
	Oliver Ditch	50	6/2/2008 - 6/30/2008	5	392	980	68%	76%
	Oliver Ditch	54	6/2/2008 - 6/30/2008	5	395	921	68%	74%
	Ryan Ditch	58	6/4/2008 - 7/2/2008	5	343	2,419	64%	90%
	Slough Creek	64	6/4/2008 - 7/2/2008	5	711	2,419	82%	90%
	Slough Creek	66	6/4/2008 - 7/2/2008	5	583	2,419	79%	90%
	Slough Cr @ US 231	UMI030-0013	6/28/1999 - 8/25/1999	6	489	1,600	74%	85%
	Thompson Ditch	82	6/2/2008 - 6/30/2008	5	361	866	65%	73%
Upper Kankakee	Aldrich Ditch	45	6/3/2008 - 7/1/2008	5	175	238	29%	1%
	Bailey Ditch	21	6/2/2008 - 7/14/2008	6	662	2,419	81%	90%
	Geyer Ditch	43	6/3/2008 - 7/1/2008	5	174	461	28%	49%
	Jain Ditch	61	6/4/2008 - 7/2/2008	5	205	261	39%	10%
	Kankakee River	47	6/3/2008 - 7/1/2008	5	215	345	42%	32%
	Kankakee River	33	6/2/2008 - 6/30/2008	5	347	866	64%	73%
	Kankakee River	11	6/2/2008 - 6/30/2008	5	334	579	63%	59%
	Kankakee River at SR 4	UMK010-0004	6/29/1999 - 7/27/1999	5	267	1,300	53%	82%

Table 6. Summary of *E. coli* Data within the Kankakee/Iroquois Watershed

Major Subwatershed	Site Name	Station	Period of Record	# Samples	Geomean (#/ 100 mL)	Maximum (#/ 100 mL)	Geomean Percent Reduction (125/ 100mL)	Maximum Percent Reduction (235/ 100mL)
Upper Kankakee	Kankakee River at SR 39 Bridge	UMK040-0004	7/1/1999 - 8/23/1999	6	303	780	59%	70%
	Kankakee River near Union Center	KR-118	4/27/1988 - 8/24/1999	87	271	25,000	54%	99%
	Kingsbury Creek	37	6/3/2008 - 7/1/2008	5	331	488	62%	52%
	Little Kankakee River	39	6/3/2008 - 7/1/2008	5	478	2,420	74%	90%
	Little Kankakee River	49	6/3/2008 - 7/1/2008	5	354	461	65%	49%
	Lower Kankakee River @ LaPorte CR 700 E	UMK010-0009	6/29/1999 - 8/23/1999	6	628	6,800	80%	97%
	Niespodziany Ditch	41	6/3/2008 - 7/1/2008	5	354	517	65%	55%
	Pine Creek	53	6/3/2008 - 7/1/2008	5	838	1,300	85%	82%
	Pine Creek	57	6/3/2008 - 7/1/2008	5	828	921	85%	74%
	Pine Cr at Quinn Rd	UMK020-0004	6/29/1999 - 7/27/1999	5	404	730	69%	68%
	Potato Creek	51	6/3/2008 - 7/1/2008	5	348	548	64%	57%
	Potato Cr @ Walnut Rd	UMK020-0003	6/29/1999 - 7/27/1999	5	590	1,600	79%	85%
	Robbins Ditch	59	6/4/2008 - 7/2/2008	5	243	276	49%	15%
	Robbins Ditch	23	6/2/2008 - 7/14/2008	6	284	1,414	56%	83%
	Travis Ditch @ U.S. 6	UMK030-0013	6/29/1999 - 7/27/1999	5	528	1,700	76%	86%
	Whitham Ditch	35	6/2/2008 - 6/30/2008	5	125	236	0%	0%
	Yellow Bank Creek	55	6/3/2008 - 7/1/2008	5	732	2,419	83%	90%
Yellow	Armey Ditch	85	6/3/2008 - 7/1/2008	5	1,112	1,733	89%	86%
	Bogus Run	1	6/2/2008 - 6/30/2008	5	522	1,414	76%	83%
	Bogus Run	13	6/2/2008 - 6/30/2008	5	395	727	68%	68%
	Clifton Ditch	71	6/4/2008 - 7/2/2008	5	589	1,986	79%	88%
	Craigmile Ditch	15	6/2/2008 - 6/30/2008	5	667	1,414	81%	83%
	Dausman Ditch	83	6/3/2008 - 7/1/2008	5	1,676	2,420	93%	90%
	Elmer Seltenright Ditch	77	6/3/2008 - 7/1/2008	5	1,225	2,419	90%	90%
	Harry Cool Ditch	67	6/4/2008 - 7/2/2008	5	330	649	62%	64%
	Kline Arm Ditch	17	6/2/2008 - 6/30/2008	5	499	770	75%	69%

Table 6. Summary of *E. coli* Data within the Kankakee/Iroquois Watershed

Major Subwatershed	Site Name	Station	Period of Record	# Samples	Geomean (#/ 100 mL)	Maximum (#/ 100 mL)	Geomean Percent Reduction (125/ 100mL)	Maximum Percent Reduction (235/ 100mL)
Yellow	Stock Ditch	87	6/3/2008 - 7/1/2008	5	983	2,419	87%	90%
	Unnamed Ditch	75	6/4/2008 - 7/2/2008	5	772	1,414	84%	83%
	Wolf Creek	73	6/4/2008 - 7/2/2008	5	1,085	1,414	88%	83%
	Yellow River	89	6/3/2008 - 7/1/2008	5	1,347	2,419	91%	90%
	Yellow River	79	6/3/2008 - 7/1/2008	5	853	2,419	85%	90%
	Yellow River	69	6/4/2008 - 7/2/2008	5	239	649	48%	64%
	Yellow River	9	6/2/2008 - 6/30/2008	5	427	816	71%	71%
	Yellow River	81	6/3/2008 - 7/1/2008	5	943	2,419	87%	90%
	Yellow River	19	6/2/2008 - 6/30/2008	5	591	1,046	79%	78%
	Yellow River	63	6/2/2008 - 7/14/2008	6	461	980	73%	76%
	Yellow River at E 4th Rd	UMK050-0020	7/1/1999 - 10/3/2000	8	1,321	24,200	91%	99%
	Yellow River @ S. Olive Trail	UMK060-0011	7/8/1999 - 7/28/1999	4	439	520	72%	55%
	Yellow River @ SR 23	UMK060-0012	6/28/1999 - 8/25/1999	6	171	400	27%	41%
	Yellow River @ SR 39	UMK060-0013	7/1/1999 - 8/24/1999	6	449	1,100	72%	79%
	Yellow River @ N Jarrah Rd	UMK050-0031	7/1/1999 - 8/26/1999	6	530	2,200	76%	89%
	Yellow River near Knox	65	6/2/2008 - 7/14/2008	6	445	1,300	72%	82%
	Yellow River near Knox	YR-12	7/1/1999 - 8/25/1999	6	348	1,400	64%	83%

Table 7. Summary of Fecal Coliform Data within the Kankakee/Iroquois Watershed

Watershed Group	Site Name	Station	Period of Record	# Samples	Geomean (#/ 100 mL)	Maximum (#/ 100 mL)	Geomean Percent Reduction (200/ 100mL)	Maximum Percent Reduction (400/ 100mL
Lower Iroquois	Gay Creek	FLIDB-01	8/19/2008 - 9/17/2008	5	700	3,600	71%	89%
	Fountain Creek	FLIDA-01	8/19/2008 - 9/17/2008	5	129	222	0%	0%
	Mud Creek East	FLIC-04	8/19/2008 - 9/17/2008	5	377	3,600	47%	89%
	Mud Creek West	FLID-02	8/19/2008 - 9/17/2008	5	502	2,100	60%	81%
	Pigeon Creek	FLIDD-CP-C3	10/3/2000 - 9/17/2008	6	514	2,500	61%	84%
	Prairie Creek	FLG-01	8/19/2008 - 9/17/2008	5	645	4,200	69%	90%
	Spring Creek	FLH-02	8/19/2008 - 9/17/2008	5	411	840	51%	52%
	Sugar Creek	FLI-M-D	8/19/2008 - 9/17/2008	8	376	1,100	47%	64%
	Sugar Creek	FLI-01	8/19/2008 - 9/17/2008	5	514	860	61%	53%
	Sugar Creek at Milford	05525500	1/19/1978 - 1/25/1996	121	1,354	84,000	85%	100%
	Sugar Creek at Milford	FLI-02	3/8/1999 - 6/10/2008	46	227	7,455	12%	95%
	Unnamed Trib Mud Creek West	FLIDE-01	8/19/2008 - 9/17/2008	5	912	2,780	78%	86%
	Unnamed Trib Sugar Creek	FLIE-01	8/19/2008 - 9/17/2008	5	328	788	39%	49%
	Whisky Creek	FLIDAA-01	8/19/2008 - 9/17/2008	5	309	3,900	35%	90%
	Beaver Creek	FLD-03	8/19/2008 - 9/17/2008	5	388	1,380	48%	71%
	Iroquois River	FL-07	8/19/2008 - 9/17/2008	5	759	3,200	74%	88%
	Iroquois River	FL-03	8/19/2008 - 9/17/2008	5	780	3,500	74%	89%
	Iroquois River at Iroquois	05525000	1/25/1978 - 1/25/1996	123	333	8,000	40%	95%
	Iroquois River at Iroquois	FL-04	3/31/1999 - 6/10/2008	40	171	7,636	0%	95%
	Iroquois River near Chebanse	05526000	1/25/1978 - 11/25/1996	165	137	70,000	0%	99%
	Iroquois River near Chebanse	FL-02	3/8/1999 - 6/18/2008	42	84	2,500	0%	84%
Lower Kankakee	Kankakee River at Momence	05520500	12/16/1977 - 11/25/1996	170	170	39,000	0%	99%
	Kankakee River at Momence	F-02	3/8/1999 - 10/17/2006	30	91	700	0%	43%
	Kankakee River near Wilmington	F-16*	1/14/2003 - 6/18/2008	16	61	240	0%	0%

Table 7. Summary of Fecal Coliform Data within the Kankakee/Iroquois Watershed

Watershed Group	Site Name	Station	Period of Record	# Samples	Geomean (#/ 100 mL)	Maximum (#/ 100 mL)	Geomean Percent Reduction (200/ 100mL)	Maximum Percent Reduction (400/ 100mL
Lower Kankakee	Kankakee River near Wilmington	05527500	4/30/1980 - 10/21/1996	128	126	20,000	0%	98%
	Kankakee River near Wilmington	F-01	3/30/1999 - 9/19/2002	21	110	8,900	0%	96%
Middle Kankakee	Kankakee River at Shelby (SR 55)	KR-68	1/6/1976 - 3/31/1988	118	136	35,000	0%	99%
Upper Kankakee	Kankakee River near Union Center	KR-118	2/21/1978 - 3/29/1988	109	458	56,000	56%	99%

* Segment F-01 impairment status previously based on data collected at station F-01; impairment status now based on data from station F-16.

4.0 SOURCE ASSESSMENT

This section summarizes the available information on significant sources of bacteria in the six subwatersheds of the Kankakee/Iroquois River watershed. Point (or regulated) sources are presented first, followed by nonpoint (or unregulated) sources.

The term point source refers to any discernible, confined and discrete conveyance, such as a pipe, ditch, channel, tunnel or conduit, by which pollutants are transported to a waterbody. It also includes vessels or other floating craft from which pollutants are or may be discharged. By law, the term "point source" also includes: concentrated animal feeding operations (which are places where animals are confined and fed); storm water runoff from Municipal Separate Storm Sewer Systems (MS4s); and illicitly connected "straight pipe" discharges of household waste. Point sources are regulated through the National Pollutant Discharge Elimination System (NPDES).

Nonpoint sources include all other categories not classified as point sources. In urban areas, nonpoint sources can include leaking or faulty septic systems, runoff from lawn fertilizer applications, pet waste, storm water runoff (outside of MS4 communities), and other sources. In rural areas, nonpoint sources can include runoff from agricultural fields, forests, and undeveloped areas.

4.1 Upper Kankakee

This section of the report presents the available information on the sources of *E. coli* in the Upper Kankakee subwatershed.

The Upper Kankakee subwatershed lies solely in Indiana, covering nearly 663 square miles of the headwater reaches of the Kankakee River (Figure 8). The Kankakee River drains portions of St. Joseph, La Porte, Marshall, and Starke Counties. In addition to the southern suburbs of South Bend, the Upper Kankakee includes La Porte, Koontz Lake, Walkerton, North Liberty, and New Carlisle. Land use/land cover in the Upper Kankakee (Table 8) is primarily agricultural. Forested areas contribute to 17 percent of the watershed area, and approximately 10 percent of the land is developed.

The potential sources of bacteria in this subwatershed are further discussed in the following sections.

Table 8. Land Use/Land Cover in the Upper Kankakee Subwatershed

Land Use/Land Cover	Area		Percent
	Acres	Square Miles	
Agricultural Land	269,668	421	63.65
Forested Land	70,282	110	16.59
Developed Land	40,583	63	9.58
Pasture/Hay	17,202	27	4.06
Grassland and Shrubs	11,262	18	2.66
Wetland	10,056	16	2.37
Open Water	4,636	7	1.09
Total	**423,690**	**662**	**100**

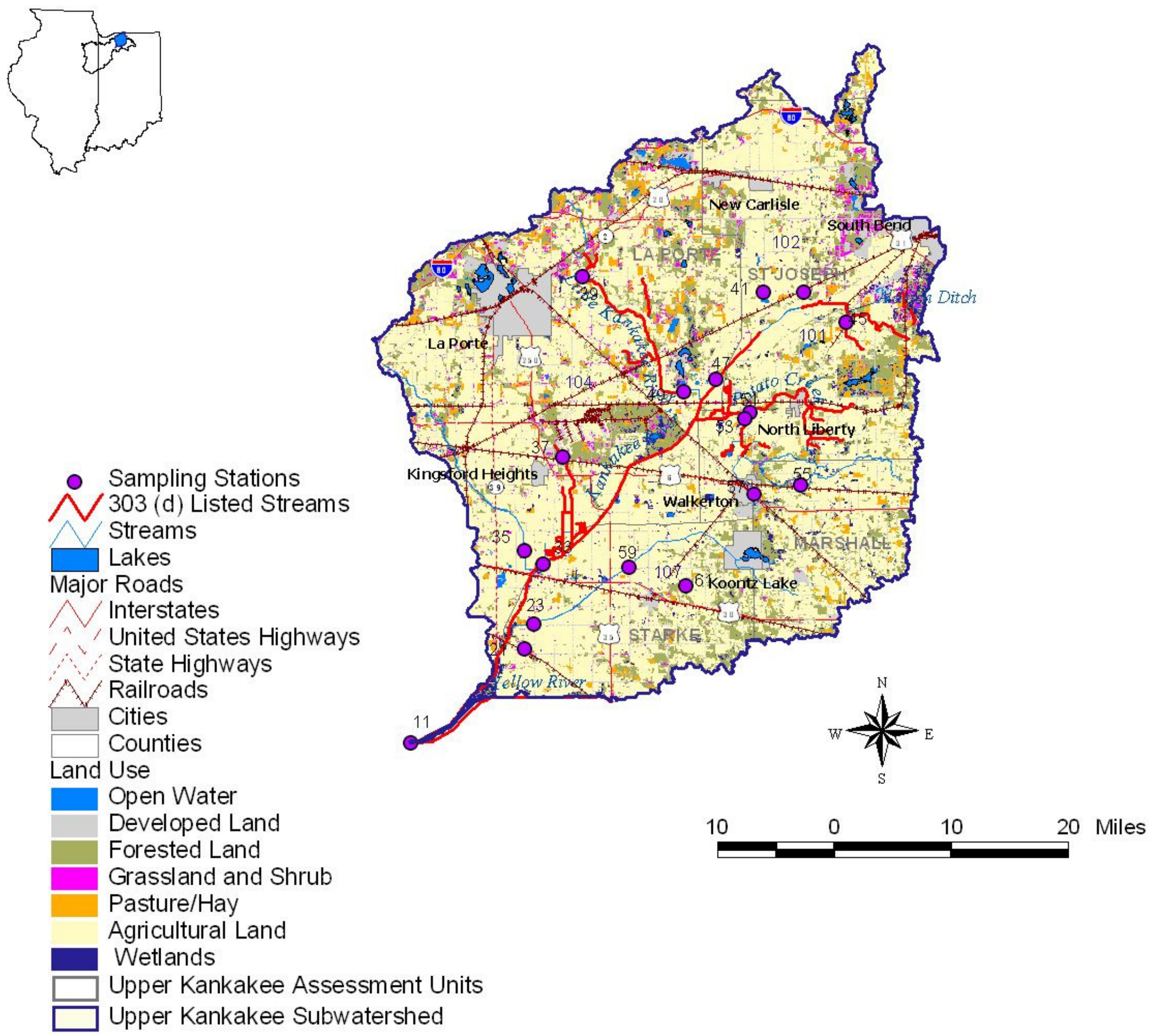

Figure 8. Land use in the Upper Kankakee Subwatershed

4.1.1 Point Sources

This section summarizes the potential point sources of bacteria in the Upper Kankakee subwatershed.

4.1.1.1 Wastewater Treatment Plants (WWTPs

There are 10 active facilities that are permitted to discharge wastewater containing bacteria within the Upper Kankakee subwatershed (Table 9 and Figure 9). These facilities include municipal and small domestic wastewater treatment plants. In Indiana municipal and small domestic wastewater treatment plants are both regulated under municipal permits. Municipal facilities in Indiana are required to disinfect their effluent during the recreational season (April 1 to October 31). IDEM does not require disinfection for waste-stabilization lagoons as long as *E. coli* limits from their permit are met utilizing the lagoon's retention time. The total design flow[1] of the 10 active facilities is 10.8 million gallons per day (MGD).

Table 9. NPDES Facilities in the Upper Kankakee Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)
712000101	Pine Creek	IN0025801	North Liberty WWTP	Kankakee R Via Pine Cr Via Potato C	0.180
		IN0052272	Potato Creek State Park	Kankakee R Via Pine Cr Via Potato C	0.093
		IN0040690	Walkerton Municipal WWTP	Kankakee R Via Pine Creek	0.364
712000102	Little Kankakee River-Kankakee River	IN0036897	New Prairie High School	Um/Kankakee River/Unnamed Swale	0.043
712000104	Mill Creek-Kankakee River	IN0045471	Kingsbury Utility Corp	Kankakee R Via Travis Ditch	2.500
		IN0023337	Kingsford Heights Municipal WWTP	Kankakee R Via Porter Ditch	0.422
		IN0025577	La Porte Municipal STP	Kankakee R Via Travis Ditch	7.000
712000107	Robbins Ditch-Kankakee River	IN0040100	Hamlet Municipal STP	Kankakee R Via Danielson Ditch	0.100
		IN0061085	Swan Lake Golf Resort	Um/Kankakee R/Lawrence Pontius D/Un	0.036
		IN0041882	Yogi Bears Jellystone Park	Um/Kankakee R/Yellow R/Bald Ditch	0.105
			Total		**10.843**

[1] A facility's design flow is the peak volume that it is designed and permitted to discharge.

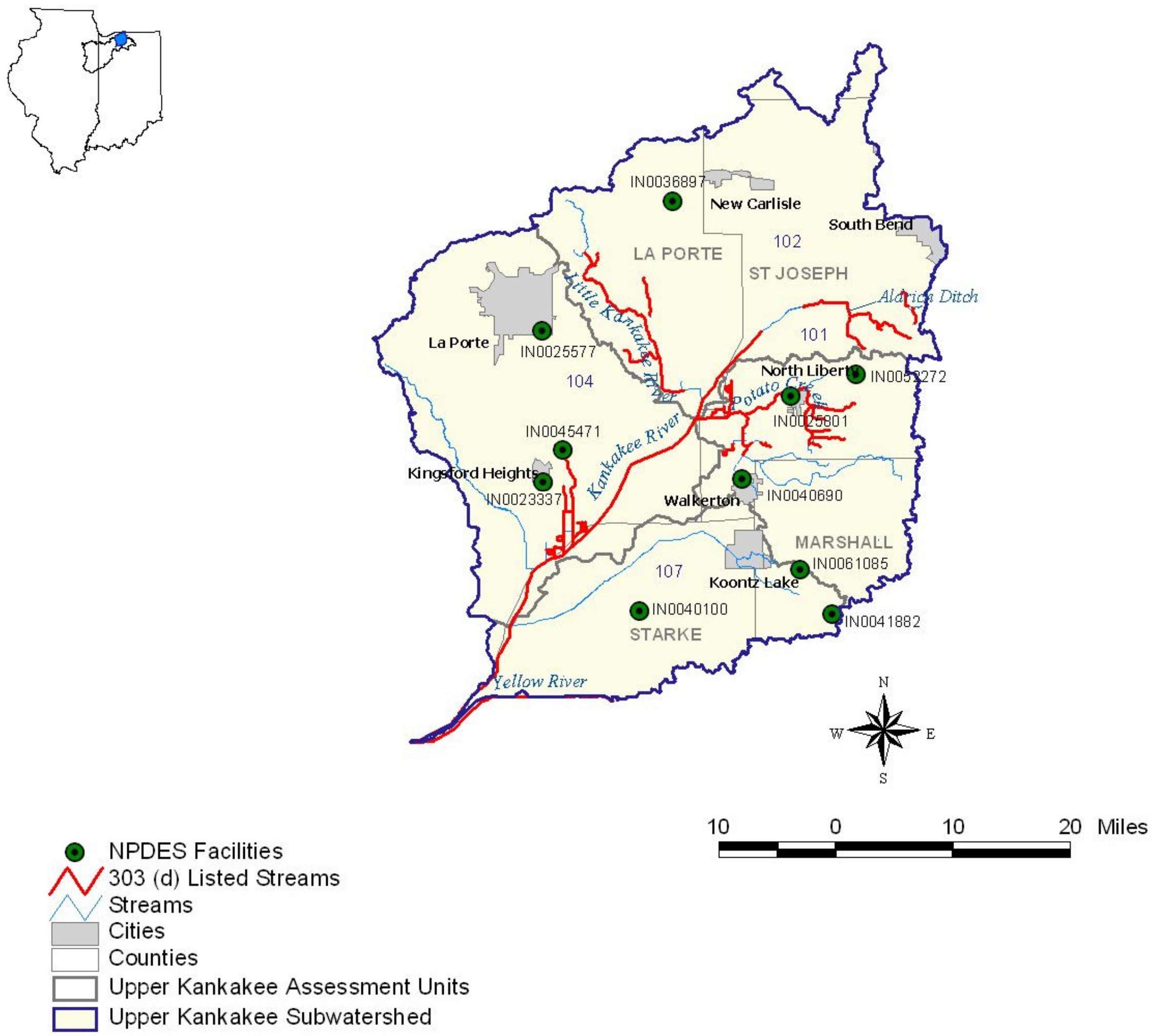

Figure 9. NPDES Facilities in the Upper Kankakee Subwatershed

4.1.1.2 Combined Sewer Overflows (CSOs)

Combined sewer systems are sewers that are designed to collect rainwater runoff, domestic sewage, and industrial wastewater into the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a waterbody. During periods of heavy rainfall or snowmelt, however, the wastewater volume in a combined sewer system can exceed the capacity of the sewer system or treatment plant. For this reason, combined sewer systems are designed to overflow occasionally and discharge excess wastewater directly to nearby streams, rivers, or other water bodies. These overflows, called combined sewer overflows (CSOs), can contain both storm water and untreated human and industrial waste. Because they are associated with wet weather events, CSOs typically discharge for short periods of time at random intervals.

There are no CSOs in the Upper Kankakee subwatershed.

4.1.1.3 Municipal Separate Storm Sewer System (MS4)

MS4s, generally, are public storm sewer systems (including roads with drainage systems and municipal streets) that are owned or operated by a public body and not part of a combined sewer (i.e., storm and sanitary sewers combined). MS4s can be significant sources of bacteria because they transport urban runoff that can be affected by pet waste, illicit sewer connections, failing septic systems, and other potential sources of bacteria. Regulated small MS4s are identified according to the U.S. Census Bureau definition of urbanized area as established every 10 years in its decennial census. Populations served by these regulated small MS4s range from several hundred to tens of thousands of people, but in most instances these systems serve fewer than about 30,000–50,000 people. There are two MS4 communities in the Upper Kankakee subwatershed as shown in Table 10.

Table 10. Upper Kankakee MS4 Communities

MS4 Facility Permit ID	MS4 Name	Area (Square Miles)
INR040107	La Porte County	14.9
INR040114	South Bend	3.4

4.1.1.4 Concentrated Animal Feeding Operations (CAFOs)

The removal and disposal of manure, litter, or processed wastewater that is generated as the result of concentrated animal feeding operations (CAFOs) is considered a point source that is regulated through the NPDES Program. Indiana regulations for CAFOs can be found in 327 IAC 15-15. In Illinois, the CAFO program is administered by the Illinois EPA through general permit number ILA01 (refer to the following Web site for more details: http://www.epa.state.il.us/water/cafo/). The federal regulations for all CAFOs can be found in 40 CFR Parts 9, 122, and 412 and U.S. EPA requires that CAFOs receive a WLA as part of the TMDL development process. The WLA is typically set at zero for all pollutants to be consistent with the requirement that CAFOs not discharge to waters of the state. Indiana has identified 28 CAFOs in the Kankakee/Iroquois watershed and the WLAs for each is set to zero. No CAFOs were identified by IEPA in the Illinois portion of the watershed, and so the WLA is also equal to zero.

There are three CAFOs within the Upper Kankakee subwatershed as shown in Table 11 and Figure 10.

Table 11. CAFOs in the Upper Kankakee Subwatershed

HUC 10	HUC 10 Name	NPDES ID	Operation Name
712000101	Pine Creek	ING802239	Walkerton Farm
712000102	Little Kankakee River-Kankakee River	ING806085	Scher-Way Dairy Farm
712000107	Robbins Ditch-Kankakee River	ING800149	N&L Pork, Inc. - Lee Nagai - Home Site

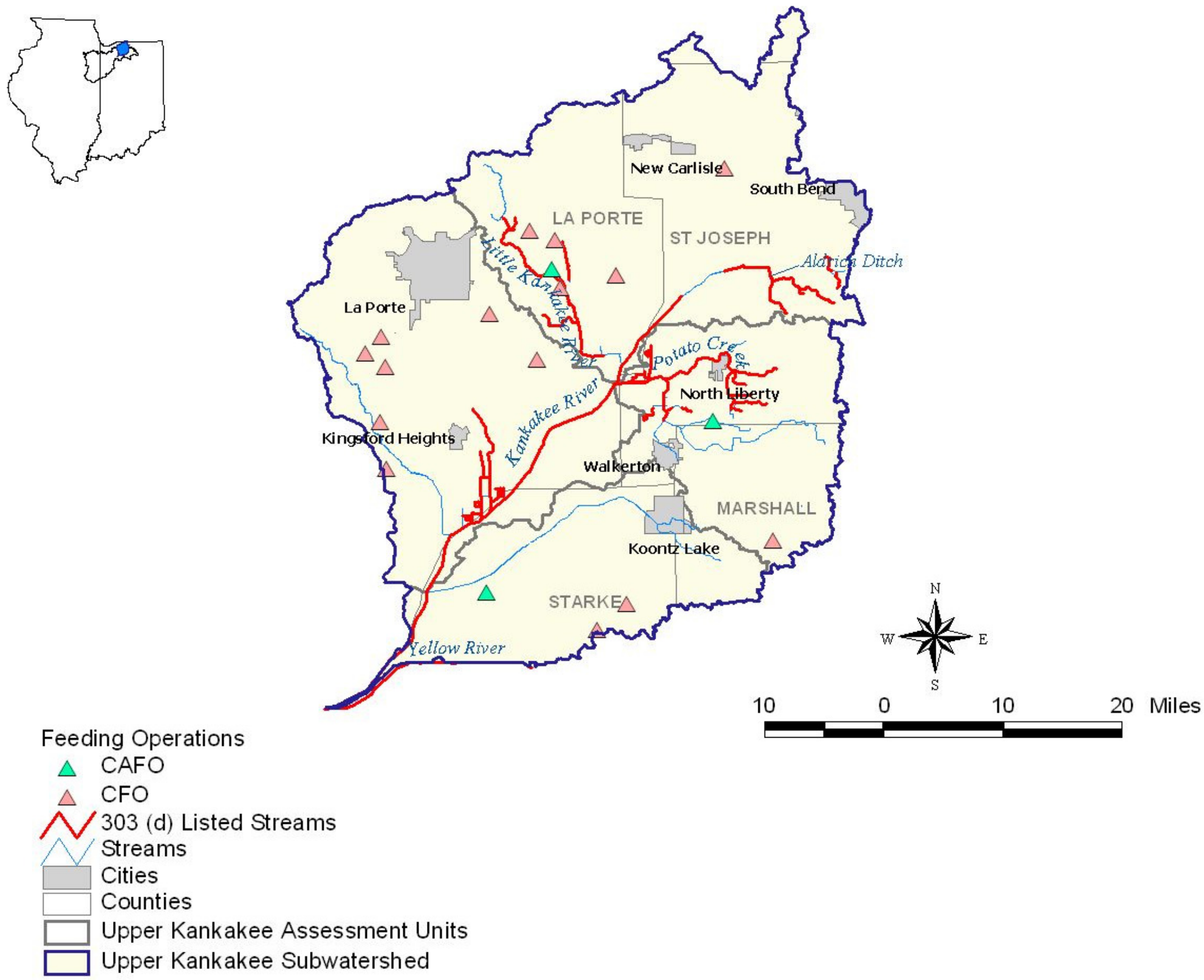

Figure 10. Feeding Operations in the Upper Kankakee Subwatershed

4.1.2 Nonpoint Sources

This section of the report presents information on the nonpoint sources of bacteria in the Upper Kankakee subwatershed.

4.1.2.1 Onsite Wastewater Treatment Systems

Onsite wastewater treatment systems (e.g., septic systems) that are properly designed and maintained should not serve as a source of contamination to surface waters. However, onsite systems do fail for a variety of reasons. Common soil-type limitations which contribute to failure are: seasonal water tables, compact glacial till, bedrock, coarse sand and gravel outwash and fragipan. When these septic systems fail hydraulically (surface breakouts) or hydrogeologically (inadequate soil filtration) there can be adverse effects to surface waters (Horsely and Witten, 1996). Septic systems contain all the water discharged form homes and business and can be significant sources of pathogens.

Failing septic systems have been a problem in portions of the Kankakee/Iroquois River watershed, and illegal methods of dumping waste through straight pipe discharges and septic systems connected to tile drains have been observed in the watershed (IDEM, 2001). Furthermore, septic system malfunctions pose danger to human health when they contaminate drinking water supplies, wells, and fishing and swimming areas.

A comprehensive database of septic systems within the watershed is not available. Therefore, the rural population of each subwatershed was calculated to obtain a general representation of the number of systems. It is assumed that the numbers of septic systems in the subwatersheds are directly proportional to rural population density. The rural population in the Upper Kankakee subwatershed is shown in Table 12, along with a calculated density (total rural population divided by total area). The rural population density can be used to compare the different major subwatersheds within the Kankakee/Iroquois watershed.

It should also be noted that hydrologic soil group A (50%) and B soils (41%) are dominant in the Upper Kankakee subwatershed. Since these soils have good infiltration rates, there is less risk for failing septic systems due to this factor.

Table 12. Rural Population Density in the Upper Kankakee Subwatershed

County	Area of County in Subwatershed (mi^2)	County Population	Urban Population	Rural Population	Rural Population Density (persons/mi^2)
La Porte	294	54,332	23,303	31,029	214
Starke	106	9,278	2,268	7,010	
St. Joseph	194	112,736	14,234	98,502	
Marshall	69	5,597	106	5,491	
Total	**663**	**181,943**	**39,911**	**142,032**	

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4.1.2.2 Confined Animal Feeding Operations (CFOs) and Animal Feeding Operations (AFOs)

Animal feeding operations that are not classified as CAFOs are known as confined feeding operations (CFOs) in Indiana and as animal feeding operations (AFOs) in Illinois. Non-CAFO animal feeding operations are considered nonpoint sources by US. EPA. CAFOs have federal permits and fall under the jurisdiction of the NPDES Program. Indiana's CFOs have state issued permits but are not under the jurisdiction of the federal NPDES Program and are therefore categorized as nonpoint sources for the purposes of this TMDL. Indiana's CFOs are not allowed to discharge under the state permits.

AFOs in Illinois do not have state permits. However, they are subject to state livestock waste regulations and may be inspected by the Illinois EPA, either in response to complaints or as part of the Agency's field inspection responsibilities to determine compliance by facilities subject to water pollution and livestock waste regulations. In Illinois *Animal feeding operation* ("AFO") is defined as a lot or facility (other than an aquatic animal production facility) where the following conditions are met:

> (1) Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and
> (2) Crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

Like CAFOs, the animals raised in CFOs and AFOs produce manure that is stored in pits, lagoons, tanks and other storage devices. The manure is then applied to area fields as fertilizer. When stored and applied properly, this beneficial re-use of manure provides a natural source for crop nutrition. It also lessens the need for fuel and other natural resources that are used in the production of fertilizer. CFOs and AFOs, however, can pose environmental concerns, including the following:

- Manure can leak or spill from storage pits, lagoons, tanks, etc.
- Improper application of manure can contaminate surface or ground water.
- Manure overapplication can adversely impact soil productivity.

There are 16 CFOs in the Upper Kankakee subwatershed as shown in Table 13 and Figure 10.

Table 13. CFOs in the Upper Kankakee Subwatershed

HUC 10	HUC 10 Name	Farm ID	Operation Name
0712000101	Pine Creek	6203	Leffert Dairy, LLC
0712000102	Little Kankakee River-Kankakee River	6135	Ginter
		3600	Farm No 2
		6072	Sunset Dairy
		4208	Farm #1
		4209	Farm #2
		280	Tuholski Farms, Inc.
0712000104	Mill Creek-Kankakee River	4255	Minich
		1110	C.L. Rhoade Corp
		4169	Applegarth
		3983	Schoof
		6096	Wil-Minfarm
		2187	Yon Ed Farm, Inc.
		250	Meadowland Farms
0712000107	Robbins Ditch-Kankakee River	430	Yankauskas Pork Production
		4676	Tip Top Farms

4.1.2.3 Livestock Population

Livestock are potential source of bacteria to streams, particularly when direct access is not restricted and/or where feeding structures are located adjacent to riparian areas. Watershed specific data are not available for livestock populations. However, county wide data available from the National Agricultural Statistic Service were downloaded and area weighted to estimate animal population in the watershed. There are an estimated 96,620 animal units in the Upper Kankakee subwatershed and the animal unit density is 146 animal units per square mile (Table 14).

Table 14. Animal Unit* Density in the Upper Kankakee Subwatershed

Subwatershed Area (sq. miles)	Animal	Number of Head	Number of Animals in One Animal Unit	Number of Animal Units	Animal Unit Density (animal units/mi^2)
663	Hogs and Pigs	22,447	2.5	8,979	146
	Cattle and Calves	13,955	1	13,955	
	Sheep and Lambs	421	10	42	
	Horses and Ponies	36,822	0.5	73,645	
			Total	**96,620**	

* An Animal Unit (AU) represents 1,000 pounds of live animal weight. It serves as a common unit for aggregating animals across farms and across animal types

4.1.2.4 Wildlife

Wildlife such as deer, geese, ducks, etc. can be sources of bacteria when they have direct access to streams Since deer population was available for both Indiana and Illinois, it was used to give a general representation of the wildlife population in the watershed. (Population estimates for other types of wildlife are generally not available). Countywide deer data were area weighted to determine the deer population in each subwatershed (Table 15).

Table 15. Deer Density in the Upper Kankakee Subwatershed.

Subwatershed Area (sq. miles)	County	Deer Population	Deer Density (per/sq. mile)
663	La Porte	917	3
	Starke	547	
	St. Joseph	283	
	Marshall	306	
	Total	**2,053**	

4.2 Middle Kankakee Subwatershed

The Middle Kankakee subwatershed lies primarily within Indiana but its most downstream section is in Illinois. The subwatershed drains almost 1,000 square miles and covers portions of LaPorte, Starke, Jasper, Lake, Newton, Will, and Kankakee Counties (Figure 11). Cities within the Middle Kankakee subwatershed include Wanatah, Wheatfield, De Motte, Roselawn, Lowell, Lake Dalecarlia, St. John, and Lakes of the Four Seasons.

Land use in the Middle Kankakee subwatershed (Table 16) is dominated by agricultural land (71%) followed by forest (11%). Developed land and grasslands account for 8 percent and 4 percent, respectively. The remaining land categories contribute less than 6 percent of the watershed area.

Table 16. Land Use/Land Cover in the Middle Kankakee Subwatershed

Land Use/Land Cover	Watershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	452,684	707	71.98
Forested Land	68,455	107	10.89
Developed Land	51,325	80	8.16
Grassland and Shrubs	24,333	38	3.87
Pasture/Hay	18,614	29	2.96
Wetland	9,026	14	1.44
Open Water	4,426	7	0.7
Total	**628,863**	**983**	**100**

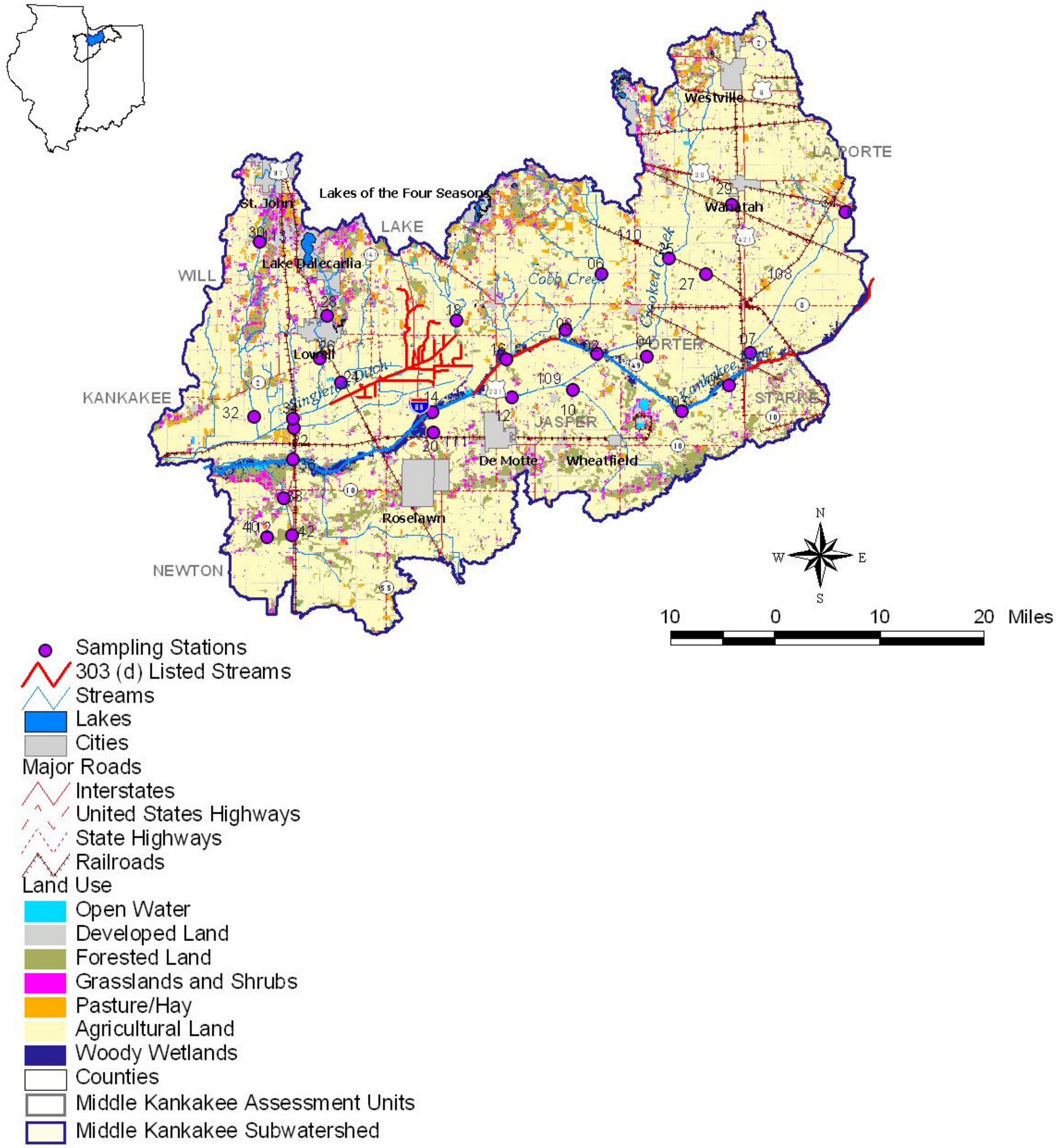


Figure 11. Land use in the Middle Kankakee Subwatershed

4.2.1 Point Sources

This section summarizes the potential point sources of bacteria in the Middle Kankakee subwatershed.

4.2.1.1 Wastewater Treatment Plants (WWTPs) and Industrial Permits

There are 27 active facilities that are permitted to discharge wastewater containing bacteria within the Middle Kankakee subwatershed (Table 17 and Figure 12). The largest of these is the Lowell WWTP, with an average design flow of four MGD

Table 17. NPDES Facilities in the Middle Kankakee Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)
712000108	Pitner Ditch-Kankakee River	IN0040193	La Crosse Municipal WWTP	Kankakee R Via Marsh Creek Via Trib	0.0670
		IN0053104	Little Co Of Mary Health Facility	Kankakee R Via Drainage Ditch	0.0400
712000109	Hodge Ditch	IN0058823	Martis Place Bomars River Lg	Um/Kankakee Riv/Marble Powers Ditch	0.0075
		IN0060852	Town Of Monterey WWTP	Um/Kankakee Riv/Marble Powers Ditch	0.0310
		IN0040754	Wheatfield Municipal WWTP	Kankakee R Via Hodge D Via Wolf Cr	0.0770
712000110	Crooked Creek-Kankakee River	IN0045888	Boone Grove Elem & Middle School	Um/Kankakee River/Phillips Ditch	0.0230
		IN0057029	Boone Grove High School WWTP	Kankakee R Via Luddington D - Arm 3	0.0180
		IN0020061	Hebron Municipal WWTP	Cobb Creek/Breyfogel Dt/Kankakee R	0.5200
		IN0061450	Hebron WWTP	Kankakee R / Cobb Cr / Storm Sewer	0.0250
		IN0023400	Kouts Municipal WWTP	Kankakee R Via Benkie Ditch	0.3300
		IN0051446	Lake Eliza Conservancy Dist	Kankakee R Via Wolf Cr - Ludington	0.0870
		IN0052248	Morgan Township School	Kankakee R Via Sandy Hook D-Ahlgrim	0.0132
		IN0056669	Wanatah Wastewater Treatment Plant	Kankakee R Via Slocum Ditch	0.0780
		IN0057703	Washington Twp School WWTP	Kankakee R Via Hutton Ditch	0.0400
		IN0042978	Westville Correctional Center	Crooked Cr To Kankakee River	0.7500
		IN0024848	Westville WWTP	Crooked Cr Via Crumpacker Arm	0.3500
712000111	Knight Ditch-Kankakee River	IN0039926	Demotte Municipal WWTP	Kankakee R Via Evers Ditch	0.4960
		IN0031275	Kankakee Rest Area	Kankakee R Via Otis-Boyle Ditch	0.0495
		IN0030503	Lincoln Elementary School	Um/Kankakee River/Hibler Ditch	0.0342
		IN0039101	Water Services Co Of Indiana	Um/Kankakee R/Candlewood Lateral Dt	0.1550
712000112	Beaver Lake Ditch-Kankakee River	IN0031143	North Newton Jr Sr High School	Um/Kankakee R/Beaver Cr/Open Ditch	0.0300
		IN0058548	Buckhill Estates WWTP	Um/Kankakee R/Cedar Creek/Foss Ditch	0.0192
712000112	Beaver Lake Ditch-Kankakee River	IN0033081	Dalecarlia Utilities Lake Dale	Cedar Cr To Kankakee River	0.0440

Table 17. NPDES Facilities in the Middle Kankakee Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)
		IN0023621	Lowell WWTP	Cedar Cr To Kankakee River	4.0000
		IN0040592	Schneider WWTP	Kankakee R Via Brown Ditch	0.0650
		IN0037176	Twin Lakes Utilities	Kankakee R/E Br Stoney Run Crk	1.1000
		IN0031127	Winfield Elementary School	Kankakee R Via Stony Run Cr E Fk	0.0100
			Total		**8.4596**

4.2.1.2 Combined Sewer Overflows (CSOs)

There is only one CSO in the Middle Kankakee subwatershed—an equalization basin overflow in the city of Lowell (Table 18 and Figure 12).

Table 18. CSOs in the Middle Kankakee Subwatershed

HUC 10	HUC 10 Name	Permit #	Facility	Outfall #	Pipe Description	Receiving Stream
712000113	Singleton Ditch	IN0023621	Lowell Municipal STP	004C	CSO-Equalization Basin Overflow	Cedar Creek

4.2.1.3 Municipal Separate Storm Sewer System (MS4)

There are eight MS4 communities in the Middle Kankakee subwatershed (Table 19) that total approximately 32 square miles.

Table 19. MS4 Communities in the Middle Kankakee Subwatershed

MS4 Facility Permit ID	MS4 Name	Area (Square Miles)
INR040007	Lakes of the Four Seasons POA	1.1
INR040046	Town of Lowell	4.2
INR040047	Town of St. John	4.3
INR040054	City of Crown Point	0.3
INR040075	Town of Cedar Lake	7.7
INR040124	Lake County	9.4
INR040140	Porter County	3.0
INR04073 Co-Permit	Valparaiso	1.9

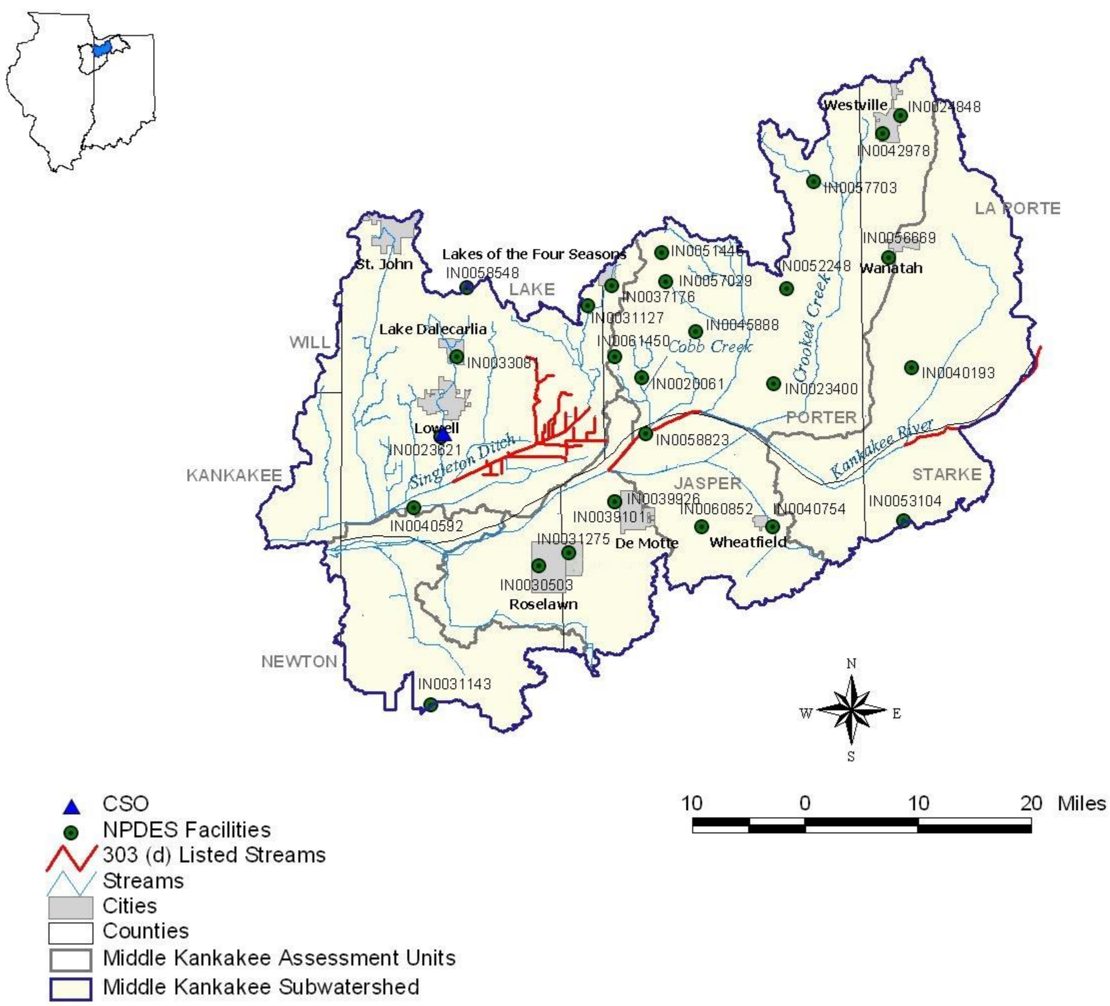


Figure 12. NPDES Facilities in the Middle Kankakee Subwatershed

4.2.1.4 Concentrated Animal Feeding Operations (CAFOs)

There are eight CAFOs in the Middle Kankakee subwatershed (Table 20 and Figure 13). Six of the CAFOs are located south and southeast of Roselawn.

Table 20. CAFOS in the Middle Kankakee Subwatershed

HUC 10	HU C 10 Name	NPDES ID	Operation Name
712000108	Pitner Ditch-Kankakee River	ING806292	David And Brenda Wolfe
		ING801092	Smoker Farms
712000111	Knight Ditch-Kankakee River	ING804410	Dekock Feedlot, Inc.
		ING801782	Dekock Feedlot Inc.
		ING802170	Bos Farms-Dry Cow Facility
		ING806155	Bos Dairy Site # 4
712000112	Beaver Lake Ditch-Kankakee River	ING806015	Fair Oaks Dairy Farm North
		ING806154	Herrema Dairy

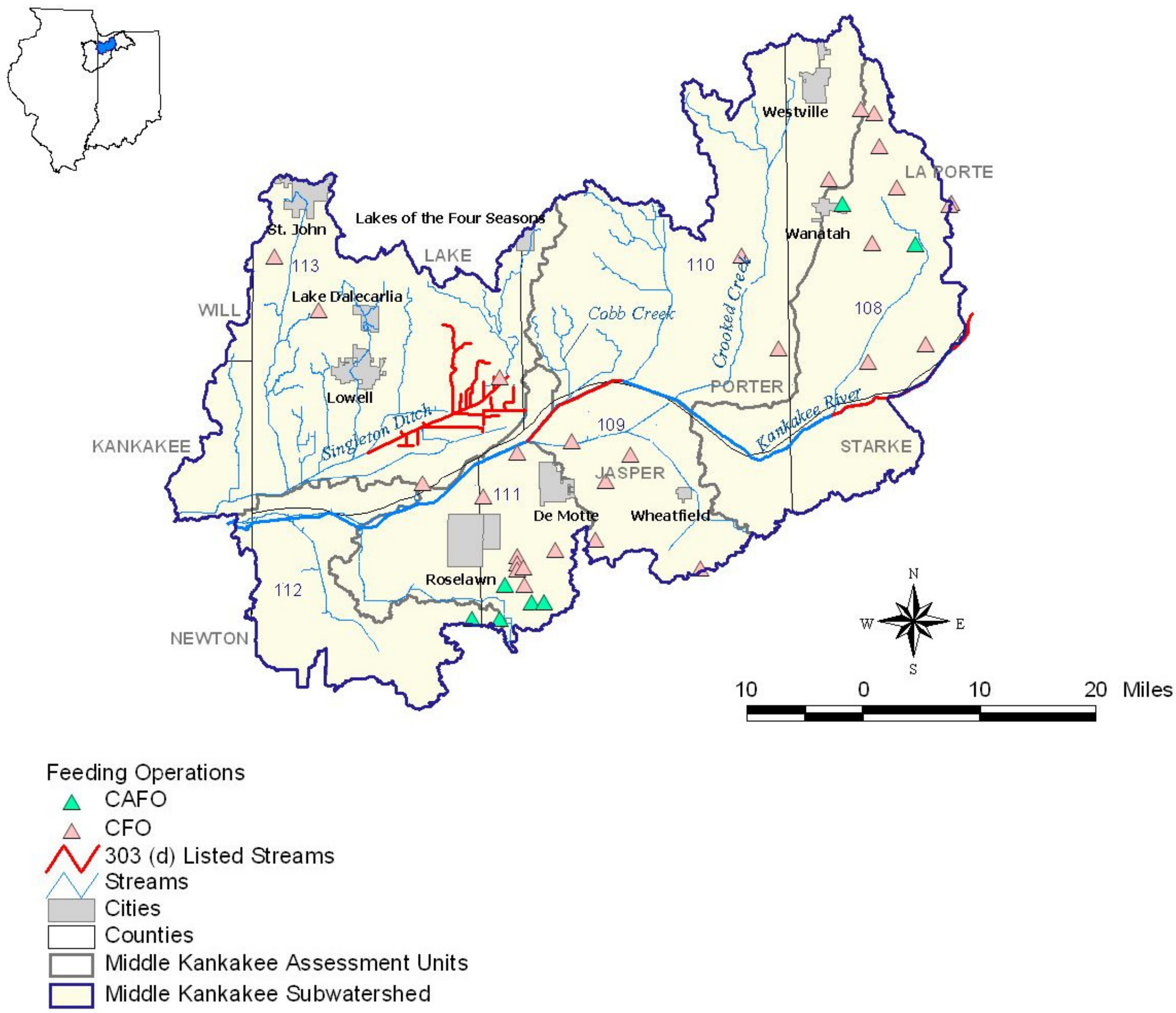


Figure 13. Feeding Operations in the Middle Kankakee Subwatershed

4.2.2 Nonpoint Sources

The following section identifies the potential nonpoint sources in the Middle Kankakee subwatershed.

4.2.2.1 Onsite Wastewater Treatment Systems

The rural population in the Middle Kankakee subwatershed is shown in Table 21, along with a calculated density (total rural population divided by total area). The rural population density of the Middle Kankakee is significantly higher than that of the Upper Kankakee (214 persons per square mile).

Hydrologic soil group A (45%) and B soils (28%) are dominant in the Middle Kankakee subwatershed. Soil group C comprises 23 percent of the land area, primarily in the Singleton and Cobb Creek drainages (Figure 5). Due to the slow infiltration rate of C soils, there is an increased likelihood of failing septic systems in this part of the watershed. Other soil categories (A/D, B/D and C/D and D) constitute less than 4 percent of the subwatershed area.

Table 21. Rural Population Density in the Middle Kankakee Subwatershed

County	Area of County in Subwatershed (mi^2)	Estimated County Population in Subwatershed	Urban Population	Rural Population	Rural Population Density (persons/mi^2)
Will	3.89	3,104	0	3,104	315
Kankakee	31.18	5,026	0	5,026	
La Porte	171.64	31,697	3,689	28,008	
Porter	219.50	84,053	10,079	73,974	
Lake	224.02	222,765	29,240	193,525	
Starke	36.45	3,199	156	3,043	
Jasper	165.32	9,998	7,939	2,059	
Newton	130.94	5,824	4,788	1,036	
Total	**982.94**	**365,666**	**55,891**	**309,775**	

4.2.2.2 Confined Animal Feeding Operations (CFOs) and Animal Feeding Operations (AFOs)

There are 31 CFOs in the Middle Kankakee subwatershed (Table 22 and Figure 13).
They are primarily located in the southern part of the subwatershed near Roselawn and in the northeastern portion of the watershed near Wanatah. The number of AFOs in the Illinois portion of the Middle Kankakee watershed is currently unavailable.

Table 22. CFOs in the Middle Kankakee Subwatershed

HUC 10	Watershed Name	Farm ID	Operation Name
0712000108	Pitner Ditch-Kankakee River	3548	Farm #1
		3992	Dgm Pork
		6114	Hoover Farms
		2547	Farm #2
		6109	Hardin Farms
		3126	Stull Farm
		3925	Rich-Lou Farms
		85	Brian Hunsley
		3896	Phegley
		3045	Hundt
0712000109	Hodge Ditch	4250	Farm & Feeders, Inc.
		4804	Klemp
		1028	Abbring
		1962	Bales
		3498	Mulder
0712000110	Crooked Creek-Kankakee River	4898	Kresel
		3515	Taber Veal
		2325	Good
		1053	Bucher Hog Farm
0712000111	Knight Ditch-Kankakee River	1063	Hamstrafarms
		4344	Hamstra Brothers
		92	Devries Farms Inc
		3993	Walstra
		4432	H & H Feedlots
		4692	Northern Trust Farm #180
		3716	Vander Molen
		2003	Mathis
		2466	Jonkman
0712000113	Singleton Ditch	661	Kleine
		1467	Bryantfarm
		810	Huseman Farm Inc.

4.2.2.3 Livestock Population

The animal unit density (Table 23) in the Middle Kankakee subwatershed is estimated at 65 animal units per square mile which is considerably less than that of the Upper Kankakee subwatershed.

Table 23. Livestock Density in the Middle Kankakee Subwatershed

Subwatershed Area (sq. miles)	Animal	Number of Head	Number of Animals in One Animal Unit	Number of Animal Units	Animal Unit Density (per square mile)
983	Hogs and Pigs	54,367	2.5	21,747	65
	Cattle and Calves	29,070	1	29,070	
	Poultry	681	50	14	
	Sheep and Lambs	2,424	10	242	
	Horses and Ponies	6,448	0.5	12,896	
			Total	**63,969**	

4.2.2.4 Wildlife

The deer population in the Middle Kankakee subwatershed is 4,295 and the density is 4 deer per square mile (Table 24).

Table 24. Deer Density in the Middle Kankakee Subwatershed

Subwatershed Area (sq. miles)	County	Deer Population	Deer Density (per sq. mile)
983	Pulaski	16	4
	Will	127	
	Kankakee	824	
	La Porte	1,864	
	Porter	637	
	Lake	72	
	Starke	421	
	Jasper	0	
	Newton	333	
	Total	4,295	

4.3 Yellow River

The Yellow River subwatershed lies solely in Indiana, covering nearly 540 square miles of the headwater reaches of the Kankakee. It drains portions of St. Joseph, Kosciusko, Marshall, Starke, and Pulaski and Elkhart Counties. Cities within the Yellow River subwatershed include Bremen, Plymouth, Argos, Knox, and North Judson (Figure 14).

As in the Upper and Middle Kankakee subwatersheds, the land in the Yellow River subwatershed is primarily used for agriculture (68%). Forested, developed and pasture land comprise 14 percent, 8 percent and 4 percent of the total subwatershed area, respectively. Grasslands occupy nearly 2 percent of the total area. Wetlands and open water comprise four percent of the total subwatershed area (Table 25).

Table 25. Land Use/Land Cover in the Yellow River Subwatershed

Land Use/Land Cover	Watershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	233,992	366	67.94
Forested Land	47,742	75	13.86
Developed Land	30,392	47	8.82
Pasture/Hay	14,179	22	4.12
Wetland	9,519	15	2.76
Grassland and Shrubs	5,279	8	1.53
Open Water	3,324	5	0.97
Total	**344,426**	**538**	**100.00**

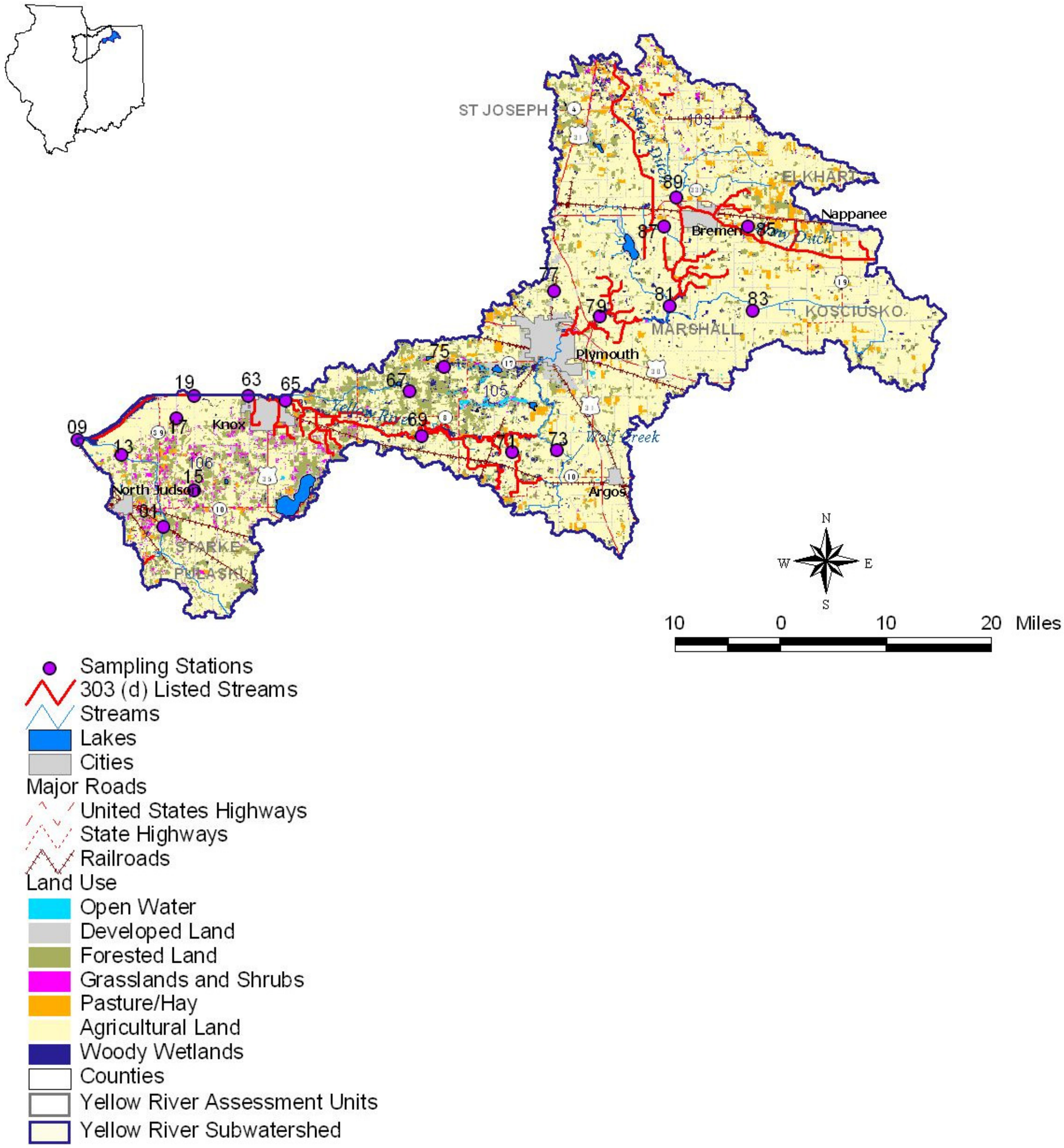


Figure 14. Land use in the Yellow River Subwatershed

4.3.1 Permitted Point Sources

This section summarizes the potential point sources of bacteria in the Yellow River subwatershed.

4.3.1.1 Wastewater Treatment Plants (WWTPs) and Industrial Facilities

Ten facilities are permitted to discharge bacteria in the Yellow River subwatershed as listed in Table 26 and Figure 15. While the Nappanee Municipal STP lies within the Yellow River Subwatershed, it discharges outside of the watershed. Plymouth is the largest WWTP with an average design flow of 3.5 MGD.

Table 26. NPDES Facilities in the Yellow River Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)
712000103	Headwaters Yellow River	IN0020427	Bremen Municipal WWTP	Um/Kankakee R/Yellow River	1.300
		IN0057002	Lake Of The Woods RSD	Yellow R Via Stock Ditch	0.135
		IN0040223	Lapaz Municipal WWTP	Yellow R Via Elmer Seltenright Dit.	0.126
		IN0021466	Nappanee Municipal STP	Elkhart River	1.900
712000105	Yellow River	IN0022284	Argos Municipal WWTP	Yellow R/Myers Ditch/Unnmd Ditch	0.212
		IN0025160	Convent Ancilla Dominion	Gilbert Lake To Flat Lake	0.046
		IN0021385	Knox Municipal WWTP	Um/Kankakee River/Yellow River	0.700
		IN0020991	Plymouth WWTP	Yellow R To Kankakee River	3.500
712000106	Kline Arm	IN0058289	Bass Lake Conservancy District	Craigmile Ditch	0.284
		IN0020877	North Judson Municipal WWTP	Kankakee R Via Pine Creek & Unnamed T	0.470
			Total		**8.673**

4.3.1.2 Combined Sewer Overflows (CSOs)

Combined sewer overflows in Plymouth, Nappanee, and North Judson are potential sources of bacteria in the Yellow River subwatershed (Table 27 and Figure 15).

Table 27. CSOs in the Yellow River Subwatershed

HUC 10	HUC 10 Name	Permit #	Facility	Outfall #	Pipe Description	Receiving Stream
712000105	Yellow River	IN0020991	Plymouth Municipal STP	002C	CSO-S.W. Retent. Basin Overflow	Yellow River
				009C	CSO-Sixth St. 12-Inch	Yellow River
				010C	CSO-15-In Overflow Near POTW	Yellow River
				011C	CSO-Simon St.	Yellow River
				008C	CSO-Adams/Water St	Yellow River
				007C	CSO-Cleveland St. Regulator	Yellow River
				006C	CSO-Bailey St. Regulator	Yellow River
				005C	CSO-Bird Park	Yellow River
				004C	CSO-Elliot/Fairbanks Ave	Yellow River
				003C	CSO-Klinger Ave/Fairbanks Ave	Yellow River
712000103	Headwaters Yellow River	IN0021466	Nappanee Municipal STP	013C	CSO- Alley Btw Locke/Clark	Berlin Court Ditch
				012C	CSO- Clark St.	Berlin Court Ditch
				011C	CSO- Main St.	Berlin Court Ditch
				010C	CSO- Elm St.	Berlin Court Ditch
				009C	CSO- Madison St.	Berlin Court Ditch
				008C	CSO- Hartman St.	Berlin Court Ditch
				007C	CSO- Summit St.	Berlin Court Ditch
				006C	CSO-Jackson St.	Berlin Court Ditch
				005C	CSO- Woodland Dr.	Berlin Court Ditch
				004C	CSO- Morningside Drive	Berlin Court Ditch
				003C	CSO- Marion St.	Berlin Court Ditch
				002C	CSO- Mariam St	Berlin Court Ditch
				016C	CSO-Eq Basin At WWTP	Berlin Court Ditch
712000106	Kline Arm	IN0020877	North Judson Municipal	004C	CSO-ELM St. Lift Station	Unnamed Ditch

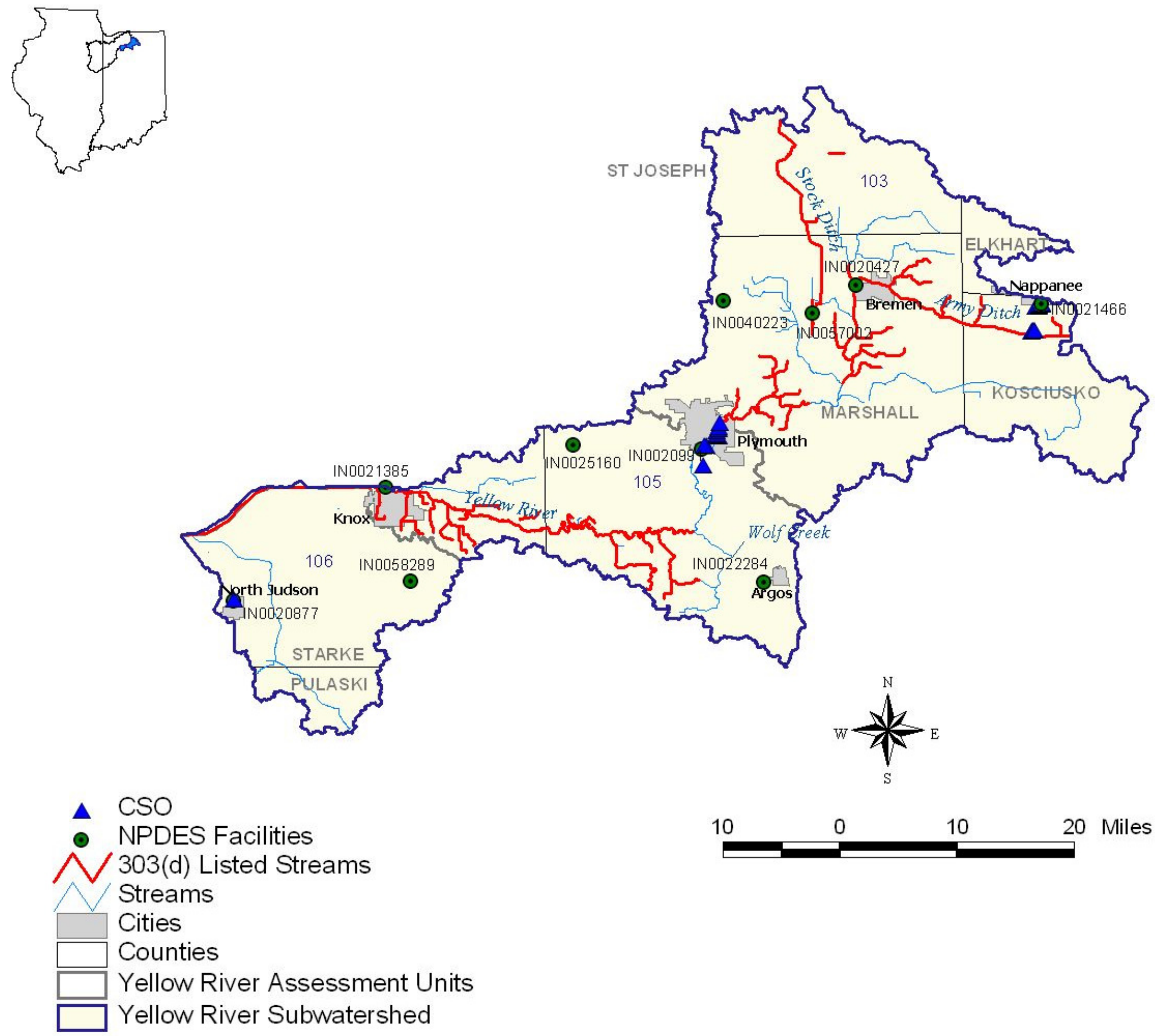


Figure 15. NPDES Facilities in the Yellow River Subwatershed

4.3.1.3 Municipal Separate Storm Sewer System (MS4)

Plymouth is the only MS4 in the Yellow River subwatershed, covering an area of seven square miles.

4.3.1.4 Concentrated Animal Feeding Operations (CAFOs)

There are 4 CAFOs in the Yellow River watershed (Table 28 and Figure 16).

Table 28. CAFOs in the Yellow River Subwatershed

Major Subwatershed	HUC 10	HUC 10 Name	NPDES ID	Operation Name
Yellow	712000103	Headwaters Yellow River	ING8040910	Fred Beer Farms, Inc.
			INA006440	Walnut Grove Dairy, LLC
			ING800005	J & T Laidig Farms
	712000105	Yellow River	ING804918	Homestead Dairy

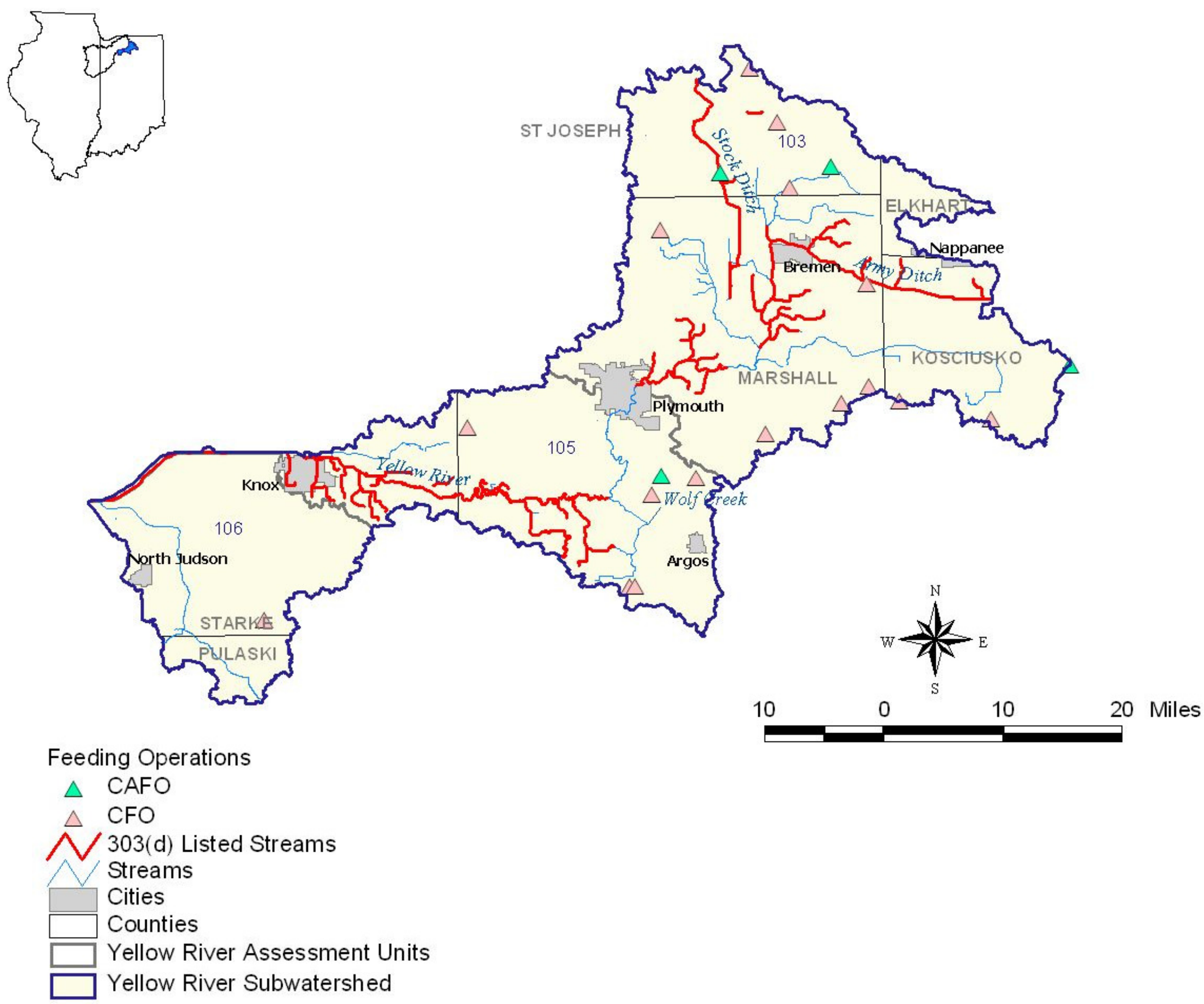


Figure 16. Feeding Operations in the Yellow River Subwatershed

4.3.2 Nonpoint Sources

The following section identifies the potential nonpoint sources in the Yellow River subwatershed.

4.3.2.1 Onsite Wastewater Treatment Systems

The rural population in the Yellow River subwatershed is shown in Table 29, along with a calculated rural density of 141 persons per square mile, which is less than that of the Upper and Middle Kankakee subwatersheds.

The dominant soils found in this region are A (42%) and B (38%) with C soils comprising 15 percent of the subwatershed.

Table 29. Rural Density in the Yellow River Subwatershed

County	Area of County in Subwatershed (mi^2)	Estimated County Population in Subwatershed	Urban Population	Rural Population	Rural Population Density (persons/mi^2)
Elkhart	11.68	4,991	511	4,480	141
Kosciusko	56.22	8,006	1,383	6,623	
St Joseph	64.90	37,846	567	37,279	
Marshall	270.87	30,561	7,990	22,571	
Starke	120.19	10,546	6,307	4,239	
Pulaski	14.62	468	0	468	
Total	**538.49**	**92,419**	**16,758**	**75,661**	

4.3.2.2 Confined Animal Feeding Operations (CFOs)

There are 16 CFOs in the Yellow River subwatershed with many of them located along the border of the watershed (Table 30 and Figure 16).

Table 30. CFOs in the Yellow River Watershed

Major Subwatershed	HUC 10	HUC 10 Name	Farm ID	Operation Name
Yellow	0712000103	Headwaters Yellow River	3050	Shively Veal Inc
			3710	Lizzi
			3891	Pick Of The Chick
			2372	Trowbridge Veal
			4349	Dinius
			4330	Farm #1
			4254	Huff
			4388	Haas
			2276	Fisher
			2240	Laidig Farm & Management
	0712000105	Yellow River	6151	Houin, Jr.
			2100	Argos Holsteins
			796	Houin Brothers Farms
			2215	Schaller
			6208	Argos Holsteins
	0712000106	Kline Arm	3908	Bope Farm

4.3.2.3 Livestock Population

There are a large number of hogs, cattle, and poultry in the Yellow River subwatershed and the animal unit density was calculated at 329 units per square mile (Table 31). This value is considerably higher than the densities calculated for the Upper and Middle Kankakee subwatersheds.

Table 31. Animal Unit* Density in the Yellow River Subwatershed

Subwatershed Area (sq. miles)	Animal	Number of Head	Number of Animals in One Animal Unit	Number of Animal Units	Animal Unit Density (per sq. mile)
538	Hogs and Pigs	179,814	2.5	71,926	329
	Cattle and Calves	90,523	1	90,523	
	Poultry	637,530	50	12,751	
	Sheep and Lambs	244	10	24	
	Horses and Ponies	987	0.5	1,974	
			Total	**177,198**	

* An Animal Unit (AU) represents 1,000 pounds of live animal weight. It serves as a common unit for aggregating animals across farms and across animal types

4.3.2.4 Wildlife Population

The deer population in this subwatershed is estimated at approximately 2,900 (Table 32), which is only slightly higher than that calculated for the Upper and Middle subwatersheds.

Table 32. Deer Density in the Yellow River Subwatershed

Subwatershed Area (sq/ miles)	County	Deer Population	Deer Density (per/sq. miles)
538	Elkhart	158	5
	Kosciusko	167	
	St Joseph	1,574	
	Marshall	328	
	Starke	622	
	Pulaski	47	
	Total	2,897	

4.4 Upper Iroquois

The Upper Iroquois subwatershed lies primarily within Indiana but its most downstream section is in Illinois. The subwatershed drains almost 685 square miles and covers portions of Starke, Pulaski, White, Jasper, Newton, Benton, and Iroquois Counties (Figure 17). Cities within the Upper Iroquois subwatershed include Rensselaer, Collegeville, Goodland, Brook, Kentland, and Sheldon.

This subwatershed is predominantly used for agriculture (84%). Developed and forested lands each account for 6 percent of the total watershed area. The remaining land use categories comprise less than 4 percent of the subwatershed area (Table 33).

Table 33. Land Use/Land Cover in the Upper Iroquois Subwatershed

Land Use/Land Cover	Watershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	368,676	576.06	84.11
Forested Land	27,192	42.49	6.2
Developed Land	26,680	41.69	6.09
Pasture/Hay	10,636	16.62	2.43
Grassland and Shrubs	2,344	3.66	0.53
Wetland	1,722	2.69	0.39
Open Water	1,082	1.69	0.25
Total	**438,332**	**684.90**	**100.00**

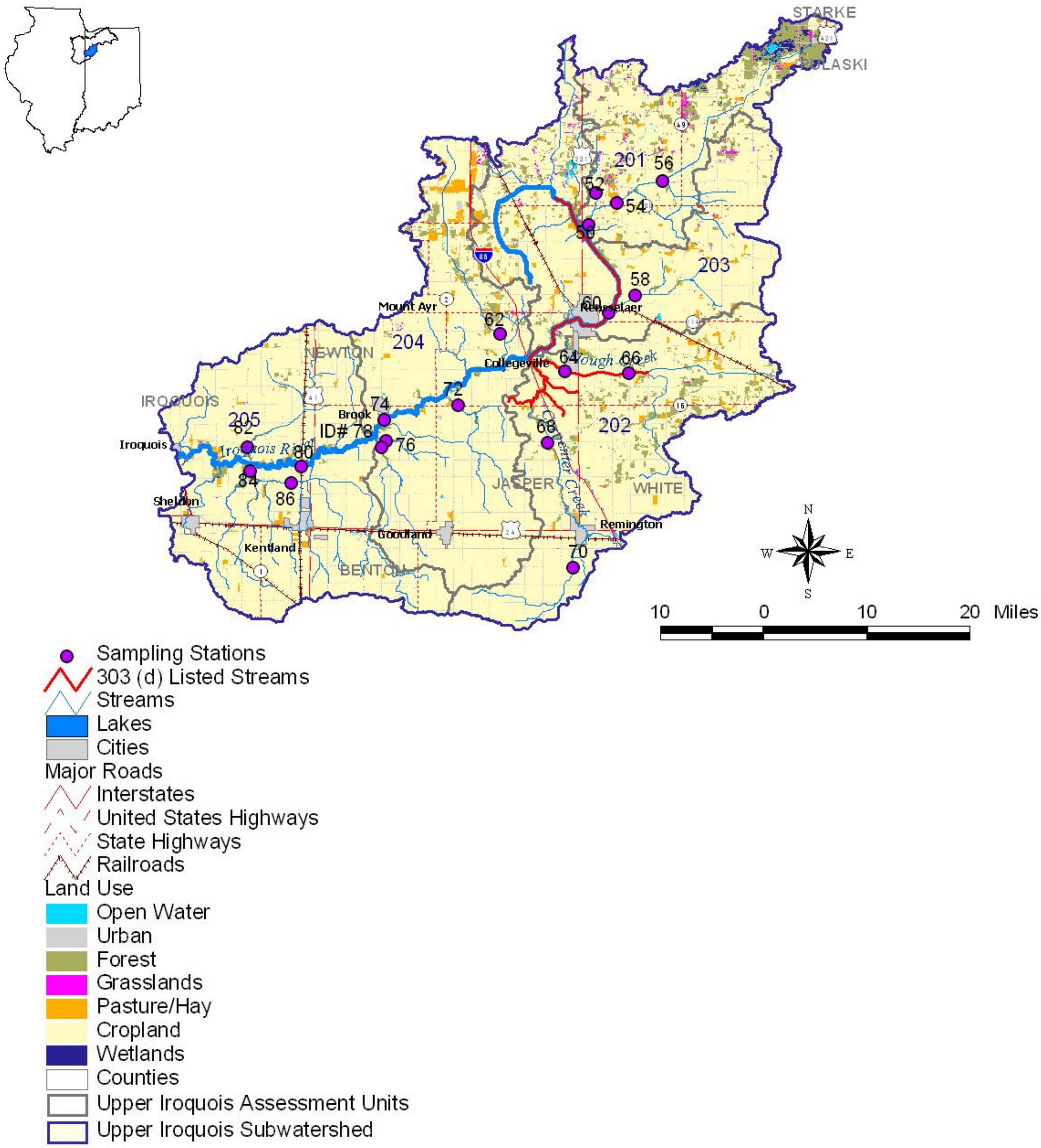


Figure 17. Land use in the Upper Iroquois Subwatershed

4.4.1 Point Sources

This section summarizes the potential point sources of bacteria in the Upper Iroquois subwatershed.

4.4.1.1 Wastewater Treatment Plants (WWTPs) and Industrial Facilities

Eight facilities are permitted to discharge bacteria in the Upper Iroquois River subwatershed as listed in Table 34 and shown in Figure 18. Among these, the Rensselaer Municipal STP is the largest facility with an average design flow of 1.2 MGD.

Table 34. NPDES Facilities in the Upper Iroquois Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)
712000202	Slough Creek	IN0020940	Remington WWTP	Iroquois R Via Carpenter Creek	0.429
712000203	Bruner Ditch-Iroquois River	IN0024414	Rensselaer Municipal STP	Iroquois River	1.200
712000204	Curtis Creek-Iroquois River	IN0050997	George Ade Mem Health Care Car	Iroquois River	0.014
		IN0040070	Goodland Municipal WWTP	Iroquois R Via Hunter Ditch Trib	0.095
		IN0053422	Grandmas Home Cooking	Iroquois R Via Yeoman Ditch Trib	0.029
		IN0041904	Trail Tree Inn	Iroquois R Via Curtis Creek Trib	0.256
712000205	Montgomery Ditch-Iroquois River	IN0039764	Brook Municipal WWTP	Iroquois River	0.100
		IN0023329	Kentland Municipal WWTP	Iroquois R Via Montgomery Via Kent	0.460
			Total		**2.622**

4.4.1.2 Combined Stormwater Overflows (CSOs)

There are nine CSO outfalls in the Upper Iroquois subwatershed, all located in Rensselaer. Information on these outfalls is presented in Table 35 and they are shown in Figure 18.

Table 35. CSOs in the Upper Iroquois Subwatershed

HUC 10	HUC 10 Name	Permit #	Facility	Outfall #	Pipe Description	Receiving Stream
712000203	Bruner Ditch-Iroquois River	IN0024414	Rensselaer Municipal STP	006C	CSO-545 Park Avenue	Iroquois River
				023C	CSO-Melville St At Irq. River	Iroquois River
				003C	CSO-Near Milton St.	Iroquois River
				007C	CSO- Grace St.	Iroquois River
				008C	CSO-Corner Of Rutsen/Front St	Iroquois River
				010C	CSO-Near Harrison/Front Sts.	Iroquois River
				021C	CSO-W Corner Strarling/Milroy Av	Iroquois River
				014C	CSO-South of Wash. St.-W. Of River	Iroquois River
				019C	CSO-Rec Stat-Ne of Lift Stat	Iroquois River

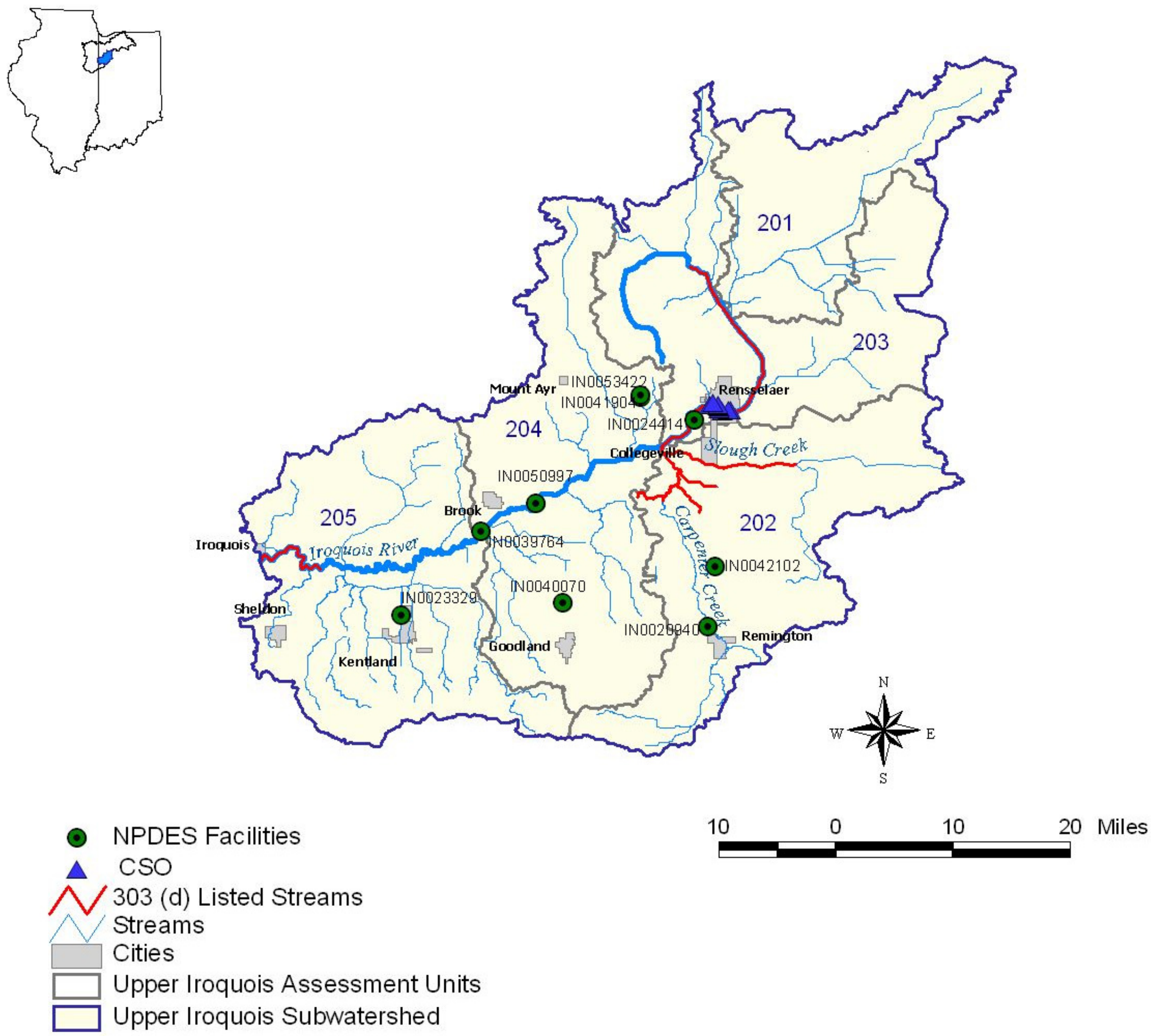


Figure 18. NPDES Facilities in the Upper Iroquois Subwatershed

4.4.1.3 Municipal Separate Storm Sewer System (MS4)

There are no MS4 communities in the Upper Iroquois subwatershed.

4.4.1.4 Concentrated Animal Feeding Operations (CAFOs)

There are 12 CAFOs in the Upper Iroquois watershed as listed in Table 36 and shown in Figure 19.

Table 36. CAFOs in the Upper Iroquois Subwatershed

HUC 10	HUC 10 Name	NPDES ID	Operation Name
712000201	Oliver Ditch	ING806083	Newberry Farms, LLC
712000202	Slough Creek	ING802689	Tip Top Pigs Inc #1
		ING803422	White County Egg Farm
712000203	Bruner Ditch-Iroquois River	ING800876	Grow Feedlots
		ING806045	Windy Ridge Dairy
712000204	Curtis Creek-Iroquois River	ING806207	Seven Hills Dairy, LLC
		ING803372	Newton County Egg Farm
		N/A	Cambalot Swine Breeders
		ING806036	Fair Oaks Dairy Farm South
		ING803732	Calf Land, LLC
		ING806341	Fair Oaks Dairy Farm, LLC. - North Central # 5
		ING806065	Fair Oaks Dairy Farm West

*N/A not available

Figure 19. Feeding Operations in the Upper Iroquois Subwatershed

4.4.2 Nonpoint Sources

The following section identifies the potential nonpoint sources in the Upper Iroquois subwatershed.

4.4.2.1 Onsite Wastewater Treatment Systems

The rural population in the Upper Iroquois subwatershed is shown in Table 37, along with a calculated rural density of 29 persons per square mile, which is significantly less than that of the Upper, Middle, and Yellow River subwatersheds.

This subwatershed is dominated by B soils (40%) and A soils (28%). Soils C, D, and B/D represent 24 percent, 4 percent, and 2 percent of the total land area, respectively.

Table 37. Rural Density in the Upper Iroquois Subwatershed

County	Area of County in Subwatershed (mi^2)	Estimated County Population in Subwatershed	Urban Population	Rural Population	Rural Population Density (persons/mi^2)
Iroquois	29.06	1,766	1,439	327	29
Starke	0.49	46	0	46	
Jasper	368.84	22,298	6,800	15,498	
Pulaski	6.02	192	0	192	
Newton	198.09	5,628	4,127	1,501	
White	22.42	1,082	0	1,082	
Benton	60.49	1,347	0	1,347	
Total	**685.41**	**32,360**	**12,366**	**19,994**	

4.4.2.2 Confined Animal Operations (CFOs) and Animal Operations (AFOs)

There are 23 CFOs in the Upper Iroquois watershed as shown in Table 38 and Figure 19.

Table 38. CFOs in the Upper Iroquois Watershed

Major Subwatershed	HUC 10	HUC 10 Name	Farm ID	Operation Name
Upper Iroquois	0712000201	Oliver Ditch	6355	Whitaker
	0712000202	Slough Creek	3506	Jasper County Pullets
			4390	Hathaway
			516	Jack Rodibaugh & Sons Inc
			745	Frey
			3423	White County Pullets
			4260	Streitmatter
			2891	Streitmatter
	0712000203	Bruner Ditch-Iroquois River	3700	Iroquois Valley Swine Breeders
			4056	Hurley Swine Enterprises #1
			652	Davisfarm
			4337	Moore Farms
			230	Bruce Wuethrich Farm
			4991	Northwind Pork LLC
			2284	Bailey
			4656	G.O.P. Farms
			4235	Parkinson & Rodibaugh
	0712000204	Curtis Creek-Iroquois River	2399	Nursery/Finishing Site
			1043	Lyons Enterprises
			651	Korniak & Miller
			3279	Oinker Acres
	0712000205	Montgomery Ditch-Iroquois River	1680	Carl E Funk Farms
			669	Clark

4.4.2.3 Livestock Population

There are a large number of hogs in the Upper Iroquois subwatershed and the animal unit density was calculated at 185 units per square mile (Table 39). This value is higher than the densities calculated for the Upper and Middle Kankakee subwatersheds but less than that of the Yellow River.

Table 39. Livestock Density in the Upper Iroquois Subwatershed

Subwatershed Area (sq. miles)	Animal	Number of Head	Number of Animals in One Animal Unit	Number of Animal Units	Animal Unit Density (per/sq. mile)
685.41	Hogs and Pigs	237,790	2.5	95,116	185
	Cattle and Calves	29,109	1	29,109	
	Poultry	33	50	1	
	Sheep and Lambs	1,546	10	155	
	Horses and Ponies	1,256	0.5	2,513	
			Total	**126,893**	

4.4.2.4 Wildlife Population

The Upper Iroquois subwatershed has an estimated deer density of two deer per square mile (Table 40).

Table 40. Deer Density in the Upper Iroquois Subwatershed

Subwatershed Area (sq. miles)	County	Deer Population	Deer Density
685	Iroquois	28	2
	Starke	3	
	Jasper	993	
	Pulaski	20	
	Newton	504	
	White	43	
	Benton	2	
	Total	1,592	

4.5 Lower Iroquois

The Lower Iroquois subwatershed lies primarily within Illinois and drains nearly 1,500 square miles. Counties within the subwatershed include Newton, Kankakee, Benton, Iroquois, Vermilion, and Ford (Figure 20). Cities within the Lower Iroquois subwatershed include Morocco, Fowler, Milford, Watseka, Onarga, Gilman, Clifton, Chebanse, St. Anne, and Kankakee.

Table 41 shows that approximately 87 percent of the land is devoted to agriculture, followed by developed land (7%) and forested land (3%).

Table 41. Land Use/Land Cover in the Lower Iroquois Subwatershed

Land Use/Land Cover	Watershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	806,253	1,260	86.93
Developed Land	64,735	101	6.98
Forested Land	27,941	44	3.01
Pasture/Hay	16,598	26	1.79
Wetland	6,222	10	0.67
Open Water	3,178	5	0.34
Grassland and Shrubs	2,545	4	0.27
Total	**927,473**	**1,449**	**100**

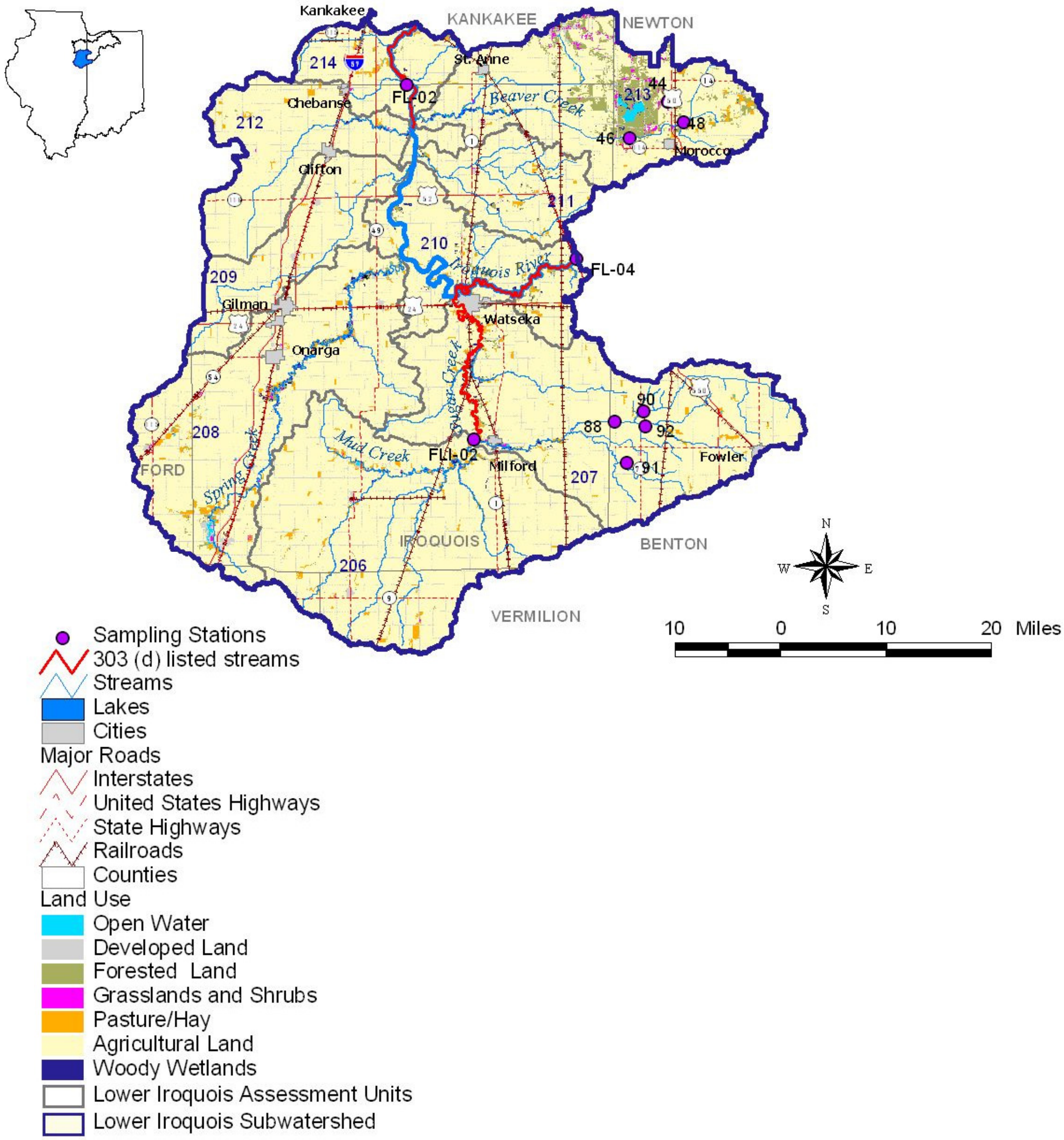


Figure 20. Land use in the Lower Iroquois Subwatershed

4.5.1 Point Sources

This section summarizes the potential point sources in the Lower Iroquois subwatershed.

4.5.1.1 Wastewater Treatment Plants (WWTPs) and Industrial Facilities

There are 14 NPDES facilities that are permitted to discharge bacteria in the Lower Iroquois subwatershed (Table 42 and Figure 21). Among them, Watseka is the largest facility with a design flow of 1.6 MGD.

In Illinois a number of WWTPs, including most of those identified in Table 42, have applied for and received disinfection exemptions which allow a facility to discharge wastewater without disinfection. Facilities with year-round disinfection exemptions may be required to provide IEPA with updated information to demonstrate compliance with these requirements and facilities directly discharging into a fecal-impaired segment may have their year-round disinfection exemption revoked through future NPDES permitting actions. Maximum design flows for Illinois NPDES facilities are also listed since they were used to determine allocations at high and moist flows.

Table 42. NPDES Facilities in the Lower Iroquois Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)	Maximum Design Flow (MGD)	Exemption Status
712000213	Beaver Creek	IN0060798	Morocco WWTP	Iroquois River Via Beaver Creek	0.1500		None
712000206	Mud Creek	IL0042391	Cissna Park STP	Pigeon Creek	0.1000	0.2500	Year Round
		ILG580122	Rankin STP	Sugar Creek Via Whisky Creek	0.0800	0.3040	Year Round
712000207	Sugar Creek	IL0023272	Milford STP	Sugar Creek	0.2000	1.3000	Year Round
712000208	Spring Creek	IL0025062	Gilman-North STP	Glmn Dtch-Spring-Iroquois-Kankake	0.5000	1.1500	Year Round
		IL0076813	Onarga STP	Drainage Tile To Spring Creek	0.2500	0.8780	Year Round
		ILG551072	Il Dot-I-57 Iroquois County	Iroquois R Via Spring Creek	0.0162	0.0405	Year Round
712000209	Prairie Creek	IL0037397	Prairieview Luthern Home	Unnamed Trib To Prairie Creek	0.0120	0.0300	Year Round
		IL0065358	Swissland Packing Company	Unnamed Creek Trib To Prairie Creek	0.0280	N/A	None
		ILG551007	Merkle-Knipprath Nursing Home	Iroquois R Via Langan Creek	0.0150	0.0375	Year Round
712000210	Gofield Creek-Iroquois River	IL0022161	Watseka STP		1.6000	4.0000	None
712000212	Langan Creek	IL0037206	Central Hs&Nash Middle School		0.0100	0.0260	Year Round
		IL0047040	Iroquois Mobile Estates		0.0100	0.0250	Year Round
		IL0049573	Clifton STP		0.2000	0.5000	Year Round
			Total		**3.1712**	7.6600	

4.5.1.2 Combined Sewer Overflows (CSOs)

There are two CSO communities (Watseka and Milford) with a total of 16 CSO outfalls in the Lower Iroquois subwatershed (Table 43 and Figure 21).

Table 43. CSOs in the Lower Iroquois Subwatershed

HUC 10	HUC 10 Name	Permit #	Facility	Outfall #	Pipe Description	Receiving Stream
712000207	Sugar Creek	IL0023272	Milford STP	20	CSO-150 Yds Downstream Chicago St.	Sugar Creek
				30	CSO-West Side	Sugar Creek
				40	CSO-Far West Side	Sugar Creek
				50	CSO-Southeast Side	Sugar Creek
				60	CSO-Kay Street	Kankakee River
				A040	CSO-Mulberry St(Gravity Flow)	Sugar Creek
				B010	CSO-Sewer Treatment Plant CSO	Iroquois River
				B040	CSO-Mulberry St(Pumped Flow)	Sugar Creek
				20	CSO-Junction Box F	Iroquois River
				50	CSO-Maple Street	Sugar Creek
712000210	Gofield Creek-Iroquois River	IL0022161	Watseka STP	A040	CSO-Mulberry St(Gravity Flow)	Sugar Creek
				B040	CSO-Mulberry St(Pumped Flow)	Sugar Creek
				50	CSO-Maple Street	Sugar Creek
				60	CSO-Kay Street	Kankakee River
				B010	CSO-Sewer Treatment Plant	Iroquois River
				20	CSO-Junction Box F	Iroquois River

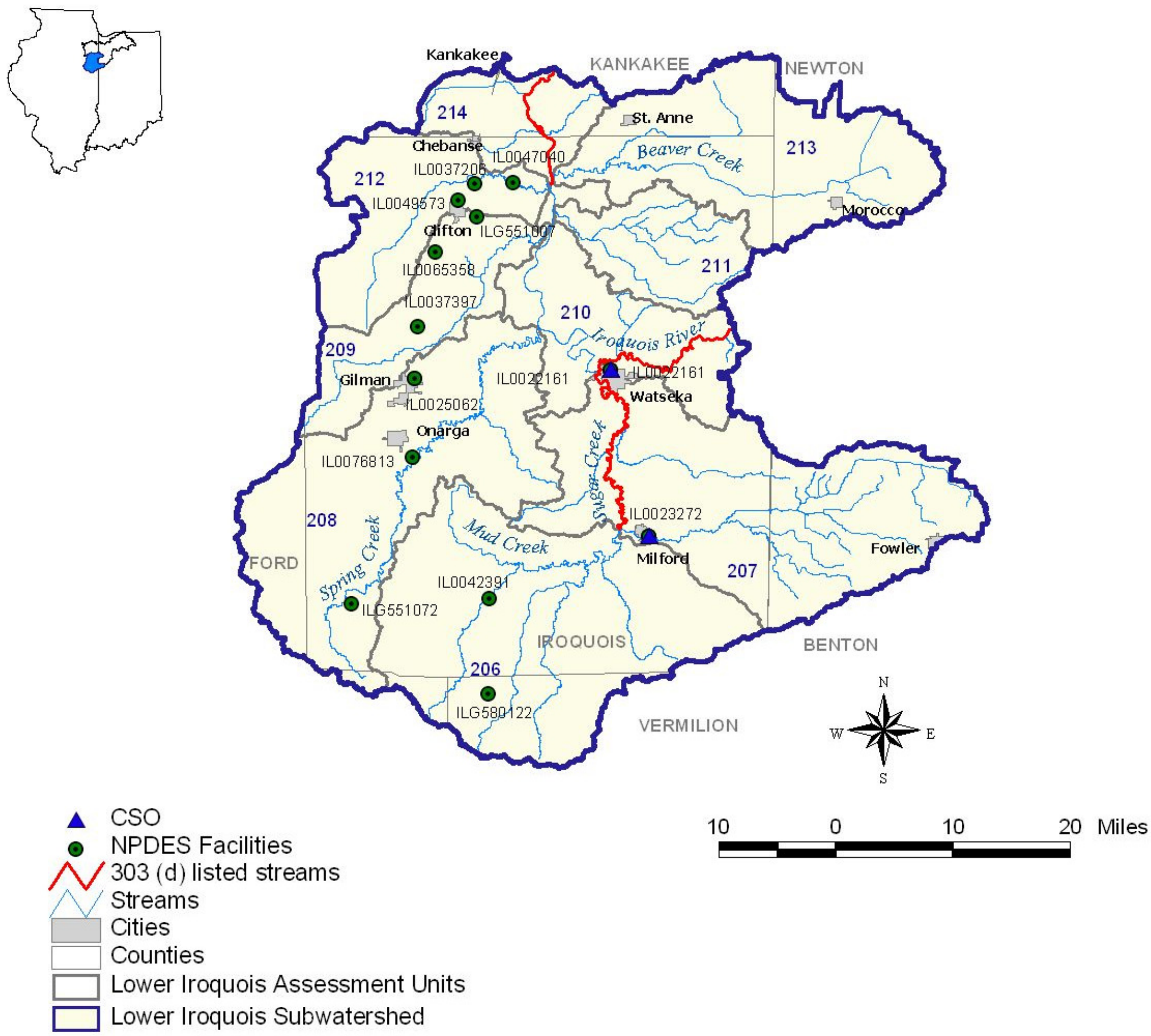


Figure 21. NPDES Facilities in the Lower Iroquois Subwatershed

4.5.1.3 Municipal Separate Storm Water Sewer System (MS4)

There are no MS4 communities lying solely within the Lower Iroquois subwatershed; however, small portions of the Kankakee and Kankakee County MS4s drain to this subwatershed (Table 44).

Table 44. MS4 Communities in the Lower Iroquois Subwatershed

MS4 Facility Permit ID	MS4 Name	Area (square miles)
ILR400260	Kankakee County	0.1
ILR400363	City of Kankakee	0.1

4.5.1.4 Concentrated Animal Feeding Operations (CAFOs)

There is only one CAFO in the Lower Iroquois watershed as shown in Table 45 and Figure 22. Illinois CAFO information is not available to Illinois EPA at this time.

Table 45. CAFOs in the Lower Iroquois Subwatershed

Major Subwatershed	HUC 10	Watershed Name	NPDES ID	Operation Name
Lower Iroquois	712000213	Beaver Creek	ING803684	Storey Pork Farm

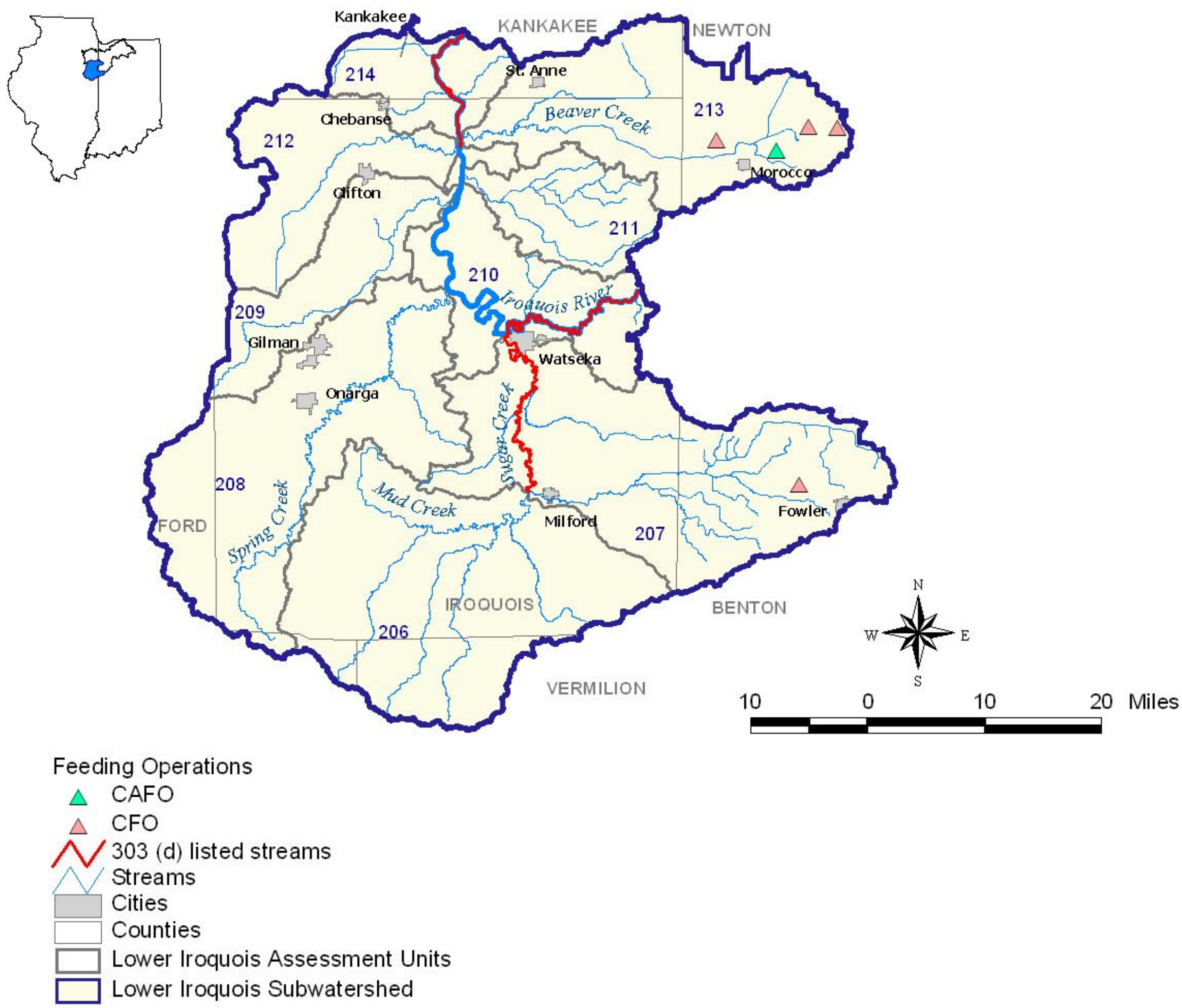


Figure 22. Feeding Operations in the Lower Iroquois Subwatershed

4.5.2 Nonpoint Sources

This section addresses the potential nonpoint sources of bacteria in the Lower Iroquois subwatershed.

4.5.2.1 Onsite Wastewater Treatment Systems

The rural population density in the Lower Iroquois subwatershed is only 22 persons per square mile, which is significantly less than that of the Upper, Middle, and Yellow River subwatersheds (Table 46). The majority (71 percent) of the subwatershed is comprised of soils with low infiltration capacity (A/D, B/D, C/D, and D). A and B soils cover 7 percent and 20 percent of the total subwatershed area, respectively.

Table 46. Rural Density in the Lower Iroquois Subwatershed

County	Area of County in Subwatershed (mi^2)	Estimated County Population in Subwatershed	Urban Population	Rural Population	Rural Population Density (persons/mi^2)
Vermilion	57.23	5,224	0	5,224	22
Iroquois	1040.20	27,509	18,654	8,855	
Ford	57.77	1,690	387	1,303	
Kankakee	94.25	15,199	1,212	13,987	
Newton	80.78	2,816	1,127	1,689	
Benton	119.78	2,668	1,671	997	
Total	**1450.01**	**55,106**	**23,051**	**32,055**	

4.5.2.2 Confined Animal Feeding Operations (CFOs) and Animal Feeding Operations (AFOs)

There are four CFOs in the Lower Iroquois watershed (Table 47 and Figure 22). The number of AFOs in the Illinois portion of the Lower Iroquois watershed is currently unavailable.

Table 47. CFOs in the Lower Iroquois Subwatershed

Major Subwatershed	HUC 10	HUC 10 Name	Farm ID	Operation Name
Lower Iroquois	0712000207	Sugar Creek	1178	Ewen Gravel Hill Farm
	0712000213	Beaver Creek	3277	C Bar C Farms
			3855	Gibson Fine Swine, Inc.
			2484	Sow Production Site

4.5.2.3 Livestock Population

Hogs, pigs, and cattle are the dominant livestock in the Lower Iroquois subwatershed and the subwatersheds animal unit density is 53 per square mile (Table 48). The approach used to estimate the number of animal units in the subwatershed is explained in Section 4.1.2.3.

Table 48. Animal Density in the Lower Iroquois Subwatershed

Subwatershed Area (sq. miles)	Animal	Number of Head	Number of Animals in One Animal Unit	Number of Animal Units	Animal Unit Density (per sq. mile)
1,450	Hogs and Pigs	94,776	2.5	37,910	53
	Cattle and Calves	37,934	1	37,934	
	Poultry	2,823	50	56	
	Sheep and Lambs	707	10	71	
	Horses and Ponies	178	0.5	356	
			Total	**76,327**	

4.5.2.4 Wildlife Population

The estimated deer density of the Lower Iroquois subwatershed is 3 deer per square mile (Table 49). The approach used to estimate the number of animal units in the subwatershed is explained in Section 4.1.2.4.

Table 49. Deer Density in the Lower Iroquois Subwatershed

Subwatershed Area (sq. mile)	County	Deer Population	Deer Density (per sq. mile)
1,450	Vermilion	2,481	3
	Iroquois	1,009	
	Ford	130	
	Kankakee	346	
	Newton	205	
	Benton	4	
	Total	4,175	

4.6 Lower Kankakee

The Lower Kankakee subwatershed lies almost entirely within Illinois and drains almost 834 square miles. Counties within the subwatershed include Will, Kankakee, Newton, Iroquois, Ford, and Grundy. Cities within the Lower Kankakee subwatershed include Herschel, Kankakee, Momence, Bradley, Bourbonnais, Manteno, Peotone, Beecher, Monee, Manhattan, Wilmington, and Lakewood Shores (Figure 23).

Similar to the rest of the Kankakee/Iroquois watershed, agriculture is the dominant land use in the Lower Kankakee subwatershed (Table 50).

Table 50. Land Use/Land Cover in the Lower Kankakee Subwatershed

Land Use/Land Cover	Watershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	399,161	624	74.82
Developed Land	59,206	93	11.1
Forested Land	27,176	42	5.09
Grassland and Shrubs	21,417	33	4.01
Pasture/Hay	19,355	30	3.63
Open Water	5,933	9	1.11
Wetland	1,214	2	0.23
Total	**533,460**	**834**	**100**

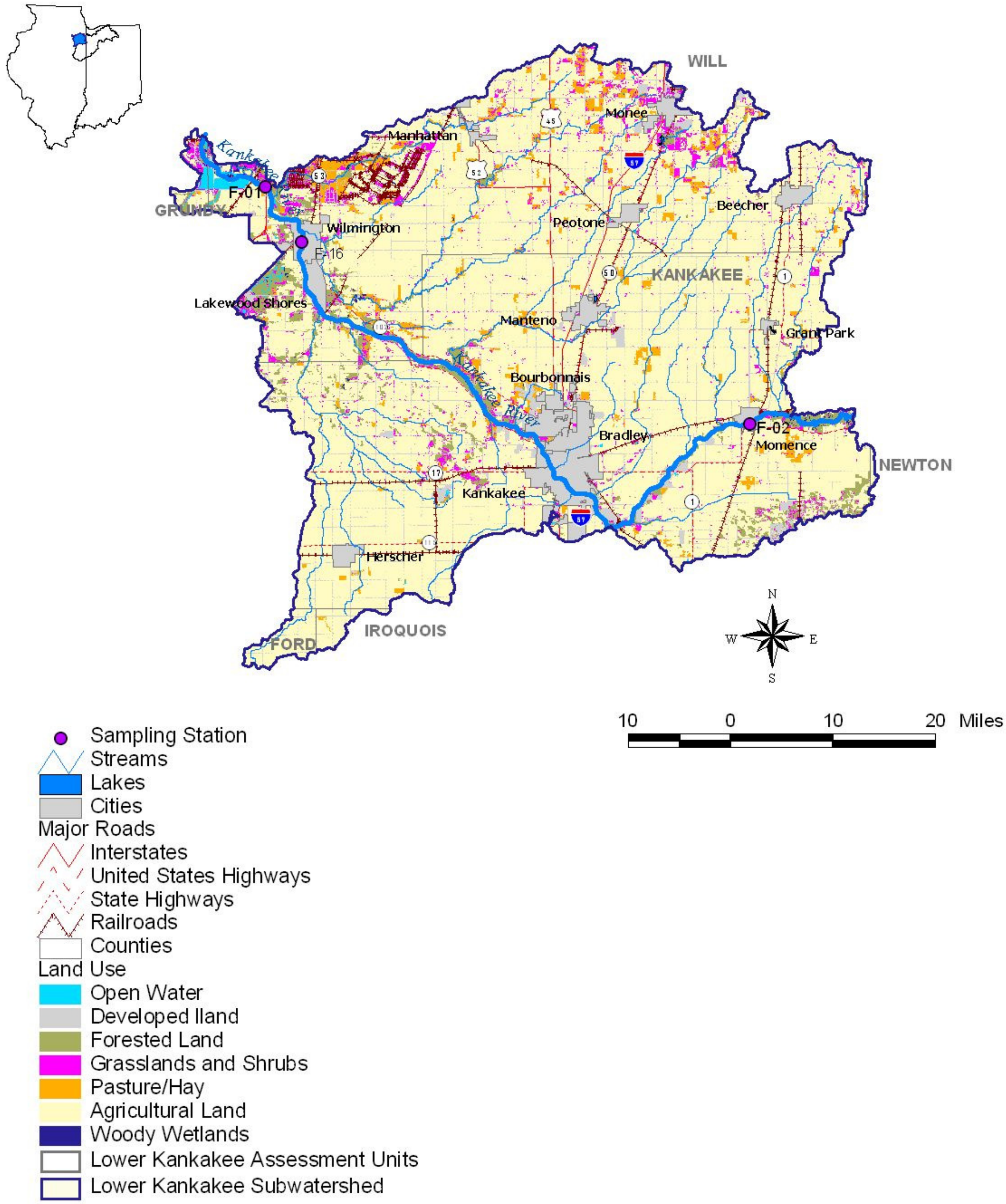


Figure 23. Land use in the Lower Kankakee Subwatershed

4.6.1 Point Sources

This section presents information about the potential point sources of bacteria in the Lower Kankakee subwatershed.

4.6.1.1 Wastewater Treatment Plants (WWTPs) and Industrial Facilities

There are 16 NPDES facilities that discharge bacteria to streams in the Lower Kankakee watershed. Eight facilities have year-round disinfection exemptions and five facilities have seasonal disinfection exemptions (November through April) as shown in Table 51 and Figure 24. The largest facility is the Kankakee River Metro Agency which has an average design flow of 25 MGD and a maximum design flow of 45 MGD.

Table 51. NPDES Facilities in the Lower Kankakee Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)	Max Design Flow (MGD)	Exemption Status
712000114	Spring Creek-Kankakee River	IL0022179	Momence STP	Kankakee River	1.6000	3.10000	Seasonal
		IL0045501	Sun River Terrace STP	Kankakee River	0.0750	0.32400	Year Round
		IL0049522	Beecher STP	Trim Creek	0.6000	1.50000	Seasonal
		IL0050717	Grant Park STP		0.3500	0.94000	Year Round
712000115	Rock Creek	IL0025089	Manteno WPCC	Kankakee River Via South Branch Rock Creek	1.1500	3.50000	None
		IL0030627	Peotone WWTP	Kankakee R Via Black Walnut Creek	0.8500	2.59000	Year Round
		IL0032051	Il Dot-I57 Will Co Rest Area	Northwest Branch Rock Creek	0.2600	0.65000	Year Round
712000116	Horse Creek	IL0032832	Herscher STP	Kankakee R Via Horse Creek Via East Br Horse Creek	0.2500	0.87500	Year Round
		IL0076368	Essex STP	Kankakee River	0.1760	0.63900	Year Round
712000117	Forked Creek	IL0026085	Wilmington STP	Kankakee River	0.7500	1.87500	Seasonal

Table 51. NPDES Facilities in the Lower Kankakee Subwatershed

HUC 10	HUC 10 Name	Permit Number	Facility Name	Receiving Stream	Average Design Flow (MGD)	Max Design Flow (MGD)	Exemption Status
712000118	Kankakee River	IL0021784	Kankakee River Metro Agency	Kankakee River Metro Agency	25.0000	45.00000	Seasonal
		IL0038199	Manteno Mobile Home Park	Exline Slough	0.0210	0.042000	Year Round
		IL0048674	Raymond's Truck Plaza	Kankakee River	0.0060	0.012500	Year Round
		IL0048968	Il State Toll Hwy-Plaza 21 STP	Des Plaines River	0.0005	0.00125	None
		IL0049093	Il DNR-Kankakee River State Pike	Kankakee R Via Rock Creek	0.0033	0.00830	Seasonal
		IL0055492	Il DNR-Kankakee River State Pike	Kankakee R Via Rock Creek	0.0050	0.02000	None
			Total		**31.096**	61.07000	

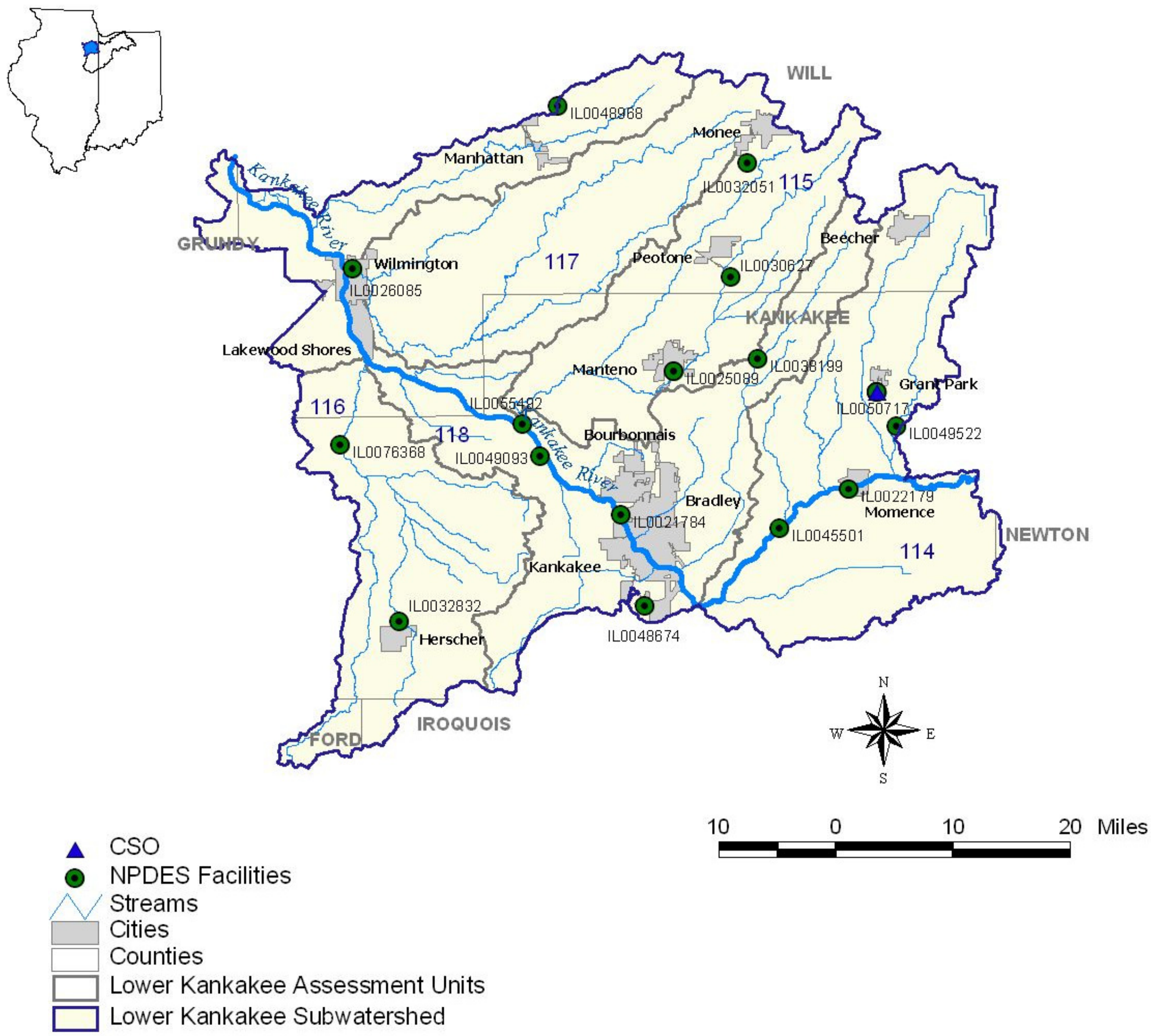


Figure 24. NPDES Facilities in the Lower Kankakee Subwatershed

4.6.1.2 <u>Combined Sewer Systems (CSOs)</u>

Grant Park in the Lower Kankakee subwatershed has 2 CSO outfalls as shown in Table 52 and Figure 24.

Table 52. CSOs in the Lower Kankakee Subwatershed

HUC 10	HUC 10 Name	Permit #	Facility	Outfall #	Pipe Description	Receiving Stream
712000114	Spring Creek-Kankakee River	IL0050717	Grant Park STP	B010	CSO-STP Bypass	Trim Creek
				A010	CSO-Raw Sewage Pump Station Overflow	Trim Creek

4.6.1.3 Municipal Separate Storm Sewer System (MS4)

There are seven MS4 communities in the Lower Kankakee subwatershed as shown in Table 53.

Table 53. MS4 Communities in the Lower Kankakee Subwatershed

MS4 Facility Permit ID	MS4 Name	Area (Square Miles)
ILR400015	Bourbonnais Township	2.0
ILR400260	Kankakee County	28.5
ILR400299	Village of Bourbonnais	12.0
ILR400300	Village of Bradley	19.0
ILR400363	City of Kankakee	29.0
ILR400495	Kankakee River Metropolitan Agency	93.0
ILR400619	Beecher Village	0.7

4.6.1.4 Concentrated Animal Feeding Operations (CAFOs)

There is currently no information available on CAFOs in the Lower Kankakee subwatershed

4.6.2 Nonpoint Sources

This section discusses potential nonpoint sources of bacteria in the Lower Kankakee Subwatershed.

4.6.2.1 Onsite Wastewater Treatment Systems

The estimated rural population density of the Lower Kankakee subwatershed is 310 persons per square mile, which is the second highest of the six subwatersheds (the density of the Middle Kankakee is 315 persons per square mile) (Table 54). Most (69%) of the soils have poor infiltration and are categorized as A/D, B/D, C/D, C, or D. A and B soils account for 31 percent of the subwatershed area.

Table 54. Rural Density in the Lower Kankakee Subwatershed

County	Area of County in Subwatershed (mi^2)	Estimated County Population in Subwatershed	Urban Population	Rural Population	Rural Population Density (persons/mi^2)
Iroquois	4.42	121	0	121	310
Ford	7.75	227	0	227	
Grundy	5.14	561	0	561	
Newton	0.71	25	0	25	
Will	333.22	266,046	16,939	251,989	
Kankakee	484.17	78,048	71,673	6,375	
Total	**835.43**	**345,028**	**88,612**	**259,177**	

4.6.2.2 Animal Feeding Operations (AFOs)

The number of AFOs in the Lower Kankakee watershed is currently unavailable.

4.6.2.3 Livestock Population

Swine and cattle comprise a majority of the farm animals in the Lower Kankakee subwatershed. The animal unit density of the subwatershed is 37 per square mile, which is the lowest of the six subwatersheds (Table 55).

Table 55. Animal Unit Density in the Lower Kankakee Subwatershed

Subwatershed Area sq. /miles	Animal	Number of Head	Number of Animals in One Animal Unit	Number of Animal Units	Animal Unit Density per sq. mile
834	Hogs and Pigs	41,908	2.5	16,763	37
	Cattle and Calves	11,304	1	11,304	
	Poultry	1,654	50	33	
	Sheep and Lambs	35	10	4	
	Horses and Ponies	1,462	0.5	2,924	
			Total	**31,028**	

4.6.2.4 Wildlife

Among the six subwatersheds, Lower Kankakee has the highest deer density at six per square mile (Table 56).

Table 56. Deer Density in the Lower Kankakee Subwatershed

Subwatershed Area sq. miles	County	Deer Population	Deer Density per/sq. mile
834	Iroquois	427	6
	Ford	17	
	Grundy	2,458	
	Newton	48	
	Will	1,777	
	Kankakee	2	
	Total	4,729	

5.0 TECHNICAL APPROACH

This section presents the technical approach used to estimate the current and allowable loads of fecal coliform and *E. coli* in the Kankakee/Iroquois watershed.

5.1 Load Duration Curves

The load duration curve calculates the allowable loadings of a pollutant at different flow regimes by multiplying each flow by the TMDL target value and an appropriate conversion factor. The following steps are taken:

1) A flow duration curve for the stream is developed by generating a flow frequency table and plotting the observed flows in order from highest (left portion of curve) to lowest (right portion of curve).

2) The flow curve is translated into a load duration (or TMDL) curve. To accomplish this, each flow value is multiplied by the TMDL target value and by a conversion factor and the resulting points are graphed. Conversion factors are used to convert the units of the target (e.g., #/100 mL) to loads (e.g., G-org/day) with the following factors used for this TMDL:

   a) Flow (cfs) x TMDL Concentration Target (#/100mL) x Conversion Factor (0.024463) = Load (G-org/day)

3) To estimate existing loads, each water quality sample is converted to a load by multiplying the water quality sample concentration by the average daily flow on the day the sample was collected and the appropriate conversion factor. Then, the existing individual loads are plotted on the TMDL graph with the curve.

4) Points plotting above the curve represent deviations from the water quality standard and the daily allowable load. Those points plotting below the curve represent compliance with standards and the daily allowable load.

5) The area beneath the load duration curve is interpreted as the loading capacity of the stream. The difference between this area and the area representing the current loading conditions is the load that must be reduced to meet water quality standards.

Water quality duration curves are created using the same steps as those used for load duration curves except that concentrations, rather than loads, are plotted on the vertical axis.

The stream flows displayed on water quality or load duration curves may be grouped into various flow regimes to aid with interpretation of the load duration curves. The flow regimes are typically divided into 10 groups, which can be further categorized into the following five “hydrologic zones” (USEPA, 2007):

- High flow zone: stream flows that plot in the 0 to 10-percentile range, related to flood flows.
- Moist zone: flows in the 10 to 40-percentile range, related to wet weather conditions.
- Mid-range zone: flows in the 40 to 50 percentile range, median stream flow conditions;
- Dry zone: flows in the 60 to 90-percentile range, related to dry weather flows.
- Low flow zone: flows in the 90 to 100-percentile range, related to drought conditions.

The duration curve approach helps to identify the issues surrounding the impairment and to roughly differentiate between sources. Table 57 summarizes the general relationship between the five hydrologic zones and potentially contributing source areas (the table is not specific to any individual pollutant). For example, the table indicates that impacts from wastewater treatment plants are usually most pronounced during dry and low flow zones because there is less water in the stream to dilute their loads. In contrast, impacts from channel bank erosion is most pronounced during high flow zones because these are the periods during which stream velocities are high enough to cause erosion to occur. Impacts from abandoned mining areas can occur during all flow zones.

The load duration curve approach also considers critical conditions and seasonal variation in the TMDL development as required by the Clean Water Act and EPA's implementing regulations. Because the approach establishes loads based on a representative flow regime, it considers seasonal variations and critical conditions attributed to flow conditions.

Table 57. Relationship Between Load Duration Curve Zones and Contributing Bacteria Sources

Contributing Source Area	Duration Curve Zone				
	High	Moist	Mid-Range	Dry	Low
Wastewater treatment plants				M	H
Livestock direct access to streams				M	H
Wildlife direct access to streams				M	H
On-site wastewater systems/Unsewered Areas	M	M-H	H	H	H
Urban stormwater/CSOs	H	H	H		
Agricultural runoff	H	H	M		
Bacterial re-suspension from stream sediments	H	M			
Note: Potential relative importance of source area to contribute loads under given hydrologic condition (H: High; M: Medium; L: Low)					

5.1.1 Stream Flow Estimates

Daily stream flows are necessary to implement the load duration curve approach. These were estimated using the observed flows available at a number of USGS gages in the Kankakee/Iroquois watershed. Most of the sampling sites were on small tributary streams whose flow patterns will vary widely from the active USGS gages which are primarily on larger rivers. To account for these differences historic gage data on smaller tributaries were used in addition to active gages. Table 58 outlines the USGS gages used to make flow estimates for each ungaged subwatershed outlet.

Flows were estimated based on drainage area weighting using the following equation:

$$Q_{ungaged} = \frac{A_{ungaged}}{A_{gaged}} \times Q_{gaged}$$

Where,

$Q_{ungaged}$: Flow at the ungaged location
Q_{gaged}: Flow at surrogate USGS gage station
$A_{ungaged}$: Drainage area of the ungaged location
A_{gaged}: Drainage area of the gaged location

In this procedure, the drainage area of each of the load duration stations was divided by the drainage area of the surrogate USGS gage. The flows for each of the stations were then calculated by multiplying the flows at the surrogate gage by the drainage area ratios. Additional flows were added to certain locations to account for wastewater treatment plants and CSOs that discharge upstream and are not directly accounted for using the drainage area weighting method.

Table 58. USGS Site Assignments for Estimated Flows at Ungaged Sites

Watershed Group	HUC 10	HUC 12	Gage Assigned for Estimating Flows	Gage ID
Upper Kankakee	107	10701	Kankakee at Davis	05515500
		10702		
		10703		
		10704		
		10705		
	104	10405	Kankakee at Davis	05515500
		10407		
		10408		
	102	10203	Kankakee at Davis	05515500
		10204		
		10206		
		10208		
		10209		
	101	10102	Kankakee at Davis	05515500
		10103		
		10105		
		10106		
Upper Iroquois	205	20502	Sugar Creek at Milford	05525500
		20503		
		20505		
		20506		
		20508		
	204	20401	Iroquois River near Foresman	05524500
		20403		
		20404		
		20405		
	203	20303	Iroquois River at Rensselaer	05522500
		20304		
		20305		
	202	20204	Iroquois River near Foresman	05524500
		20205		
		20206		
	201	20103	Iroquois River at Rensselaer	05522500
Lower Iroquois	206	20604	Sugar Creek at Milford	05525500
		20605		
		20607		
		20608		
		20609		
		20610		
	207	20702	Sugar Creek at Milford	05525500
		20703		
		20704		
		20705		
		20706		
		20707		
		20711		
	208	20808	Iroquois at Iroquois, IL	05525000
Lower Iroquois	209	20902	Iroquois at Iroquois, IL	05525000
	210	21001	Iroquois at Iroquois, IL	05525000
		21002		
	211	21102	Iroquois at Iroquois, IL	05525000
	212	21202	Iroquois at Iroquois, IL	05525000
	213	21302	Iroquois at Iroquois, IL	05525000
		21303		
		21308		
	214	21402	Iroquois near Chebanse, IL	05526000

Table 58. USGS Site Assignments for Estimated Flows at Ungaged Sites

Watershed Group	HUC 10	HUC 12	Gage Assigned for Estimating Flows	Gage ID
Yellow	106	10601	Iroquois River at Rosebud	05521000
		10603		
		10604		
	105	10501	Yellow River at Plymouth	05516500
		10503		
		10504		
		10505		
		10506		
	103	10302	Yellow River at Plymouth	05516500
		10303		
		10305		
		10307		
		10309		
		10311		
		10312		
Middle Kankakee	113	11302	Singleton Ditch at Schneider	05519000
		11304		
		11305		
		11306		
		11307		
		11308		
		11310		
		11312		
	112	11203	Iroquois River at Rosebud	05521000
		11205		
	111	11101	Iroquois River at Rosebud	05521000
		11103		
	110	11001	Singleton Ditch at Schneider	05519000
		11005		
		11006		
		11007		
		11009		
		11010		
	109	10902	Iroquois River at Rosebud	05521000
		10904		
	108	10802	Iroquois River at Rosebud	05521000
		10805		
		10806		
		10807		
Lower Kankakee	118	11806	Kankakee River near Wilmington, IL	05527500
		11809		

6.0 LINKAGE ANALYSIS

An essential component of developing a TMDL is establishing a relationship between the source loadings and the resulting water quality. Water quality data within the Kankakee/Iroquois watershed are discussed in Section 3.2 and potential point and nonpoint sources are inventoried in Section 4.0. The purpose of this section of the report is to evaluate which of the various potential sources is most likely to be contributing to the observed water quality impairments.

Establishing a linkage analysis for bacteria is challenging because there are so many potential sources and because bacteria counts have a high degree of variability. While it is difficult to perform a site-specific assessment of the causes of high bacteria for each location in the Kankakee/Iroquois watershed, it is reasonable to expect that general patterns and trends can be used to provide some perspective on the most significant sources.

Table 59 summarizes several of the potential bacteria sources in each subwatershed along with the *E. coli* data collected by IDEM in 2008. *E. coli* counts are highest in the Yellow River, Upper Iroquois, and Upper Kankakee subwatersheds which are all characterized by relatively high animal unit densities. It is therefore possible that waste generated by livestock in these subwatersheds is contributing to the elevated bacteria counts. In fact, the animal unit density of each subwatershed is strongly correlated with the geomean of *E. coli* counts in each subwatershed (Figure 25). Similar trends are not apparent with the other sources listed in Table 59. However, it is also possible that some other factor could explain the higher counts. For example, the Yellow River, Upper Iroquois, and Upper Kankakee are also headwater subwatersheds and many of the sampled tributaries therefore have a relatively small drainage area. Streams with smaller drainage areas generally have relatively higher *E. coli* counts because there is less opportunity for dilution compared to larger streams. Bacteria patterns associated with drainage areas, as well as flow conditions, are further discussed in the next several sections.

Table 59. Potential sources of pathogens in the Kankakee/Iroquois Watershed.

		Upper Kankakee	Middle Kankakee	Yellow River	Upper Iroquois	Lower Iroquois	Lower Kankakee
Mean of All 2008 *E. coli* data (#/100mL)		760	435	1014	767	473	514
Geomean of All 2008 E. coli data (#/100 mL)		308	165	545	375	156	139
Source Type or Concern							
Point	Total Average Design Flow of Wastewater Treatment Plants (MGD)	10.8	10.4	8.6	2.6	3.1	31
	Total Number of Combined Sewer Overflows	0	1	23	9	16	2
	Square Miles of MS4 Storm Water	18.3	31.9	7.0	0	0.2	184.2
Non-Point	Rural Population Density (persons/square mile)	214	315	141	29	22	310
	Animal Unit Density (units/square mile)	146	65	329	185	53	37
	Deer Density (animals/square mile)	3	4	5	2	3	6

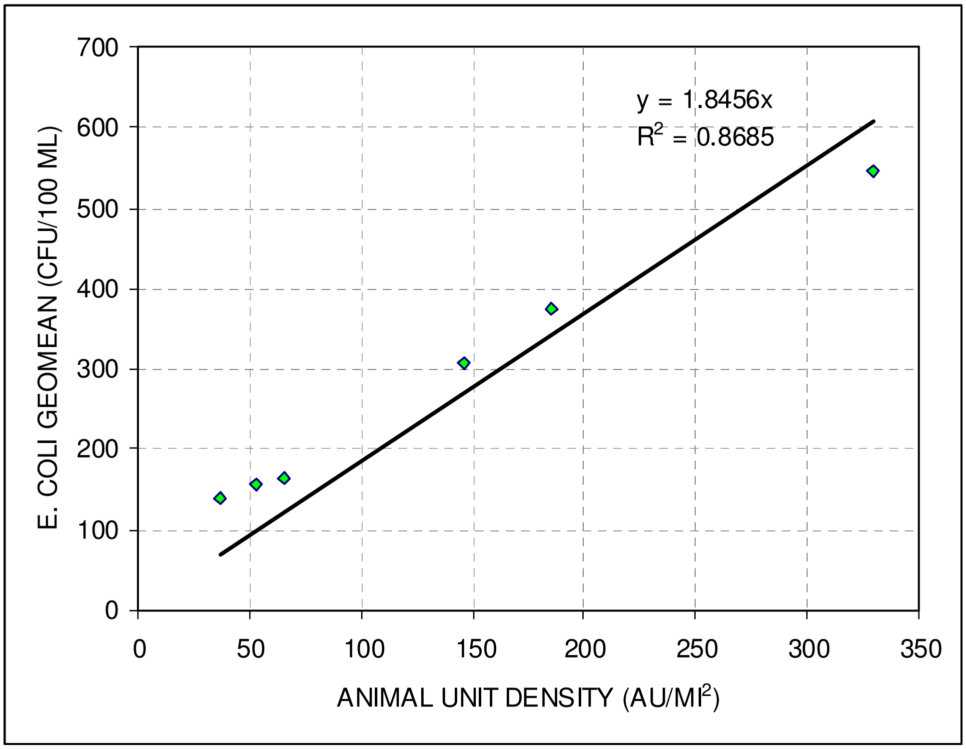


Figure 25. Correlation of subwatershed animal unit densities and *E. coli* geomean (based on 2008 sampling data).

6.1 Upper Kankakee

Data collected for the Upper Kankakee in the summer of 2008 indicate that there are *E. coli* exceedances throughout the subwatershed. In fact, only one site within the subwatershed did not exceed the geomean standard (Whitham Ditch, Station #35). The drainage area profile (Figure 26) does not show any definitive patterns within the subwatershed. Most of the 2008 IDEM water quality data were taken during moist and mid-range flow regimes; patterns might emerge if data were available for a wider range of flow conditions.

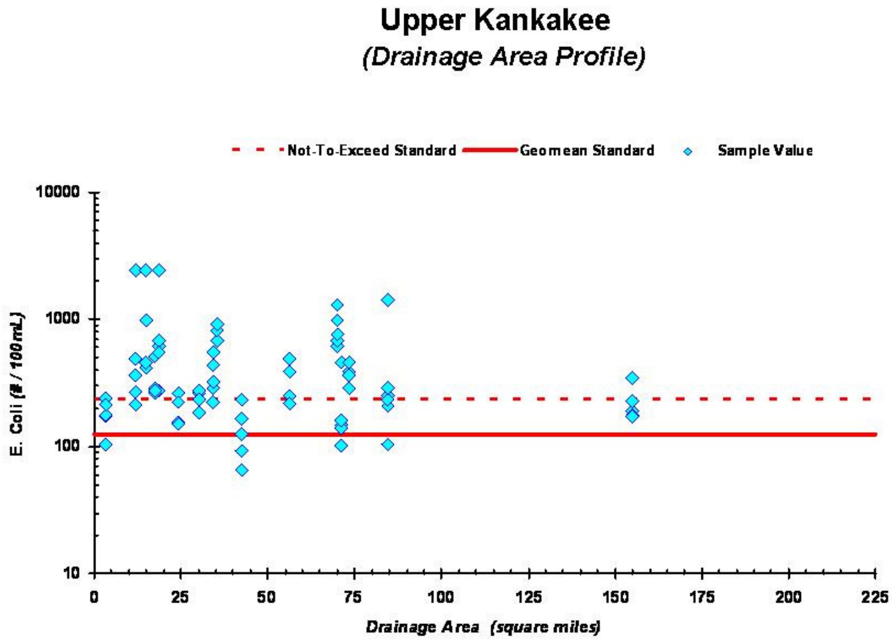
Figure 27 summarizes the 2008 bacteria data for the Upper Kankakee by tributary and indicates that the tributaries in general exhibit higher *E. coli* counts compared to the mainstem. Counts in the Potato/Pine tributaries are notably higher than in the Headwaters, Little Kankakee, Kingsbury/Robbins, and Upper Kankakee mainstem. A detailed assessment of the sources known to exist in the Potato and Pine Creek tributaries did not reveal any noticeable difference from other tributaries in the Upper Kankakee subwatershed, however.

Most facilities in this subwatershed are in compliance in with their flow and bacteria limits (Table 60).

Table 60. Summary of NPDES facility compliance with design flow and bacteria permit limits in the Upper Kankakee subwatershed (2004 to 2006).

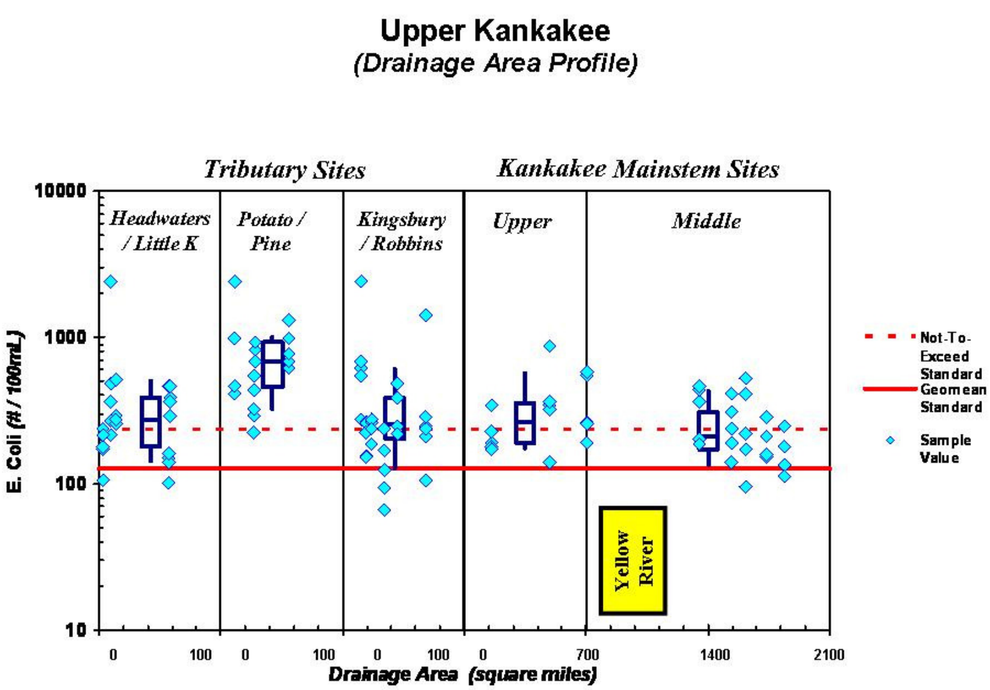
NPDES ID	Facility Name	Flow		Bacteria	
		Average Design Flow (MGD)	Number of Violations	Limit (#/100 mL)	Number of Violations
IN0023337	Kingsford Heights Municipal WWTP	0.422	0	125	1
IN0025577	La Porte Municipal STP	7	0	125*	6
IN0025801	North Liberty WWTP	0.18	1	125	1
IN0040100	Hamlet Municipal STP	0.1	3	125	ND
IN0040690	Walkerton Municipal WWTP	0.364	2	125	0
IN0045471	Kingsbury Utility Corp	2.5	0	125	11

Notes: MGD = Million gallons per day; ND= No data; *data at this facility also showed exceedances 235 standard



(Data reported by Indiana DEM)

Figure 26. Upper Kankakee Drainage Area Profile



(Data reported by Indiana DEM)

Figure 27. Upper Kankakee Tributary versus Mainstem Drainage Area Profile

An *E. coli* duration curve was prepared for sampling station KR-117 which is located on the Kankakee River in the Upper Kankakee subwatershed (Figure 29). Data are available at this station from 1988 to 1999 and the water quality duration curve is shown in Figure 28. The curve indicates that *E. coli* frequently exceeds 235 #/100 mL during high flows, moist conditions, and mid-range flows. The geomean of all the samples collected during low flows is less than 235 #/100 mL. Bacteria sources typically associated with high flow and moist conditions include failing onsite wastewater systems, urban stormwater/CSOs, runoff from agricultural areas, and bacterial re-suspension from the streambed.

Kankakee River along Route 6, Indiana

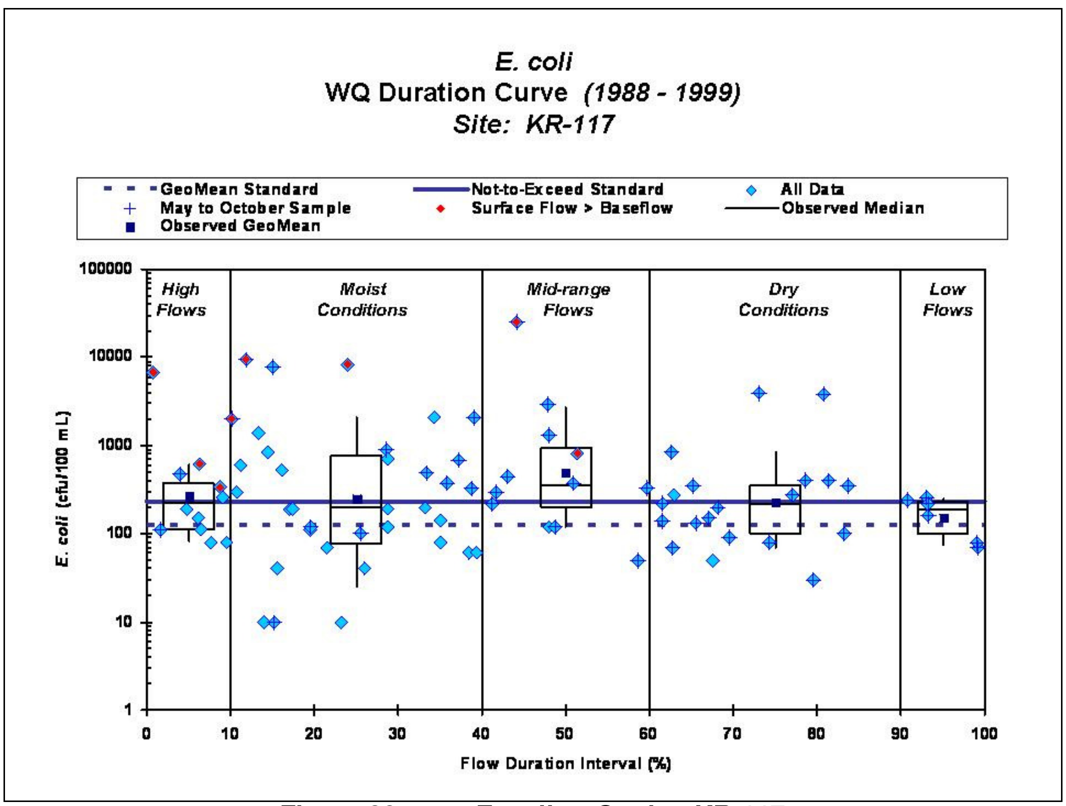


Figure 28. ***E. coli* at Station KR-117**

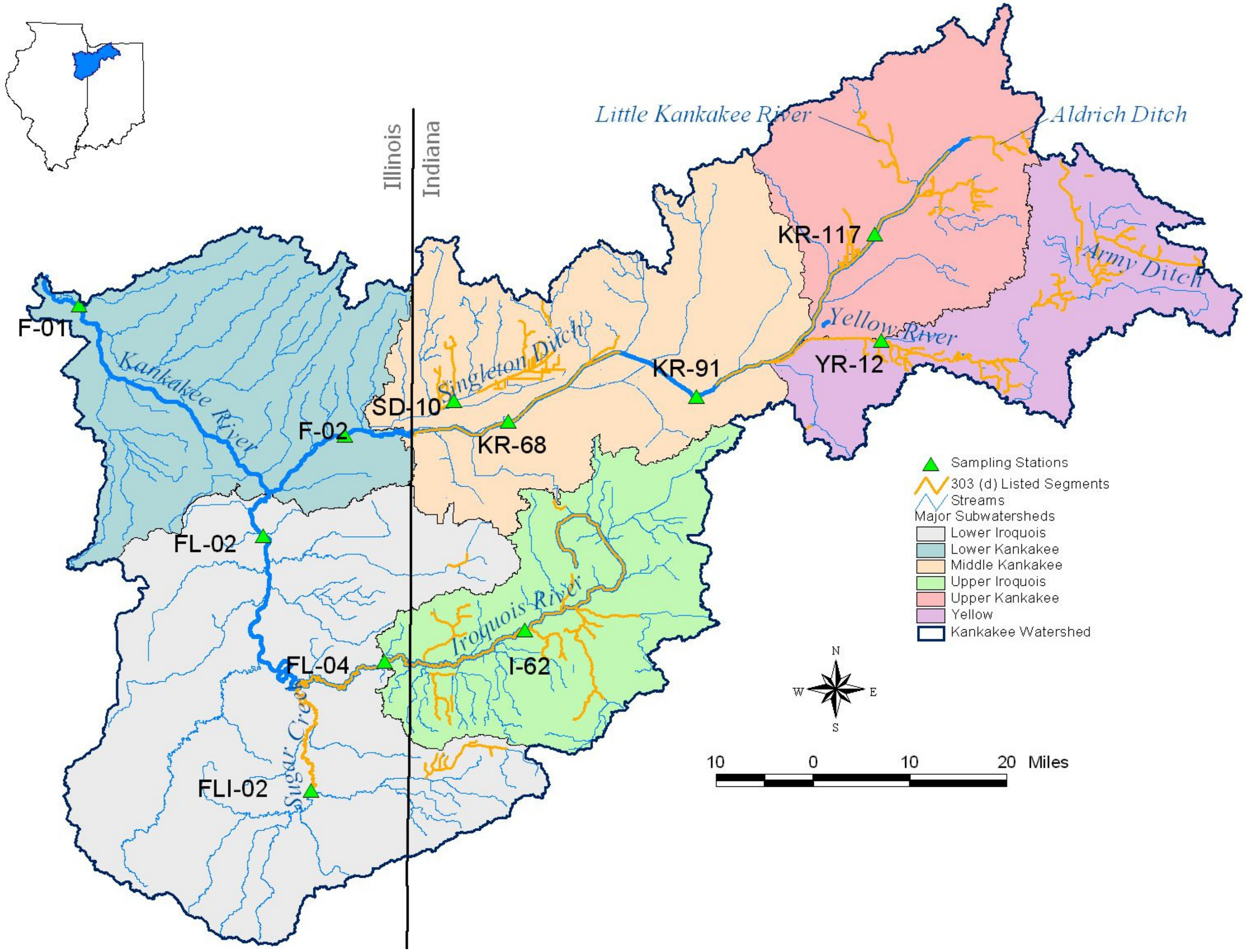


Figure 29. Key Sampling Stations in Kankakee/Iroquois River Watershed

6.2 Middle Kankakee

Data compiled for the Middle Kankakee in the summer of 2008 indicate that there are *E. coli* exceedances throughout the subwatershed. Only three sites within the subwatershed do not exceed the geomean standard (Pitner Ditch, Station # 07; Cobb Ditch, Station #06; and Brown Ditch, Station #22). Five stations have geomean values over 600 #/100 mL: #31 (Hunsley Ditch), #29 (Slocum Ditch), #27 (Crooked Creek), #18 (Stony Run Ditch), and #20 (Dehaan Ditch). A detailed assessment of the sources known to exist in these tributaries did not reveal any noticeable difference from other tributaries in the Middle Kankakee subwatershed, however.

Figure 31 indicates that in general *E. coli* counts are higher in the Middle Kankakee tributaries compared to the mainstem of the Kankakee River. This occurs despite the fact that the Yellow River, which was observed to have very high *E. coli* counts, discharges upstream of the Middle Kankakee. *E. coli* appears to decrease moving downstream due to the larger dilution capacity of the river.

Most facilities in this subwatershed are in compliance in with their flow and bacteria limits; however, the Hebron Municipal WWTP exceeded its permit limit 10 times between 2004 and 2006 (Table 61).

Table 61. Summary of NPDES facility compliance with design flow and bacteria permit limits in the Middle Kankakee subwatershed (2004 to 2006).

NPDES ID	Facility Name	Flow		Bacteria	
		Design Flow (MGD)	Number of Violations	Limit (#/100 mL)	Number of Violations
IN0020061	Hebron Municipal WWTP	0.52	9	125*	10
IN0023400	Kouts Municipal WWTP	0.33	1	125*	1
IN0023621	Lowell WWTP	4	0	125*	1
IN0031127	Winfield Elementary School	0.01	1	125	4
IN0033081	Dalecarlia Utilities Lake Dale	0.044	0	125*	1
IN0037176	Twin Lakes Utilities	1.1	3	125*	4
IN0039101	Water Services Co Of Indiana	0.155	0		1
IN0040754	Wheatfield Municipal WWTP	0.077	5	125	0
IN0042978	Westville Correctional Center	0.75	1	125*	4
IN0045888	Boone Grove Elem & Middle School	0.023	1	125	0
IN0052248	Morgan Township School	0.0132	6	125	0
IN0056669	Wanatah Wastewater Trmt Plant	0.078	14	125	0
IN0057029	Boone Grove High School WWTP	0.01875	1	125*	7
IN0061450	Hebron WWTP	0.025	25	125	0

Notes: MGD = Million gallons per day; ND= No data; *data at this facility also showed exceedances 235 standard

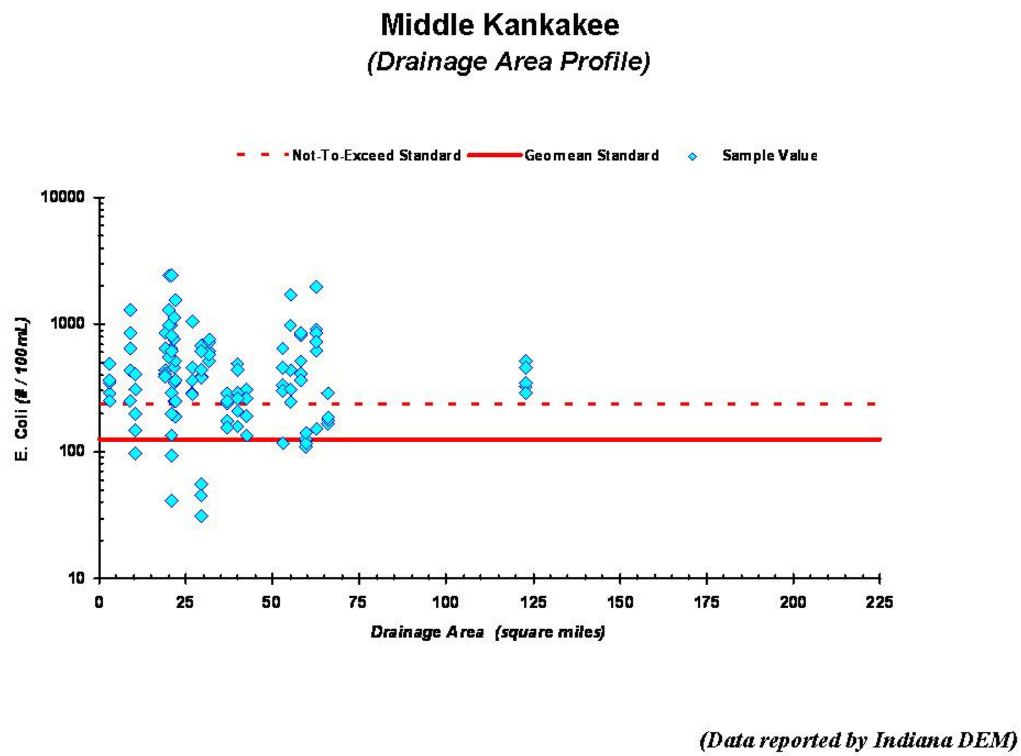


Figure 30. Middle Kankakee Small Watershed Drainage Area Profile

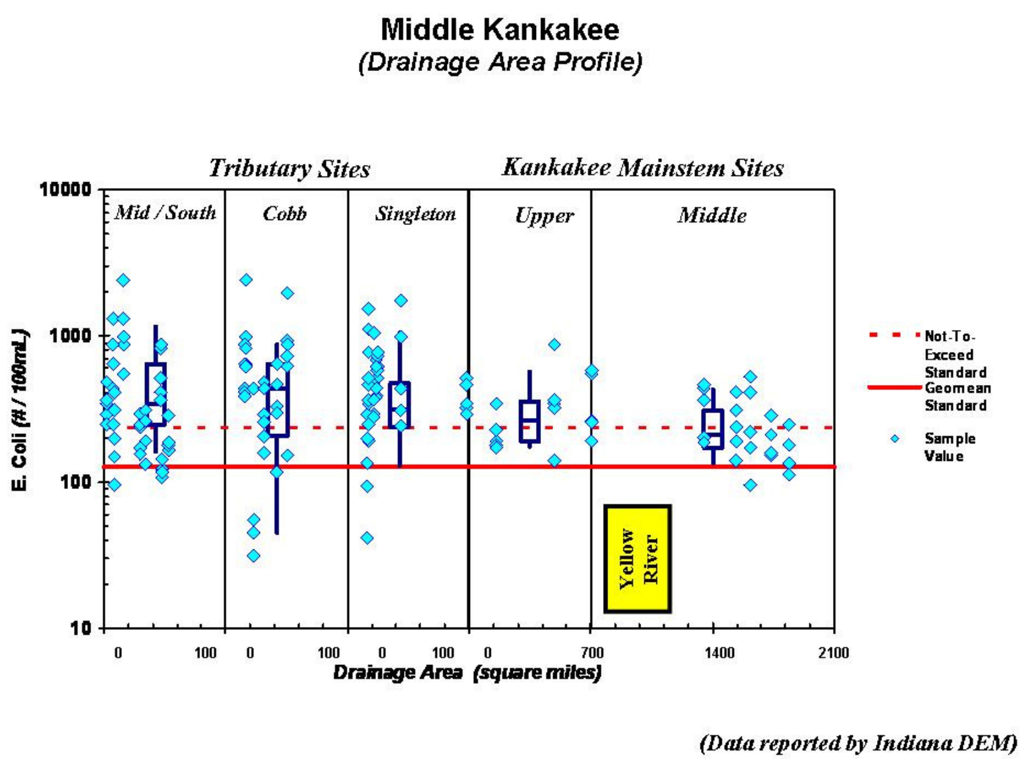


Figure 31. Middle Kankakee Tributary versus Mainstem Drainage Area Profile

An *E. coli* duration curve was prepared for sampling station KR-68 which is located in the Middle Kankakee subwatershed. Data are available at this station from 1988 to 1999 and the duration curve is shown in Figure 32. The curve indicates that *E. coli* frequently exceeds 235 #/100 mL during high flows. Bacteria sources typically associated with high flows include urban stormwater/CSOs, runoff from agricultural areas, and bacterial re-suspension from the streambed. Most samples during dry conditions and low flows meet water quality standards.

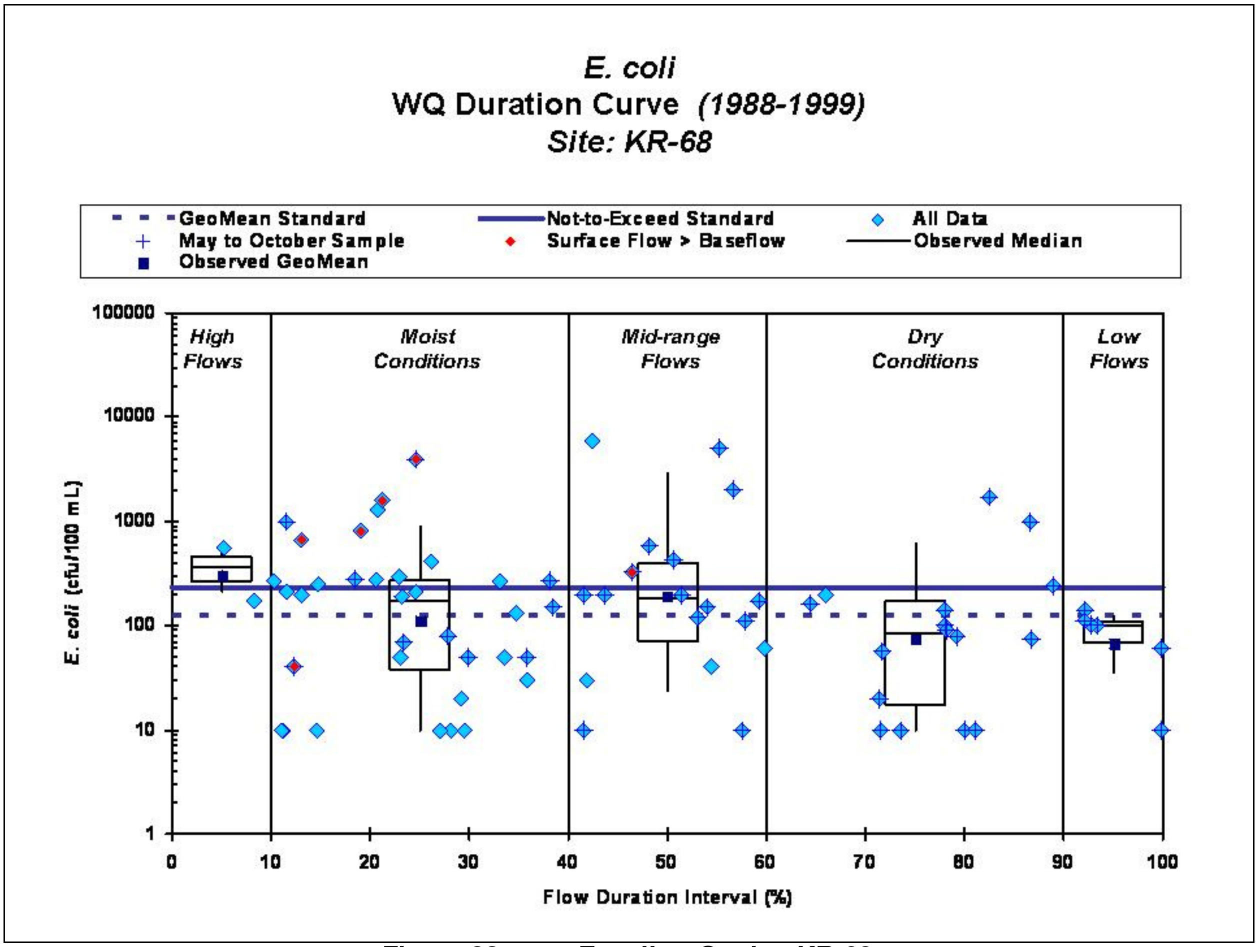


Figure 32. ***E. coli* at Station KR-68**

6.3 Yellow River

Data compiled for the Yellow River in the summer of 2008 indicate that it had the worst *E. coli* of any of the subwatersheds. Every site sampled in the subwatershed exceeded the geomean standard of 125 #/100 mL. The site with the lowest geomean was on the main stem Yellow River (Site # 69), with a geomean of 239 counts/100 mL. The tributary within the subwatershed with the lowest geomean was Site #67 of Harry Cool Ditch, with a geomean of 330. A detailed assessment of the sources known to exist in these tributaries did not reveal any noticeable difference from other tributaries in the Yellow River subwatershed, however.

The drainage area profile (Figure 33) suggests a slight increasing trend in the Yellow River as drainage area increases. Tributaries to the Yellow River in general have higher *E. coli* counts than does the middle section of the Yellow River (Figure 34).

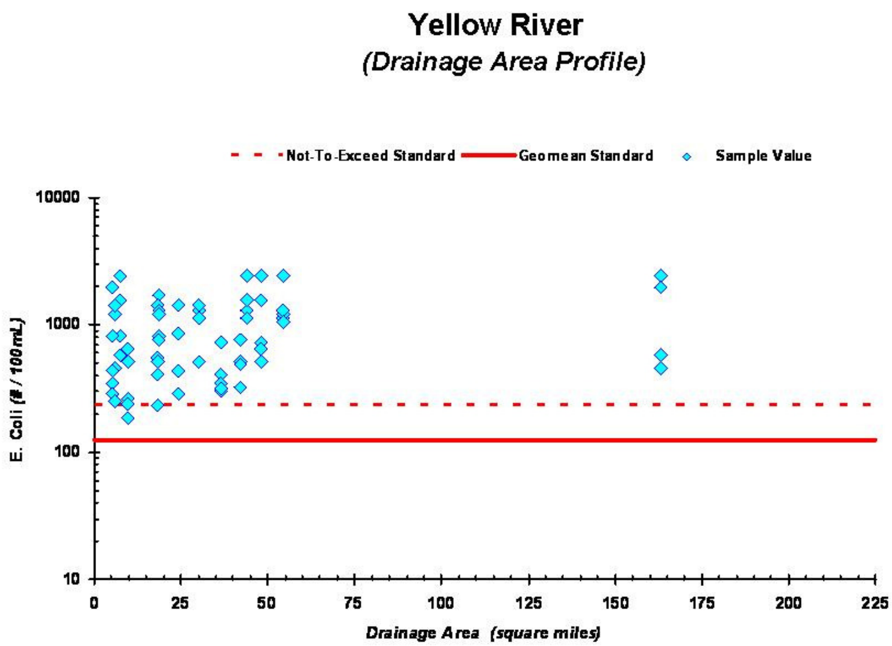
Water quality duration curves were not prepared for any sites in the Yellow River subwatershed because of the lack of historical *E. coli* data.

Most facilities in this subwatershed are in compliance in with their flow and bacteria limits; however, the Knox Municipal WWTP exceeded its permit limit 20 times between 2004 and 2006 (Table 62).

Table 62. Summary of NPDES facility compliance with design flow and bacteria permit limits in the Yellow River subwatershed (2004 to 2006).

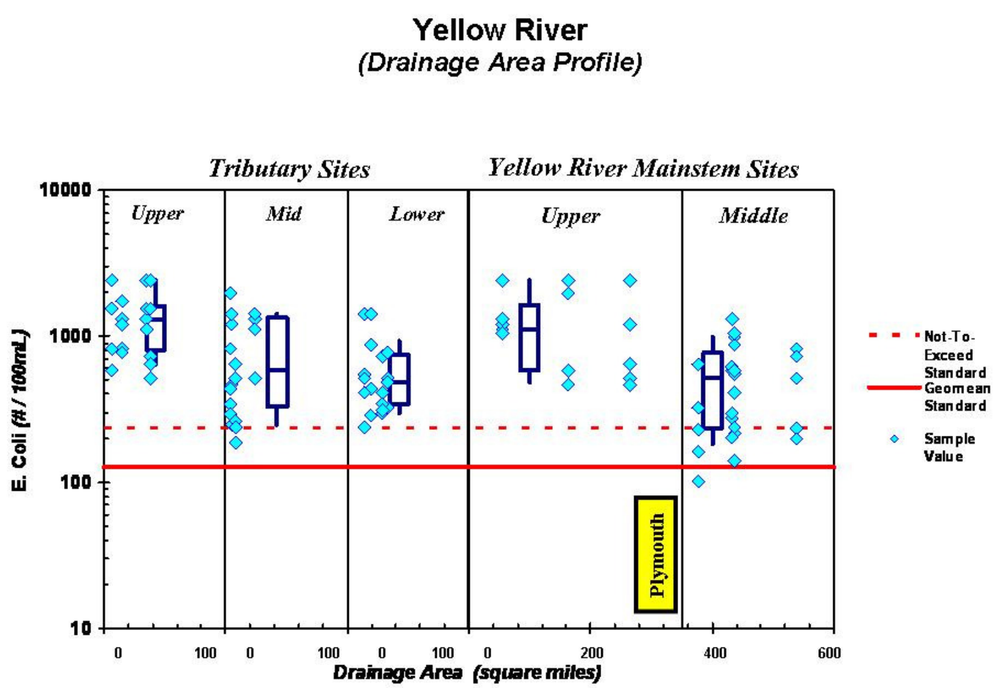
NPDES ID	Facility Name	Flow		Bacteria	
		Average Design Flow (MGD)	Number of Violations	Limit (#/100 mL)	Number of Violations
IN0020427	Bremen Municipal WWTP	1.3	2	125	No Data
IN0020877	North Judson Municipal WWTP	0.47	8	125	No Data
IN0020991	Plymouth WWTP	3.5	2	125	0
IN0021385	Knox Municipal WWTP	0.7	0	125*	20
IN0022284	Argos Municipal WWTP	0.212	2	125	0
IN0025160	Convent Ancilla Dominion	0.046	9	125*	3
IN0040223	Lapaz Municipal WWTP	0.126	1	125	0
IN0057002	Lake Of The Woods RSD	0.135	3	125	No Data
IN0058289	Bass Lake Conservancy District	0.284	1	125	No Data

Notes: MGD = Million gallons per day; ND= No data; *data at this facility also showed exceedances 235 standard



(Data reported by Indiana DEM)

Figure 33. Yellow River Small Watershed Drainage Area Profile



(Data reported by Indiana DEM)

Figure 34. Yellow River Tributary versus Mainstem Drainage Area Profile

6.4 Upper Iroquois

Data compiled for the Upper Iroquois in the summer of 2008 indicate that there are *E. coli* exceedances throughout the Indiana portion of the subwatershed (limited data are available for the Illinois portion of the watershed). Every site sampled in the subwatershed exceeded the geomean standard of 125 #/100 mL. The site with the lowest geomean was on the main stem Iroquois River (Site # 80). The tributary within the subwatershed with the lowest geomean was Site # 70 on Carpenter Creek. The drainage area profile (Figure 35) does not show any definitive patterns within the subwatershed. Three stations have geomean values over 800 #/100 mL: # 68 (Carpenter Creek), # 76 (Hunter Ditch), and # 84 (Montgomery) but a detailed assessment did not reveal any characteristics unique to these streams.

Similar to other subwatersheds, the tributaries to the Upper Iroquois in general have higher *E. coli* counts than the Upper Iroquois itself (Figure 36).

Water quality duration curves were not prepared for any sites in the Upper Iroquois subwatershed because of the lack of historical *E. coli* data.

Most facilities in this subwatershed are in compliance in with their flow and bacteria limits (Table 63).

Table 63. Summary of NPDES facility compliance with design flow and bacteria permit limits in the Upper Iroquois subwatershed (2004 to 2006).

NPDES ID	Facility Name	Flow		Bacteria	
		Average Design Flow (MGD)	Number of Violations	Limit (#/100 mL)	Number of Violations
IN0020940	Remington WWTP	0.429	5	125	0
IN0023329	Kentland Municipal WWTP	0.46	5	125*	4
IN0024414	Rensselaer Municipal STP	1.2	5	125*	5
IN0039764	Brook Municipal WWTP	0.1	5	125	No Data
IN0040070	Goodland Municipal WWTP	0.095	8	125	No Data
IN0041904	Trail Tree Inn	0.256	0	125*	1
IN0050997	George Ade Mem Health Care Ctr	0.014	1	125*	4
IN0053422	Grandmas Home Cooking	0.0289	0	125	2

Notes: MGD = Million gallons per day;*data at this facility also showed exceedances 235 standard

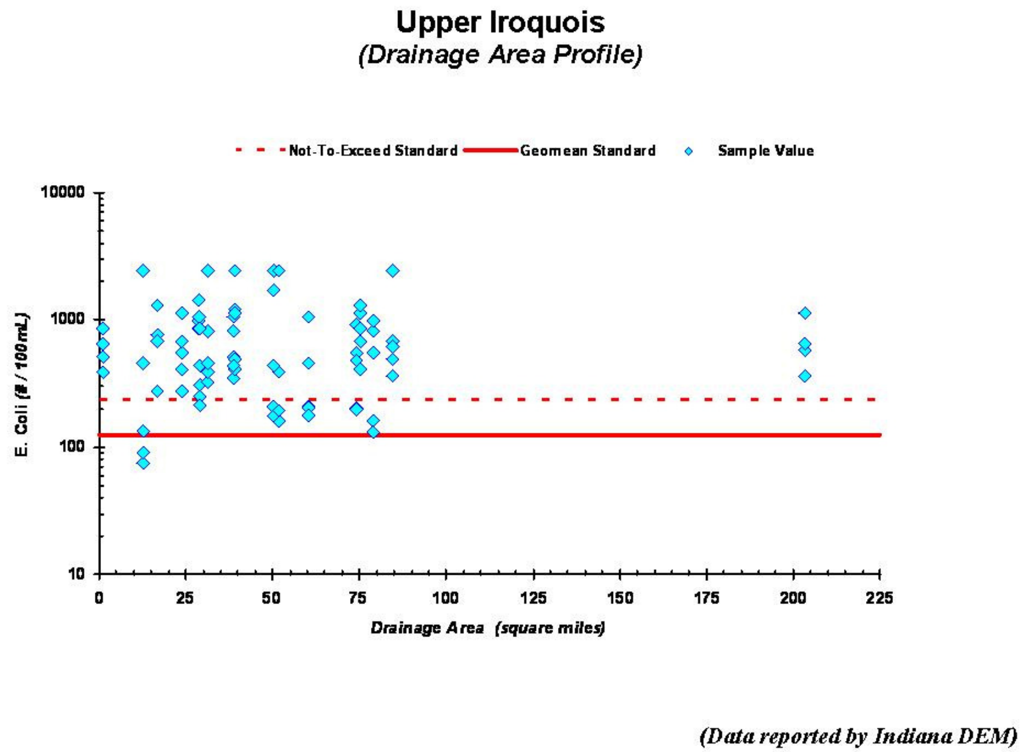


Figure 35. Upper Iroquois Small Watershed Drainage Area Profile

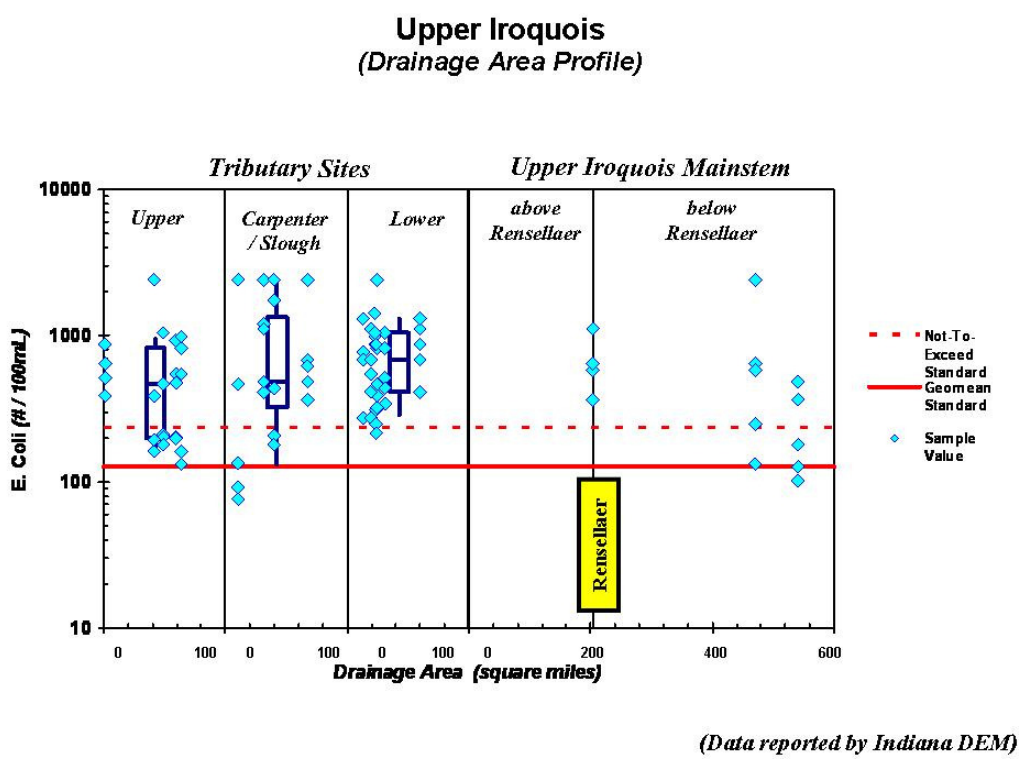


Figure 36. Upper Iroquois Tributary versus Mainstem Drainage Area Profile

6.5 Lower Iroquois-Indiana

Data compiled for the Lower Iroquois in the summer of 2008 indicate that there are *E. coli* exceedances throughout the Indiana portion of the subwatershed. Every site sampled in the subwatershed exceeded the geomean standard of 125 #/100 mL. The drainage area profile (Figure 37) does not show any definitive patterns within the subwatershed and there are limited data to compare the tributaries to the mainstem (Figure 36).

Water quality duration curves were not prepared for any sites in the Indiana portion of the Lower Iroquois subwatershed because of the lack of historical *E. coli* data.

It is difficult to assess whether facilities in this subwatershed are in compliance in with their bacteria limits due to a lack of data reported in PCS; many have violated their flow limits, however (Table 64).

Table 64. Summary of NPDES facility compliance with design flow and bacteria permit limits in the Lower Iroquois subwatershed (2004 to 2007).

NPDES ID	Facility Name	Exemption Status	Flow		Bacteria	
			Average Design Flow (MGD)	Number of Violations	Limit (#/100 mL)	Number of Violations
IL0022161	Watseka STP	None	1.6	34	200	39
IL0023272	Milford STP	Year Round	0.2	33	200	No Data
IL0025062	Gilman-North STP	Year Round	0.5	33	200	No Data
IL0042391	Cissna Park STP	Year Round	0.1	27	200	No Data
ILG551007	Merkle-Knipprath Nursing Home	Year Round	0.015	4	200	No Data
ILG551072	Il Dot-I-57 Iroquois County	Year Round	0.0162	13	200	No Data
ILG580122	Rankin STP	Year Round	0.08	41	200	No Data
IN0060798	Morocco WWTP	None	0.15	1	125	4
IL0022161	Watseka STP	None	1.6	34	200	No Data
IL0023272	Milford STP	Year Round	0.2	33	200	No Data

Notes: MGD = Million gallons per day.

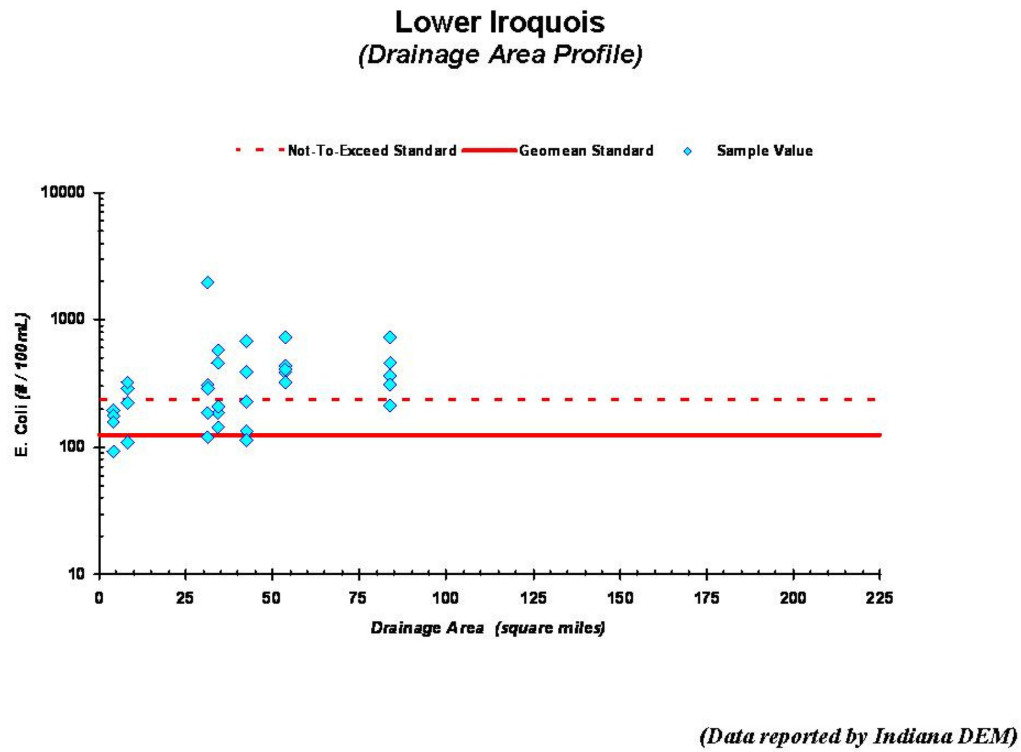


Figure 37. Lower Iroquois Small Watershed Drainage Area Profile

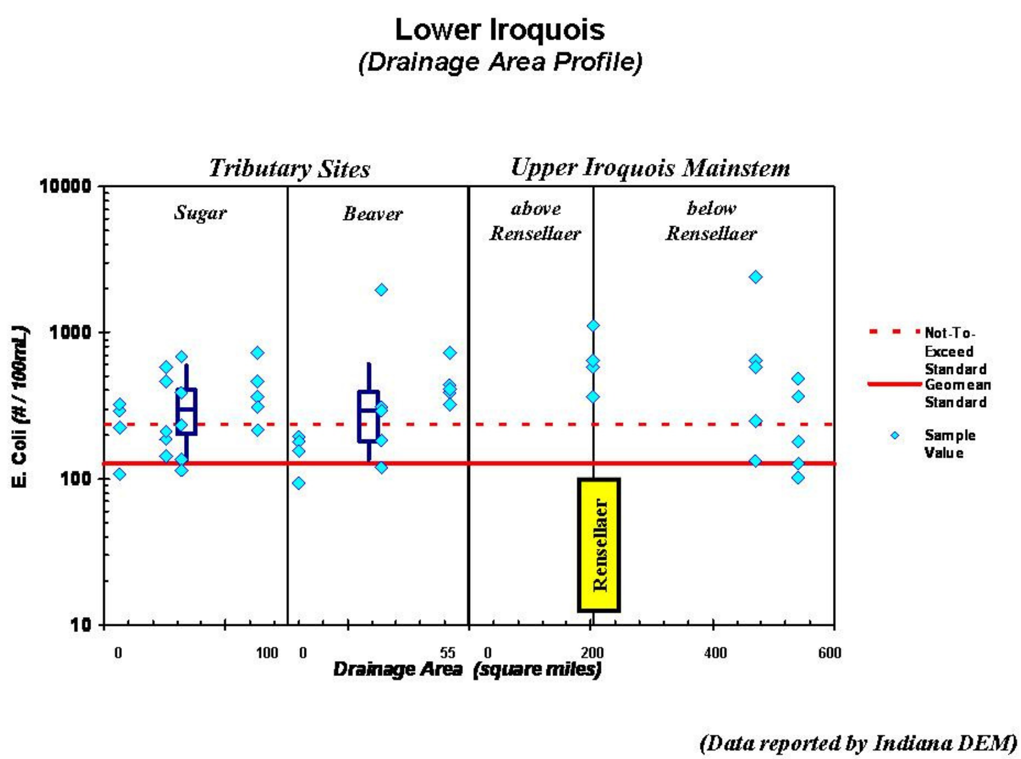
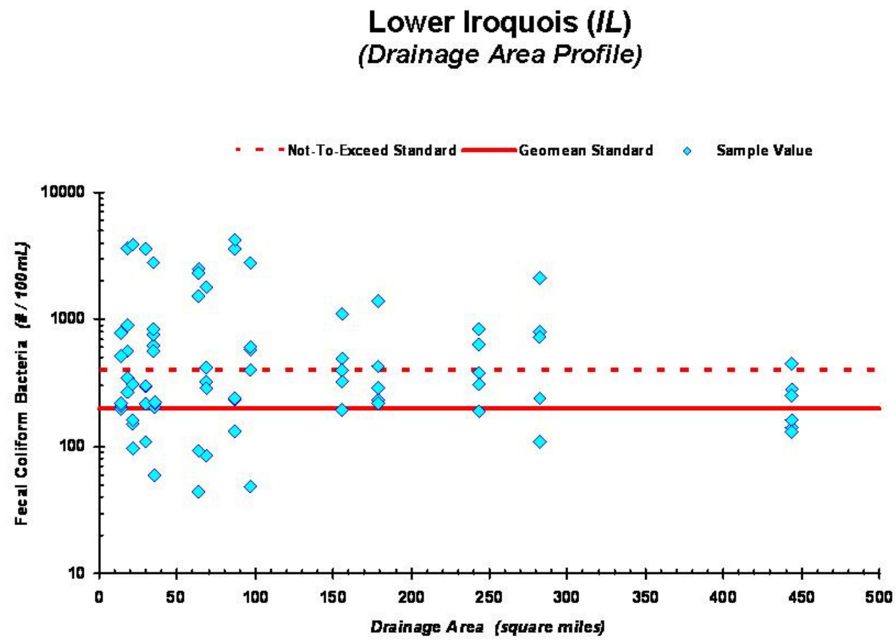


Figure 38. Lower Iroquois Tributary versus Upper Iroquois Mainstem Drainage Area Profile

6.6 Lower Iroquois-Illinois

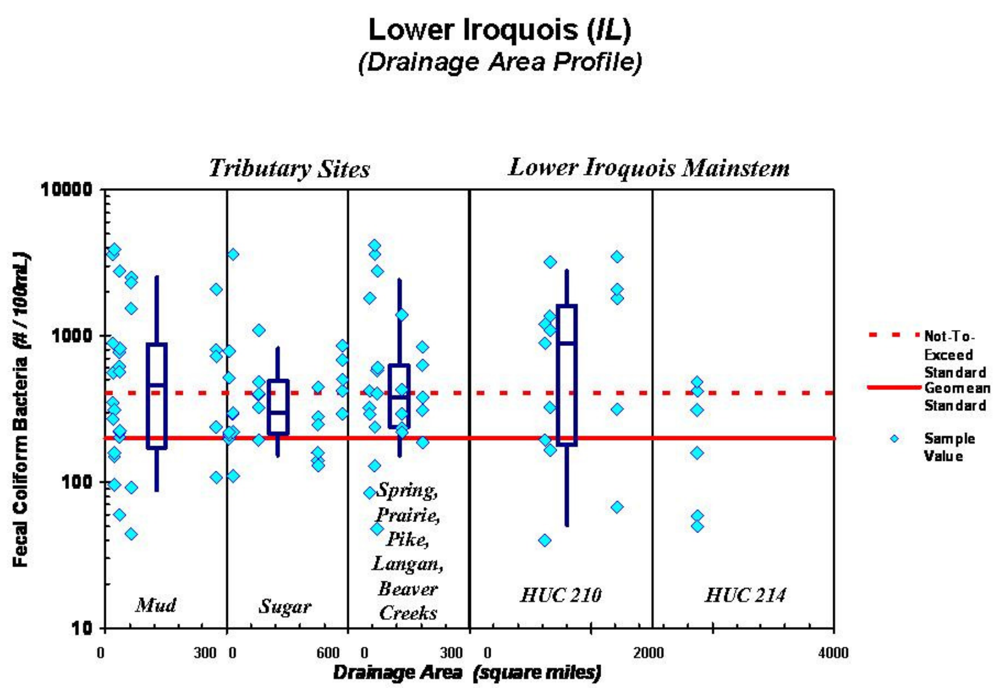
Data collected in the Lower Iroquois in the summer of 2008 indicate that there are fecal coliform bacteria exceedances throughout the Illinois portion of the subwatershed. Seventeen sites sampled in the subwatershed exceeded the geomean standard of 200 #/100 mL.

The drainage area profile (Figure 39) displays a slight decreasing trend in fecal coliform as drainage area increases. Fecal coliform counts collected from the Lower Iroquois itself are somewhat lower than those collected from tributaries to the Lower Iroquois (Figure 40).



(Data reported by Illinois EPA)

Figure 39. Lower Iroquois Small Watershed Drainage Area Profile (> 500 square miles)



(Data reported by Illinois EPA)

Figure 40. Lower Iroquois Tributary versus Lower Iroquois Mainstem Drainage Area Profile

A fecal coliform duration curve was prepared for sampling station FL-04 which is located on the Iroquois River at Iroquois. Data are available at this station from 1978 to 2006 and the duration curve is shown in Figure 41. The curve indicates that fecal coliform frequently exceeds 400 #/100 mL during high flows and moist conditions. Most samples from mid-range, dry, and low flow conditions meet water quality standards. Many storm event samples (indicated by the red diamonds) also exceed 400 #/100 mL, even during mid-range and dry conditions. Bacteria sources typically associated with high flow and storm events include urban stormwater/CSOs, runoff from agricultural areas, and bacterial re-suspension from the streambed.

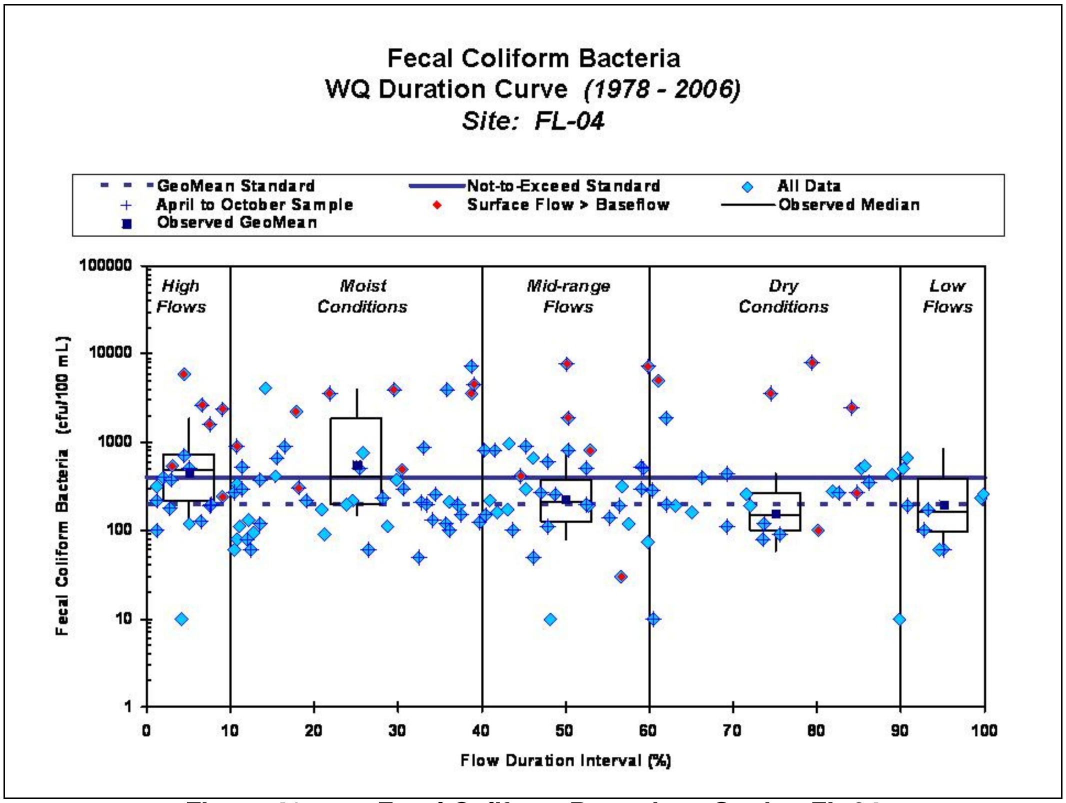


Figure 41. Fecal Coliform Bacteria at Station FL-04

A fecal coliform duration curve was also prepared for sampling station FLI-02 which is located on Sugar Creek at Milford in the Lower Iroquois subwatershed. Data are available at this station from 1978 to 2007 and the duration curve is shown in Figure 42. The curve indicates that fecal coliform frequently exceeds 400 #/100 mL during all flow conditions. The fact that fecal coliform is high during low flow conditions suggests that there is a constant source of bacteria to this segment, potentially from a large number of homes on failing or illicitly connected septic systems. Elevated bacteria levels at low flow could also result from inadequate disinfection at wastewater treatment plants

Sugar Creek in Watseka, Illinois

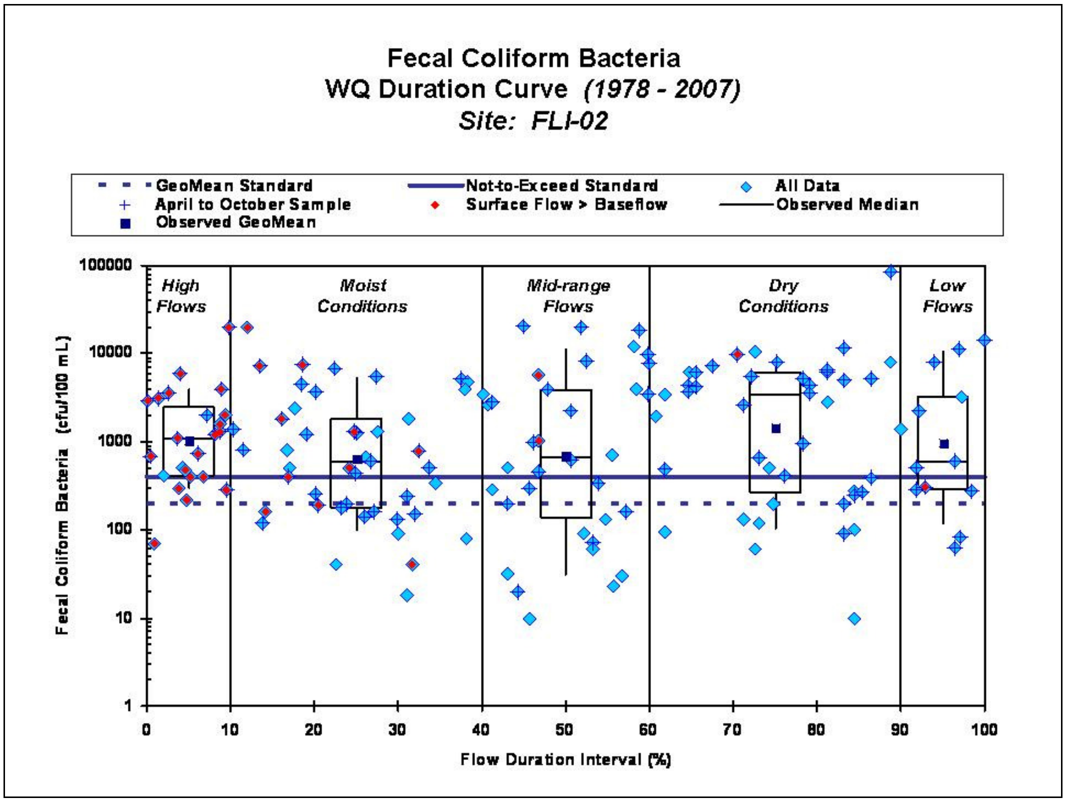


Figure 42. Fecal Coliform Bacteria at Station FLI-02

A fecal coliform duration curve was also prepared for sampling station FL-02 located on the Iroquois River near Chebanse. Data are available at this station from 1978 to 2006 and the duration curve is shown in Figure 49. The curve indicates that fecal coliform frequently exceeds 400 #/100 mL during high flows but is usually less than 400 #/100 mL during other flow conditions.

A potential explanation for the higher *E. coli* counts in FLI-02 compared to FL-02 is the difference in drainage area. FL-02 has a much larger drainage area and is located downstream of the Lower Sugar Creek watershed which receives flows from the Upper Iroquois River. *E. coli* counts might therefore be reduced due to the additional dilution afforded by higher flows.

Iroquois River near Chebanse, Illinois

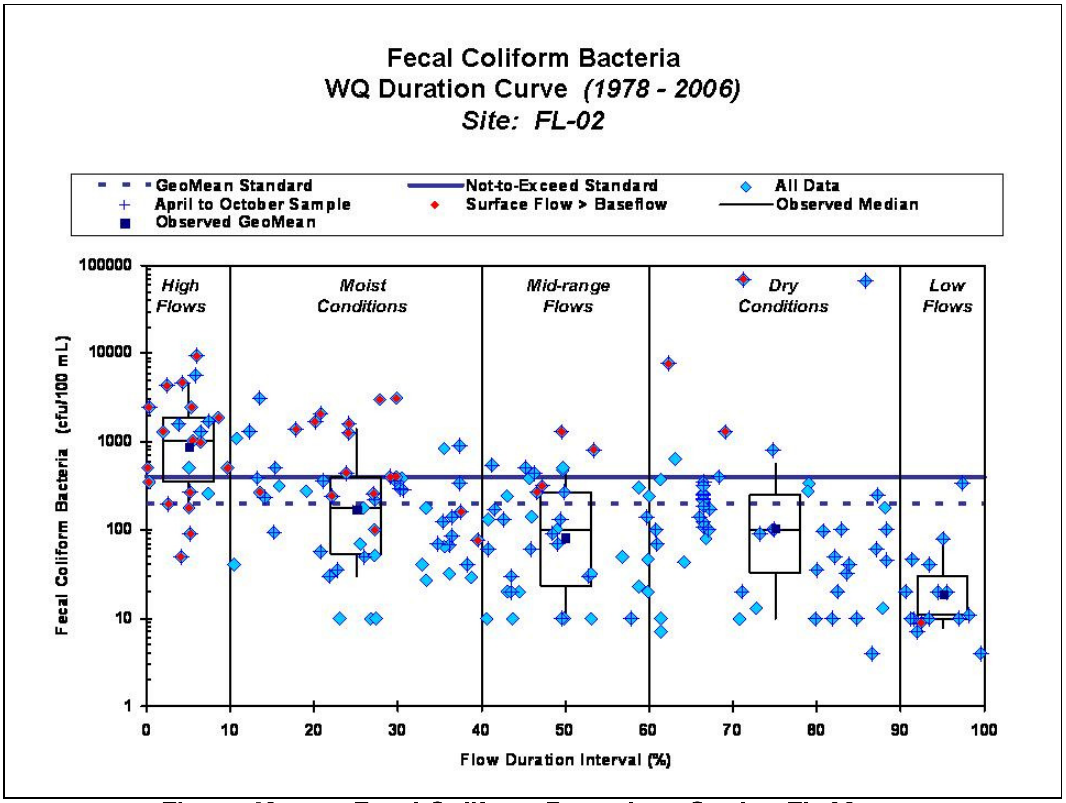


Figure 43. Fecal Coliform Bacteria at Station FL-02

6.7 Lower Kankakee

Only one station was sampled in the Lower Kankakee in 2008. This was site F-16 on the Kankakee River near Wilmington. The geomean of five fecal coliform samples from this site was only 84 #/100 mL, which is well below the standard. The drainage area at site F-16 is almost 5,000 miles which likely contributes to a great deal of dilution at this location.

Historical data from sites F-02 and F-01 in this subwatershed also suggest that water quality standards are usually met, most likely due to the large drainage area.

Kankakee River in Momence, Illinois

It is difficult to assess whether facilities in this subwatershed are in compliance in with their bacteria limits due to a lack of data; many have violated their flow limits, however (Table 65).

Table 65. Summary of NPDES facility compliance with design flow and bacteria permit limits in the Lower Kankakee subwatershed (2004 to 2007).

NPDES ID	Facility Name	Exemption Status	Flow		Bacteria	
			Average Design Flow (MGD)	Number of Violations	Limit (#/100 mL)	Number of Violations
IL0021784	Kankakee River Metro Agency	Seasonal	25	13	200*	17
IL0022179	Momence STP	Seasonal	1.6	36	200*	3
IL0025089	Manteno Wpcc	None	1.15	34	200	No Data
IL0026085	Wilmington STP	Seasonal	0.75	6	200*	3
IL0032832	Herscher STP	Year Round	0.25	23	200	No Data
IL0038199	Manteno Mobile Home Park	Year Round	0.021	28	200	No Data
IL0045501	Sun River Terrace STP	Year Round	0.075	3	200*	15
IL0048968	Il State Toll Hwy-Plaza 21 STP	None	0.0005	22	200	No Data
IL0049522	Beecher STP	Seasonal	0.6	56	200	No Data
IL0050717	Grant Park STP	Year Round	0.35	17	200	No Data
IL0076368	Essex STP	Year Round	0.176	1	200	No Data

Notes: MGD = Million gallons per day; *data at this facility also exceeded the maximum criteria of 400 #/100 mL

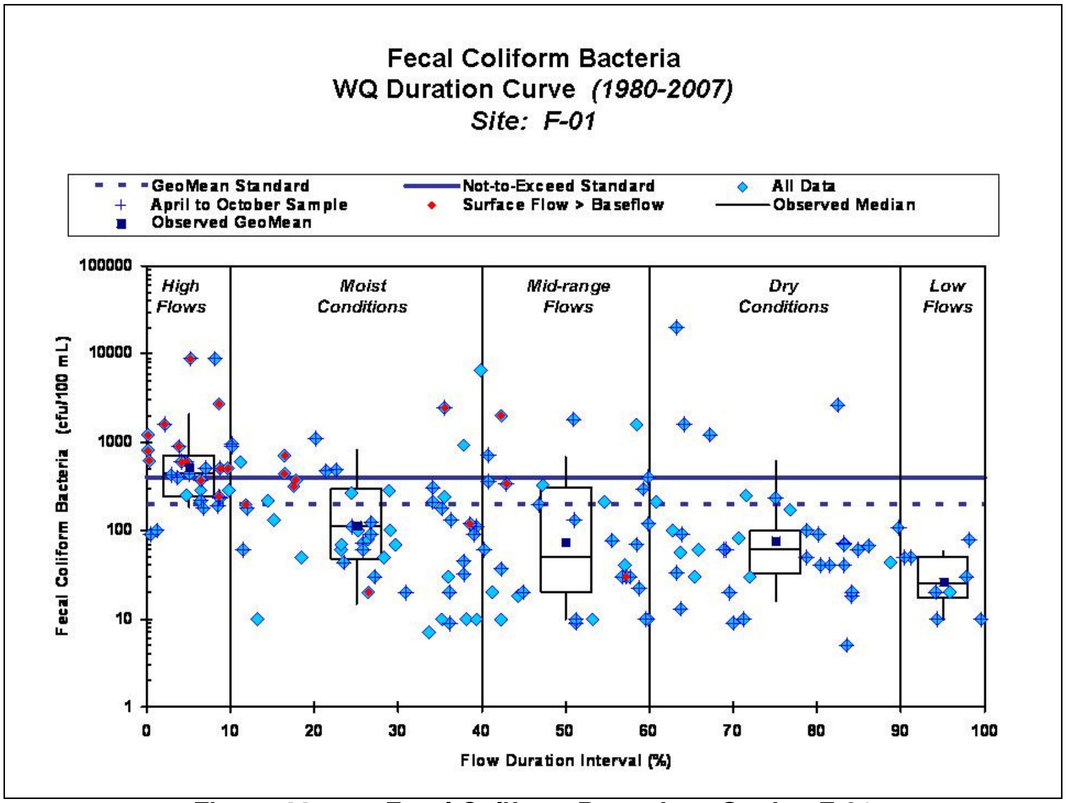


Figure 44. Fecal Coliform Bacteria at Station F-01

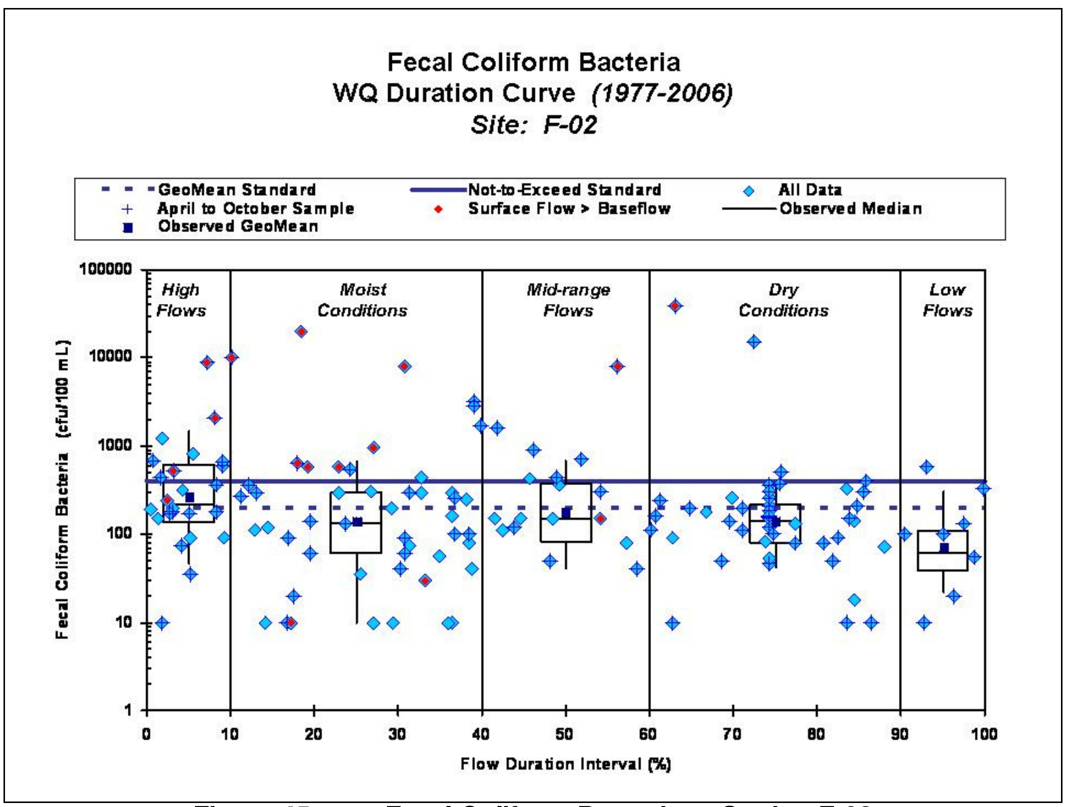


Figure 45. Fecal Coliform Bacteria at Station F-02

7.0 ALLOCATIONS

A TMDL is the total amount of a pollutant that can be assimilated by the receiving water while still achieving water quality standards. TMDLs are composed of the sum of individual wasteload allocations (WLAs) for regulated sources and load allocations (LAs) for unregulated sources and natural background levels. In addition, the TMDL must include a margin of safety (MOS), either implicitly or explicitly, that accounts for the uncertainty in the relationship between pollutant loads and the quality of the receiving waterbody. Conceptually, this is defined by the equation:

$$TMDL = \sum WLAs + \sum LAs + MOS$$

7.1 Results by Assessment Location

The following sections present the allowable *E. coli* loads and associated allocations for each of the impaired waterbodies in the Kankakee/Iroquois watershed. The results are arranged for each of the HUC 10 watersheds in each of the six main subwatersheds.

7.1.1 Upper Kankakee Subwatershed

The Upper Kankakee subwatershed has an area of nearly 670 square miles and is comprised of four HUC 10 subwatersheds and 28 HUC 12 subwatersheds as listed in Table 66. The following sections provide a brief description of each HUC 10 subwatershed and the TMDL allocations.

Table 66. Hydrologic Unit Codes (HUC 10 and 12) in the Upper Kankakee Subwatershed

HUC 10	HUC 10 Name	HUC 12	HUC 12 Name	Area (sq. miles)
101	Pine Creek	101	Peter Sarber Ditch-Pine Creek	20.2
		102	Yellow Bank Creek	22.5
		103	Peter Sarber Ditch-Pine Creek	21.8
		104	Headwaters Potato Creek	17.2
		105	Kartoffel Creek-Potato Creek	17.5
		106	Horace Miller Ditch-Pine Creek	15.7
102	Little Kankakee River-Kankakee River	201	Hudson Lake-Geyer Ditch	29.8
		202	Chain-Lakes Ditch-Geyer Ditch	25.4
		203	Geyer Ditch	16.4
		204	Laskowski Ditch-Kankakee River	19.0
		205	Dixon West Place Ditch	20.7
		206	Aldrich Ditch	17.1
		207	Clear Lake Basin	22.8
		208	Lower Fish Lake-Little Kankakee River	50.8
		209	County Line Ditch-Kankakee River	31.4
104	Mill Creek-Kankakee River	401	Breckenridge Ditch	22.0
		402	Kingsberry Creek	15.3
		403	Travis Ditch	38.7
		404	Salisbury Ditch	19.8
		405	Johnani Ditch-Kankakee River	48.0
		406	Headwaters Mill Creek	23.9
		407	Hickleson Ditch-Mill Creek	19.9
		408	Marquardt Ditch-Kankakee River	15.6
107	Robbins Ditch-Kankakee River	701	Jain Ditch	28.9
		702	Amy Kelly Ditch-Robbins Ditch	30.5
		703	Shearin Ditch-Robbins Ditch	25.9
		704	Bailey Ditch-Kankakee River	19.6
		705	Laramore Ditch-Kankakee River	13.4

7.1.1.1 Pine Creek Subwatershed (10-Digit HUC 101)

The Pine Creek subwatershed has an area of nearly 115 square miles and covers portions of La Porte, Marshall, and St. Joseph counties as shown in Figure 46. Cities within this subwatershed include Koontz Lake, Walkerton, and North Liberty. Figure 47 and Figure 48 display NPDES facilities and CAFOs and CFOs within the subwatershed, respectively. Agriculture (66%) is the dominant land use followed by forest (16%) and developed land (7%) (Table 70).

Two stream segments are impaired for *E. coli* in this subwatershed (Table 67) and the 2008 pathogen monitoring locations are listed in Table 68. The summary of 2008 pathogen data in this subwatershed is shown in Table 69. All four sites exceeded the geomean standard and three of the four sites exceeded the maximum 235 #/100 mL standard 100 percent of the time. Reductions to meet the geomean criteria of 125 #/100 mL range from 64 to 85 percent.

Table 67. 303 (d) Listed Streams in the Pine Creek Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
106	Horace Miller Ditch-Pine Creek	INK0126_00	Pine Creek-Horace Miller Ditch	13.88	*E. coli*
105	Kartoffel Creek-Potato Creek	INK0125_00	Potato Creek-Kartoffel Creek	15.17	*E. coli*

Table 68. Station Locations in the Pine Creek Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
102	Yellow Bank Creek	ID# 55	Yellow Bank
103	Peter Sarber Ditch-Pine Creek	ID# 57	Pine Cr
105	Kartoffel Creek-Potato Creek	ID# 51	Potato Cr
106	Horace Miller Ditch-Pine Creek	ID# 53	Pine Cr

Table 69. Summary of Pathogen Data in the Upper Kankakee Subwatershed (HUC10-101)

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
55	6/3/2008 - 7/1/2008	5	100	100	416	732	948	2,419	83%
57	6/3/2008 - 7/1/2008	5	100	100	687	828	832	921	85%
51	6/3/2008 - 7/1/2008	5	100	80	225	348	365	548	64%
53	6/3/2008 - 7/1/2008	5	100	100	613	838	870	1,300	85%

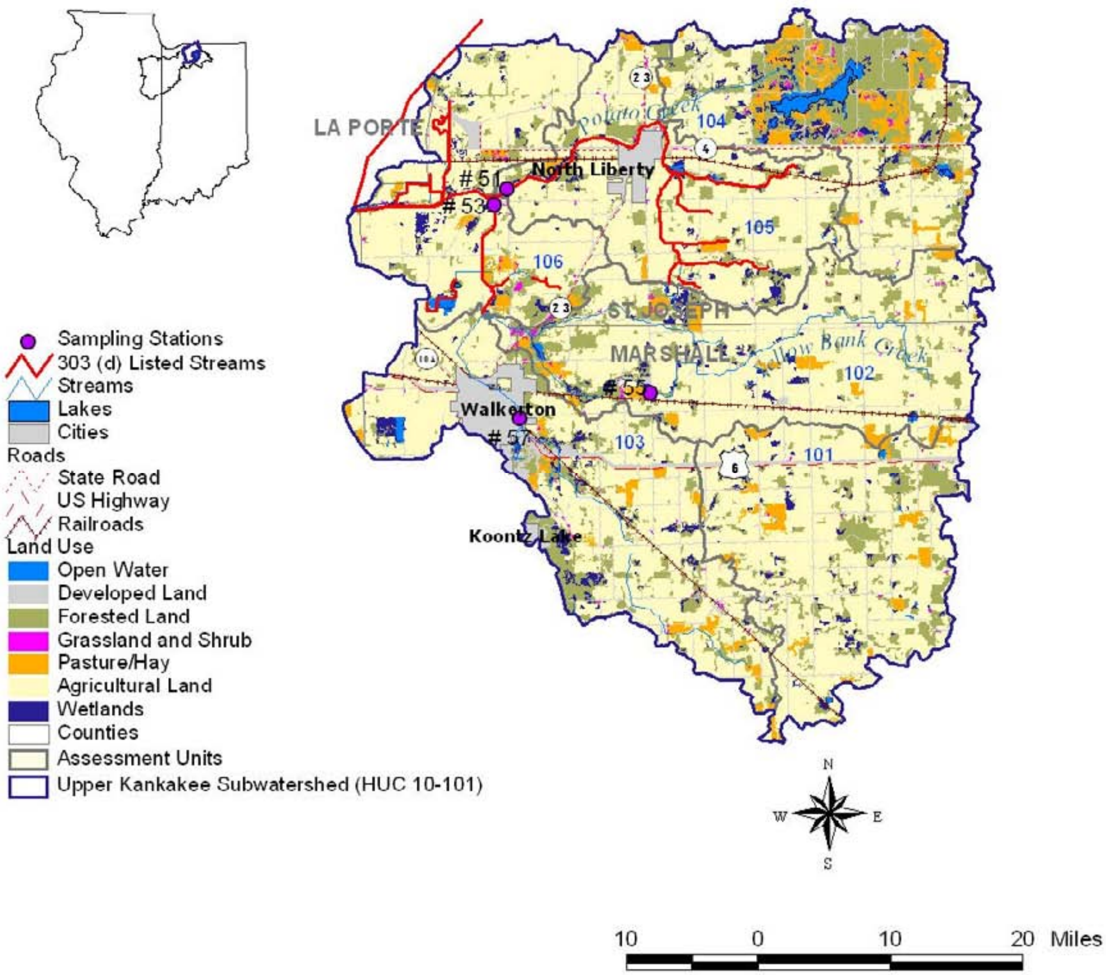


Figure 46. Location of Pine Creek Subwatershed (HUC10-101)

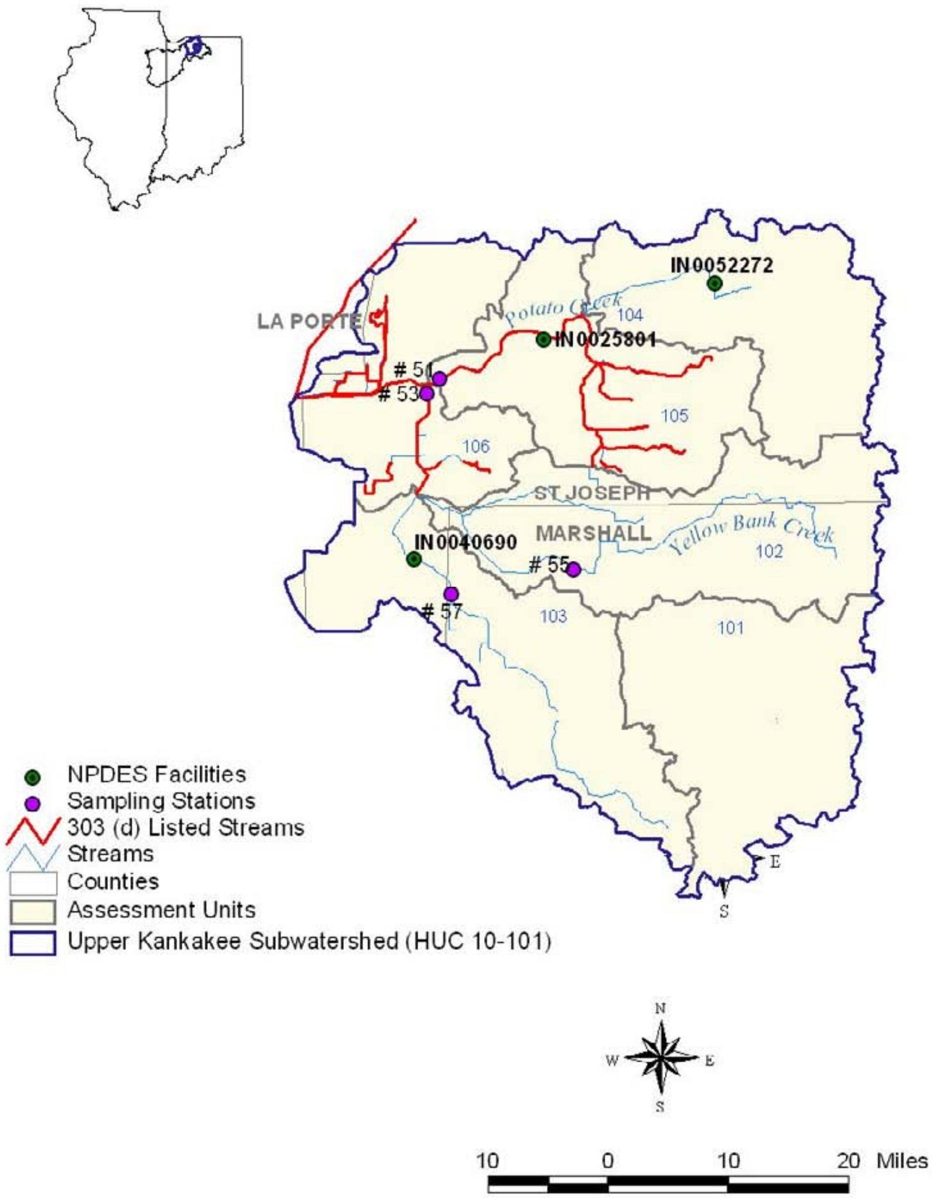


Figure 47. NPDES Facilities in the Pine Creek Subwatershed (HUC10-101)

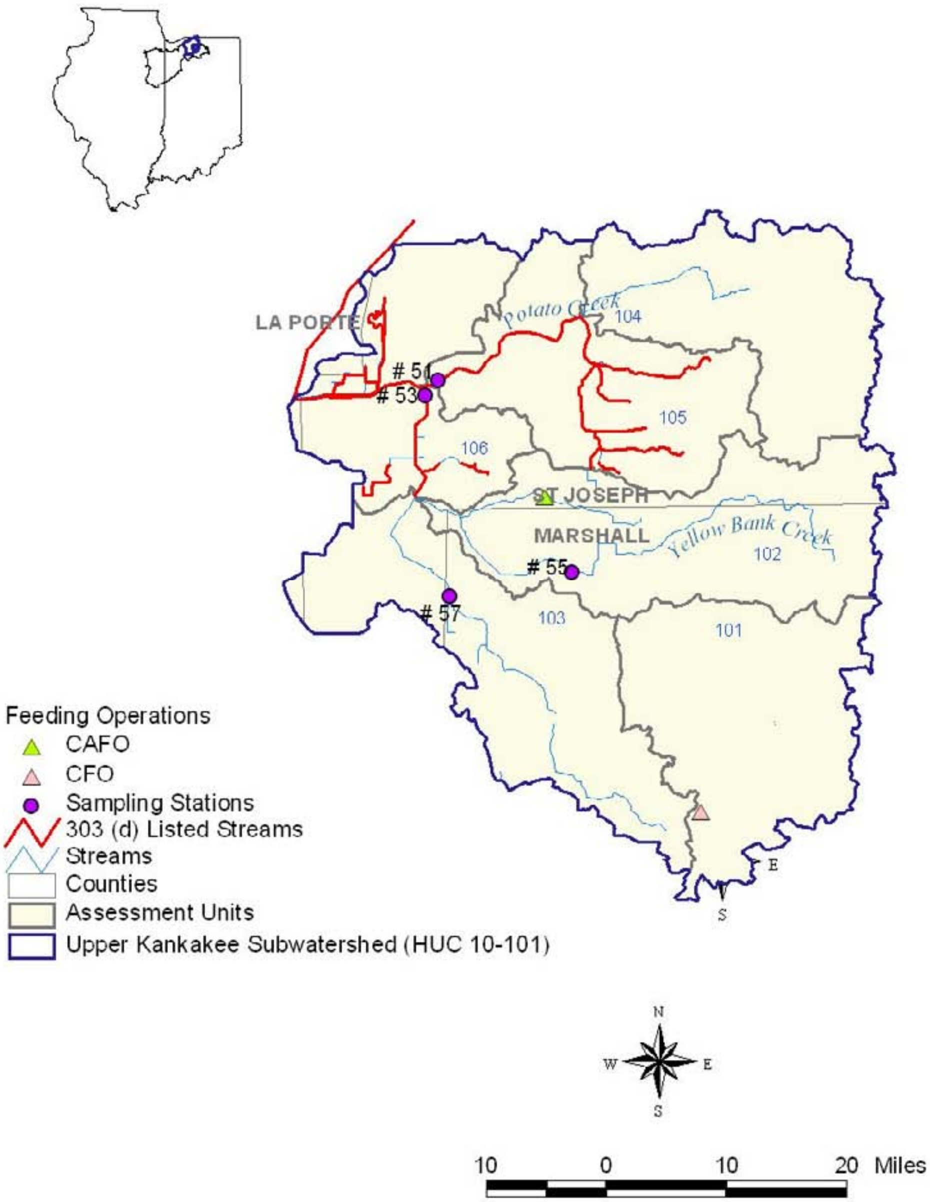


Figure 48. Feeding Operations in the Pine Creek Subwatershed (HUC10-101)

Table 70. Land Use/Land Cover in the Pine Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	48,888.86	76.39	66.43
Forested Land	12,208.32	19.08	16.59
Developed Land	5,351.24	8.36	7.27
Pasture/Hay	3,583.66	5.60	4.87
Wetland	2,436.55	3.81	3.31
Open Water	601.80	0.94	0.82
Grassland and Shrubs	350.27	0.55	0.48
Total	**73,420.70**	**114.72**	**100.00**

Table 71 through Table 74 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. The TMDL results correspond to the outlet of each HUC 12 subwatershed (i.e., they are based on the flows and loads estimated for the outlet of the subwatershed).

It should be noted that there are no current 303(d) listings in HUC 102 and HUC 103; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the 2010 303(d) list in category 4A and TMDLs for those streams are presented here.

There are three NPDES facilities within the Pine Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. The individual WLAs are presented in Table 276. There is only one CAFO within this subwatershed and it receives a WLA of zero as described further in Section 7.3.

Table 71. Yellow Bank Creek Characteristics and TMDL Summary (HUC12-102)

Upstream Characteristics					
Drainage Area	20.46 square miles				
Sampling Station	55				
Listed Segments	None				
Land Use	Agriculture: 74.04%; Developed Land:4.61%; Forest:12.85%; Other: 8.5%				
Soils	A: 23.40%; B: 39.01%; C: 36.17%; D: 0.71%; Unknown:0.71%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Walkerton Farm (ING802239)				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	106.96	60.71	43.83	33.35	24.64
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	11.88	6.75	4.87	3.70	2.74
TMDL = LA+WLA+MOS	118.84	67.46	48.70	37.05	27.38

Table 72. Peter Sarber Ditch-Pine Creek Characteristics and TMDL Summary (HUC12-103)

Upstream Characteristics					
Drainage Area	34.63 square miles				
Sampling Station	57				
Listed Segments	None				
Land Use	Agriculture: 66.96%; Developed Land:9.72%; Forest:15.51%; Other: 7.81%				
Soils	A: 48.93%; B: 41.07%; C: 8.21%; D: 1.79%; Unknown: 0%				
NPDES Facilities	Walkerton Municipal WWTP (IN0040690)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Leffert Dairy, LLC (6203)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	179.31	101.04	72.47	54.72	39.99
WLA	1.72	1.72	1.72	1.72	1.72
MOS (10%)	20.11	11.41	8.24	6.27	4.63
TMDL = LA+WLA+MOS	201.14	114.17	82.43	62.71	46.34

Table 73. Kartoffel Creek-Potato Creek Characteristics and TMDL Summary (HUC12-105)

Upstream Characteristics					
Drainage Area	32.90 square miles				
Sampling Station	51				
Listed Segments	INK0125_00				
Land Use	Agriculture: 56.78%; Developed Land:7.03%; Forest:23.12%; Other: 13.07%				
Soils	A: 31.58%; B: 42.11%; C: 21.93%; D: 21.9%; Unknown:2.19%				
NPDES Facilities	North Liberty WWTP (IN0025801)				
	Potato Creek State Park (IN0052272)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	170.69	96.33	69.19	52.33	38.34
WLA	1.29	1.29	1.29	1.29	1.29
MOS (10%)	19.11	10.85	7.83	5.95	4.40
TMDL = LA+WLA+MOS	191.09	108.47	78.31	59.57	44.03

Table 74. Horace Miller Ditch-Pine Creek Characteristics and TMDL Summary (HUC12-106)

Upstream Characteristics					
Drainage Area	103.66 square miles				
Sampling Station	53				
Listed Segments	INK0126_00				
Land Use	Agriculture: 66.59%; Developed Land:7.29%; Forest:16.63.12%; Other: 9.50%				
Soils	A: 42.74%; B: 38.26%; C: 16.62%; D: 1.45%; Unknown:0.92%				
NPDES Facilities	North Liberty WWTP (IN0025801)				
	Walkerton Municipal WWTP (IN00406990)				
	Potato Creek State Park (IN0052272)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Walkerton Farm (2239)				
CFOs	Leffert Dairy, LLC (6203)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	538.86	304.58	219.05	165.93	121.83
WLA	3.01	3.01	3.01	3.01	3.01
MOS (10%)	60.21	34.18	24.67	18.77	13.87
TMDL = LA+WLA+MOS	602.08	341.77	246.73	187.71	138.71

7.1.1.2 Little Kankakee River-Kankakee River Subwatershed (10-Digit HUC 102)

The Little Kankakee River subwatershed has an area of nearly 233 square miles. Cities within this subwatershed include New Carlisle and South Bend as shown in Figure 49. The subwatershed is predominantly used for agricultural purposes (58%) followed by forest (19%) and developed land (10%) as shown in Table 78. The remaining land categories constitute 13 percent of the subwatershed area. There is only one NPDES facility and one CAFO in this subwatershed as shown in Figure 50 and Figure 51, respectively.

There are four 303 (d) listed segments (Table 75) and six monitoring locations (Table 76) in this subwatershed. The summary of 2008 *E. coli* data in this subwatershed is shown in Table 77. All five sites exceeded the geomean standard. Two of the five sites exceeded the maximum 235 #/100 mL standard 100 percent of the time. Reductions to meet the geomean criteria of 125 #/100 mL range from 29 to 74 percent.

Table 75. 303 (d) Listed Streams in the Little Kankakee River-Kankakee River Subwatershed

HUC 12	Subwatershed Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
206	Aldrich Ditch	INK0112_00	Aldrich Ditch - Schang Ditch	12.31	*E. coli*
208	Lower Fish Lake-Little Kankakee River	INK011C_00	Little Kankakee River-Byron	17.51	*E. coli*
209	County Line Ditch-Kankakee River	INK011A_T1001	Kankakee River-Mainstem	2.12	*E. coli*
		INK011D_T1002	Kankakee River	3.77	*E. coli*

Table 76. Station Locations in the Little Kankakee River-Kankakee River Subwatershed

HUC 12	Subwatershed Name	Station #	Stream Name
203	Geyer Ditch	ID# 43	Geyer D
204	Laskowski Ditch-Kankakee River	ID# 41	Niespodziany
206	Aldrich Ditch	ID# 45	Aldrich D
208	Lower Fish Lake-Little Kankakee River	ID# 39	L Kankakee
		ID# 49	L Kankakee
209	County Line Ditch-Kankakee River	ID# 47	Kankakee R

Table 77. Summary of Pathogen Data in the Little Kankakee River-Kankakee River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
43	6/3/2008 - 7/1/2008	5	80	20	102	174	203	461	28%
41	6/3/2008 - 7/1/2008	5	100	100	260	354	372	517	65%
45	6/3/2008 - 7/1/2008	5	80	20	105	175	182	238	29%
39	6/3/2008 - 7/1/2008	5	100	80	214	478	752	2,420	74%
49	6/3/2008 - 7/1/2008	5	100	100	291	354	359	461	65%
47	6/3/2008 - 7/1/2008	5	100	20	172	215	223	345	42%

Table 78. Land Use/Land Cover in the Little Kankakee River-Kankakee River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	87,398.82	136.56	58.54
Forested Land	28,090.58	43.89	18.81
Developed Land	14,744.72	23.04	9.88
Pasture/Hay	7,976.83	12.46	5.34
Grassland and Shrubs	6,263.73	9.79	4.20
Wetland	2,991.87	4.67	2.00
Open Water	1,835.42	2.87	1.23
Total	**149,301.96**	**233.28**	**100.00**

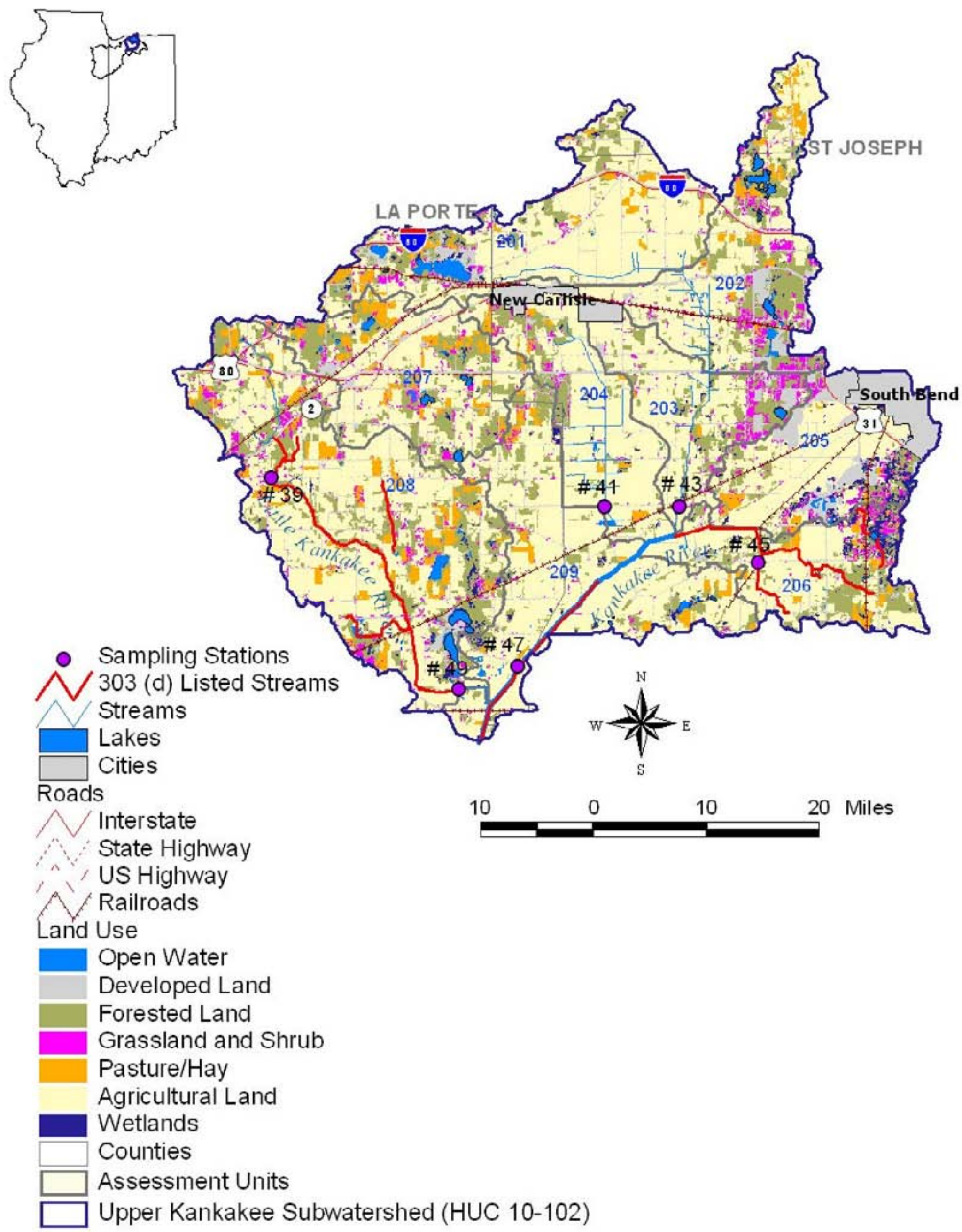


Figure 49. Location of the Little Kankakee River-Kankakee River Subwatershed

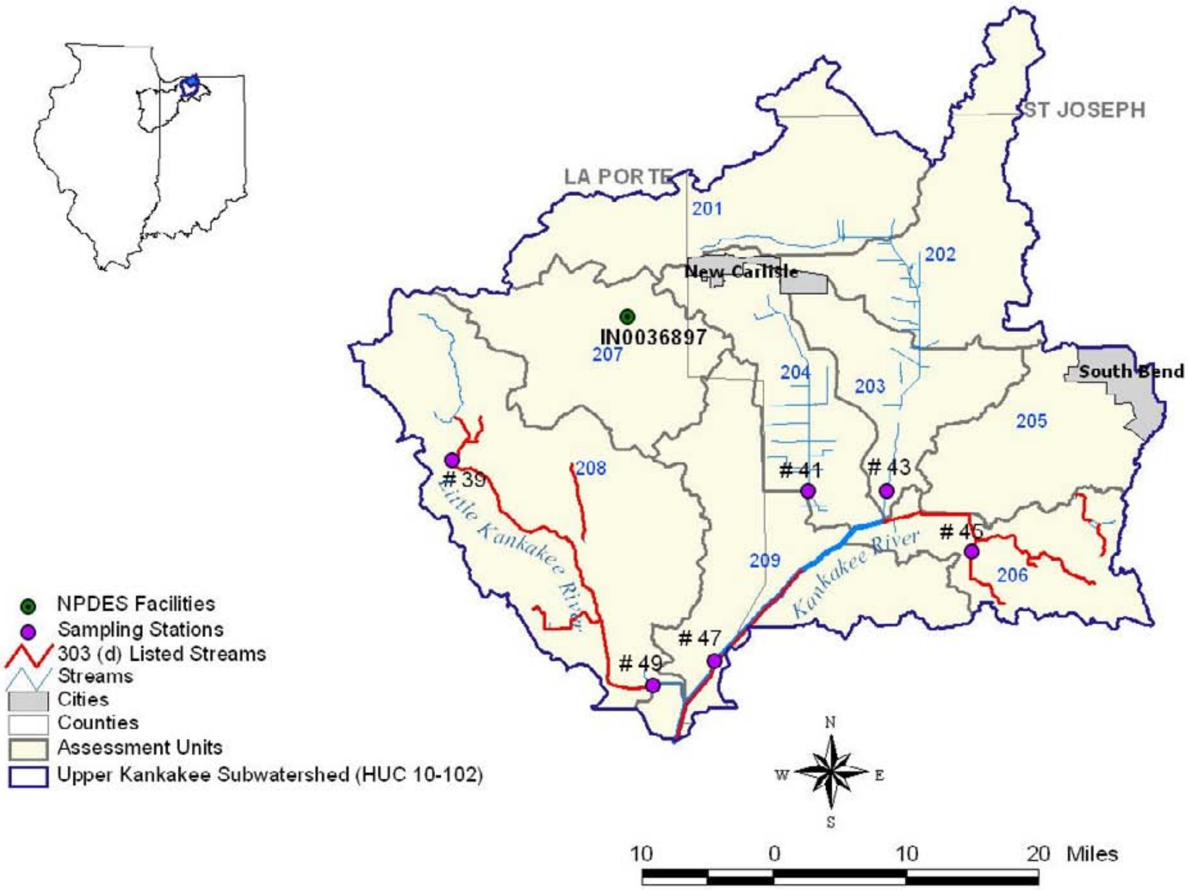


Figure 50. NPDES Facilities in the Little Kankakee River-Kankakee River Subwatershed

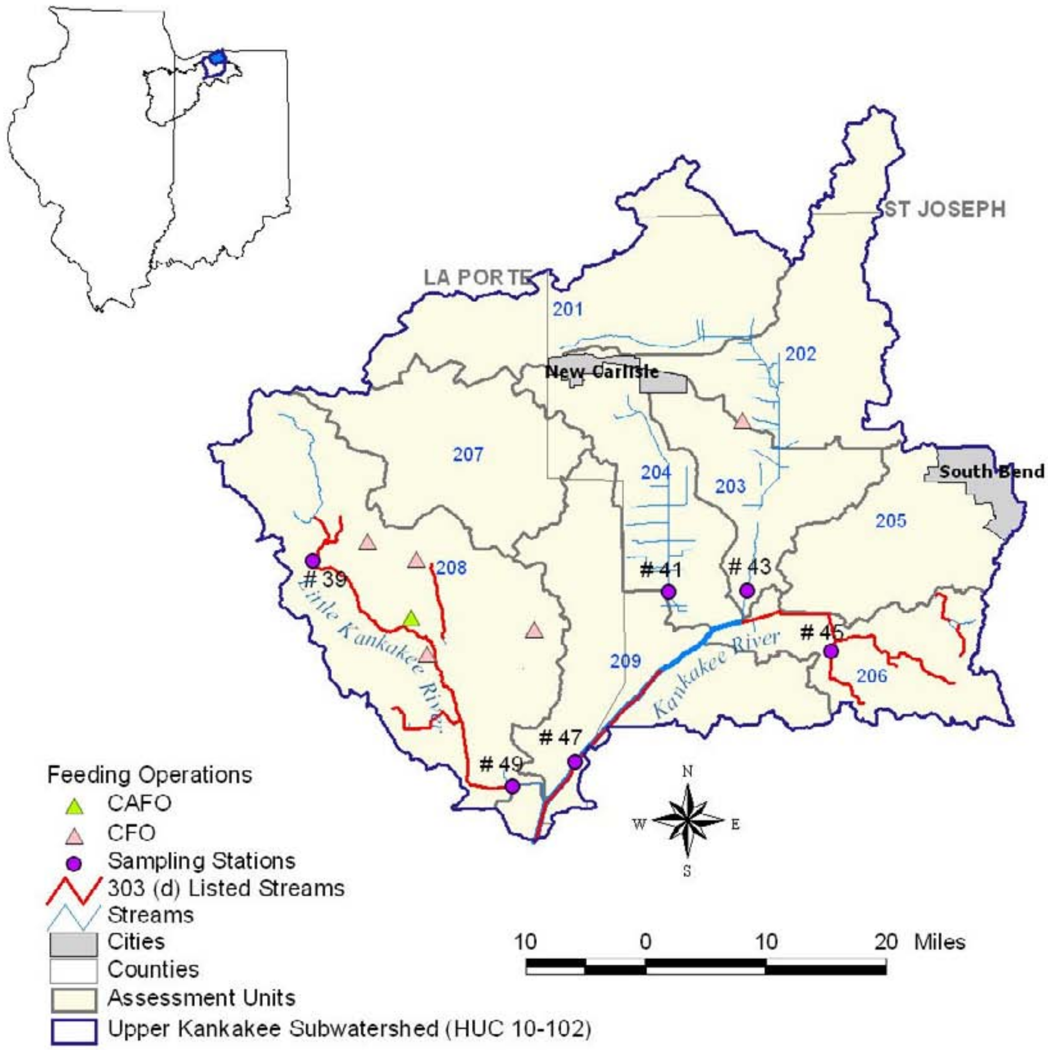


Figure 51. Feeding Operations in the Little Kankakee River-Kankakee River Subwatershed

Table 79 through Table 83 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. Although there are no current 303(d) listings in HUC 204; the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There is one NPDES facility within the Little Kankakee River subwatershed; however it is not upstream of any listed segments. There are two MS4 communities within the Little Kankakee River subwatershed and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. The individual WLAs are presented in Table 276. There is only one CAFO within this subwatershed and it receives a WLA of zero as described further in Section 7.3.

Table 79. Geyer Ditch Characteristics and TMDL Summary (HUC12-203)

Upstream Characteristics					
Drainage Area	69.88 square miles				
Sampling Station	43				
Listed Segments	None				
Land Use	Agriculture: 57.44%; Developed Land:10.80%; Forest:19.34%; Other: 12.41%				
Soils	A: 18.26%; B: 68.68%; C: 4.25%; D: 4.56%; Unknown:4.25%				
NPDES Facilities	None				
MS4 Communities	South Bend (INR040114): 0.22 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	Ginter (6135)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	364.14	207.35	149.7	113.89	84.16
WLA	1.15	0	0	0	0
MOS (10%)	40.59	23.04	16.63	12.65	9.35
TMDL = LA+WLA+MOS	405.88	230.39	166.33	126.54	93.51

Table 80. Laskowski Ditch-Kankakee River and TMDL Summary (HUC12-204)

Upstream Characteristics					
Drainage Area	18.96 square miles				
Sampling Station	41				
Listed Segments	None				
Land Use	Agriculture: 70.40%; Developed Land:8.14%; Forest:13.89%; Other: 7.56%				
Soils	A: 24.81%; B: 75.19%; C: 0%; D: 0%; Unknown: 0%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	99.11	56.26	40.62	30.90	22.83
WLA	0	0	0	0	0
MOS (10%)	11.01	6.25	4.51	3.43	2.54
TMDL = LA+WLA+MOS	110.12	62.51	45.13	34.33	25.37

Table 81. Aldrich Ditch Characteristics and TMDL Summary (HUC12-206)

Upstream Characteristics					
Drainage Area	100.58 square miles				
Sampling Station	45				
Listed Segments	INK0112_00				
Land Use	Agriculture: 55.27%; Developed Land:13.34%; Forest:18.23%; Other: 13.16%				
Soils	A: 28.85%; B: 58.49%; C: 5.80%; D: 3.75%; Unknown:3.11%				
NPDES Facilities	None				
MS4 Communities	South Bend (INR040114): 3.42 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	Ginter (6135)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	507.89	298.45	215.46	163.92	121.13
WLA	17.88	0	0	0	0
MOS (10%)	58.42	33.16	23.94	18.21	13.46
TMDL = LA+WLA+MOS	584.19	331.61	239.40	182.13	134.59

Table 82. Lower Fish Lake-Little Kankakee River Characteristics and TMDL Summary (HUC12-208)

Upstream Characteristics					
Drainage Area	50.34 square miles				
Sampling Station	39,49				
Listed Segments	INK011C_00				
Land Use	Agriculture: 55.68%; Developed Land:6.80%; Forest:22.14%; Other: 15.37%				
Soils	A: 38.05%; B: 54.28%; C: 3.24%; D: 3.54%; Unknown:0.88%				
NPDES Facilities	None				
MS4 Communities	La Porte County (INR040107): 0.01 square miles				
CSO Communities	None				
CAFOs	Scher-Way Dairy Farm (6085)				
CFOs	Tuholski Farms, Inc.(280)				
	Farm No 2 (3600)				
	Farm #1 (4208)				
	Farm #2 (4209)				
	Sunset Dairy (6072)				
TMDL Allocations (billion/day)					
Allocation Category	High Flows	Moist Conditions	Mid-Range Flows	Dry Conditions	Low Flows
LA	263.1	149.37	107.84	82.04	60.63
WLA	0.05	0	0	0	0
MOS (10%)	29.23	16.6	11.98	9.11	6.73
TMDL = LA+WLA+MOS	292.38	165.97	119.82	91.15	67.36

Table 83. County Line Ditch- Kankakee River Characteristics and TMDL Summary (HUC12-209)

Upstream Characteristics					
Drainage Area	201.24 square miles				
Sampling Station	47				
Listed Segments	INK011A_T1001, INK011D_T1002				
Land Use	Agriculture: 59.54%; Developed Land:9.90%; Forest:18.07%; Other: 12.49%				
Soils	A: 34.88%; B: 56.04%; C: 4.12%; D: 3.08%; Unknown:1.88%				
NPDES Facilities	None				
MS4 Communities	La Porte County (INR040107): 0.01 square miles				
	South Bend (INR040114): 3.42 square miles				
CSO Communities	None				
CAFOs	Scher-Way Dairy Farm (ING806085)				
CFOs	Tuholski Farms, Inc.(280)				
	Farm No 2 (3600)				
	Farm #1 (4208)				
	Farm #2 (4209)				
	Ginter (6135)				
	Sunset Dairy (6072)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1034.03	597.14	431.1	327.96	242.36
WLA	17.93	0	0	0	0
MOS (10%)	116.88	66.35	47.89	36.44	26.93
TMDL = LA+WLA+MOS	1168.84	663.49	478.99	364.4	269.29

7.1.1.3 Mil Creek-Kankakee River Subwatershed (10-Digit HUC104)

The Mill Creek-Kankakee River subwatershed has an area of nearly 202 square miles. Counties within this subwatershed include St. Joseph, Laporte and Stark and the urban areas listed are Kingsford Heights and LaPorte both of which lie completely within this subwatershed (Figure 52). Figure 52 and Figure 53 show the NPDES facilities and feeding operations, respectively. Similar to other HUC 10-subwatersheds in the Upper Kankakee, agriculture is the dominant land use (Table 87).

E. coli impairments are found throughout this subwatershed (Table 84). Recent IDEM *E. coli* sampling data was collected at three locations (Table 85). A summary of the 2008 data in this subwatershed is shown in Table 86. Sampling at station 35 on Hickleson Ditch indicates that there is no exceedance of the geomean standard, however twenty percent of the samples exceeded the maximum 235 #/100 mL standard at this site. Reductions to meet the geomean criteria of 125 #/100 mL range from zero to 64 percent.

Table 84. 303 (d) Listed Streams in the Mill Creek-Kankakee River Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
408	Marquardt Ditch-Kankakee River	INK013C_T1007	Kankakee River -Mainstem	4.03	*E. coli*
405	Johnani Ditch-Kankakee River	INK0138_T1006	Kankakee River -Mainstem	1.64	*E. coli*
		INK0131_T1003	Kankakee River -Mainstem	3.33	*E. coli*
		INK0134_T1005	Kankakee River -Mainstem	2.8	*E. coli*
		INK0138_00	Kankakee River -Long Ditch	15.82	*E. coli*
		INK0133_T1004	Kankakee River -Mainstem	3.7	*E. coli*

Table 85. Station Locations in the Mill Creek-Kankakee River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
405	Johnani Ditch-Kankakee River	ID# 37	Kingsbury Cr
407	Hickleson Ditch-Mill Creek	ID# 35	Whitham D
408	Marquardt Ditch-Kankakee River	ID# 33	Kankakee R

Table 86. Summary of Pathogen Data in the Mill Creek-Kankakee River

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
37	6/3/2008 - 7/1/2008	5	100	80	219	331	346	488	62%
35	6/2/2008 - 6/30/2008	5	40	20	66	125	137	236	0%
33	6/2/2008 - 6/30/2008	5	100	80	141	347	409	866	64%

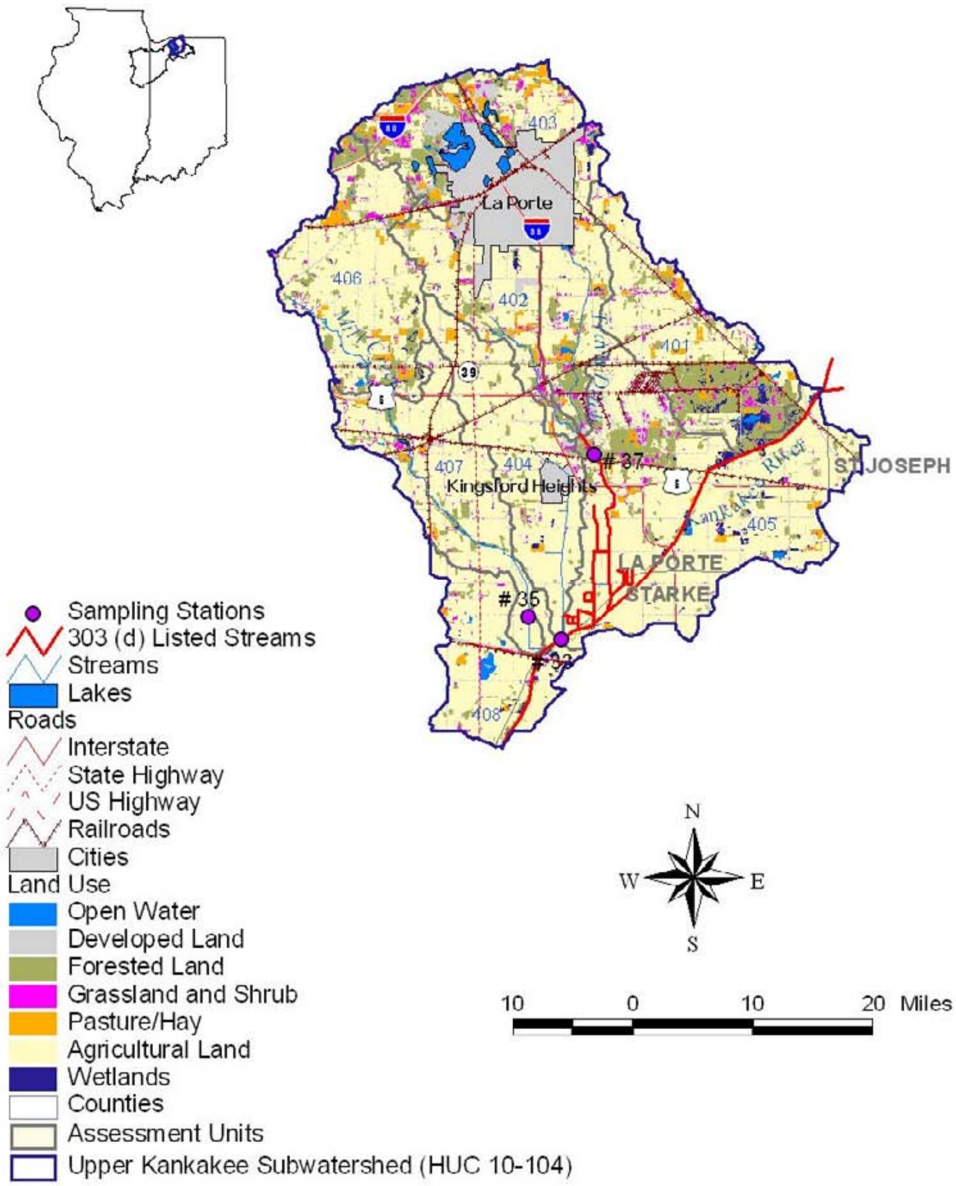


Figure 52. Location of Mill Creek-Kankakee River

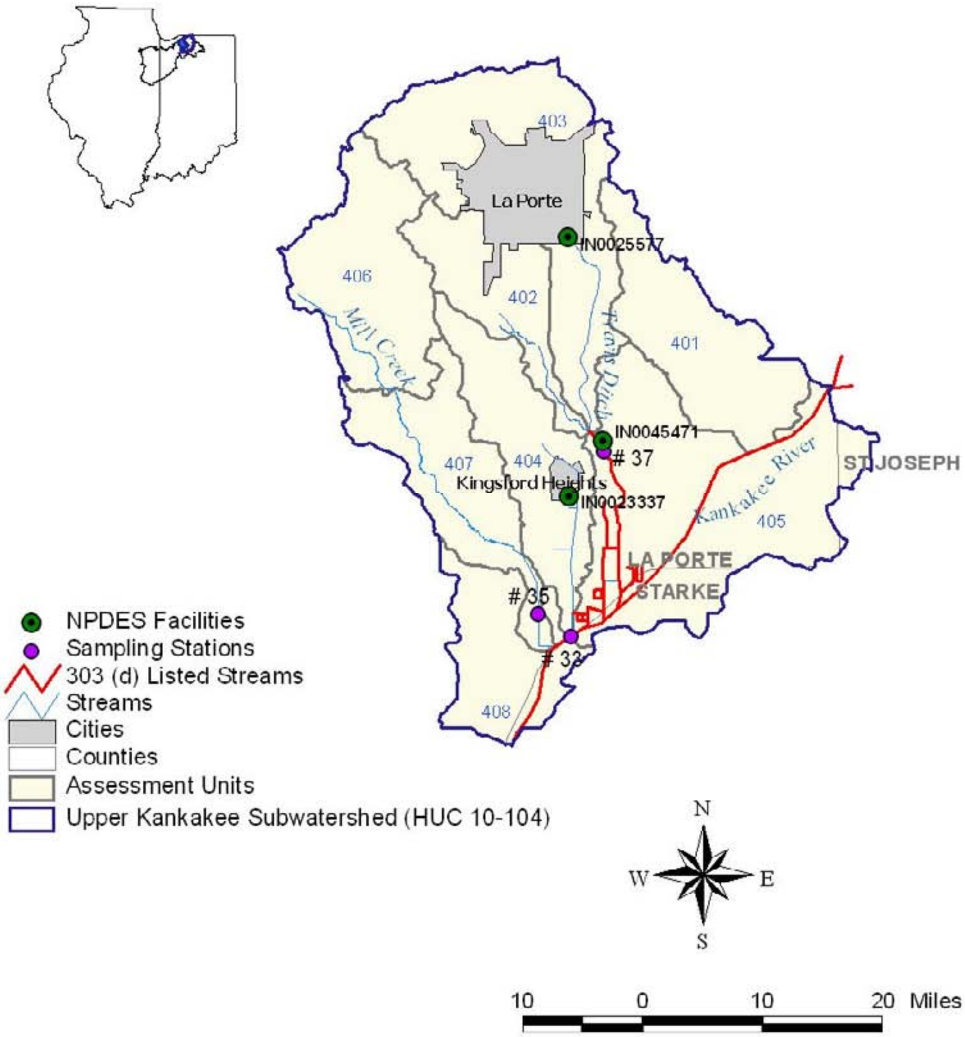


Figure 53. NPDES Facilities in the Mill Creek-Kankakee River

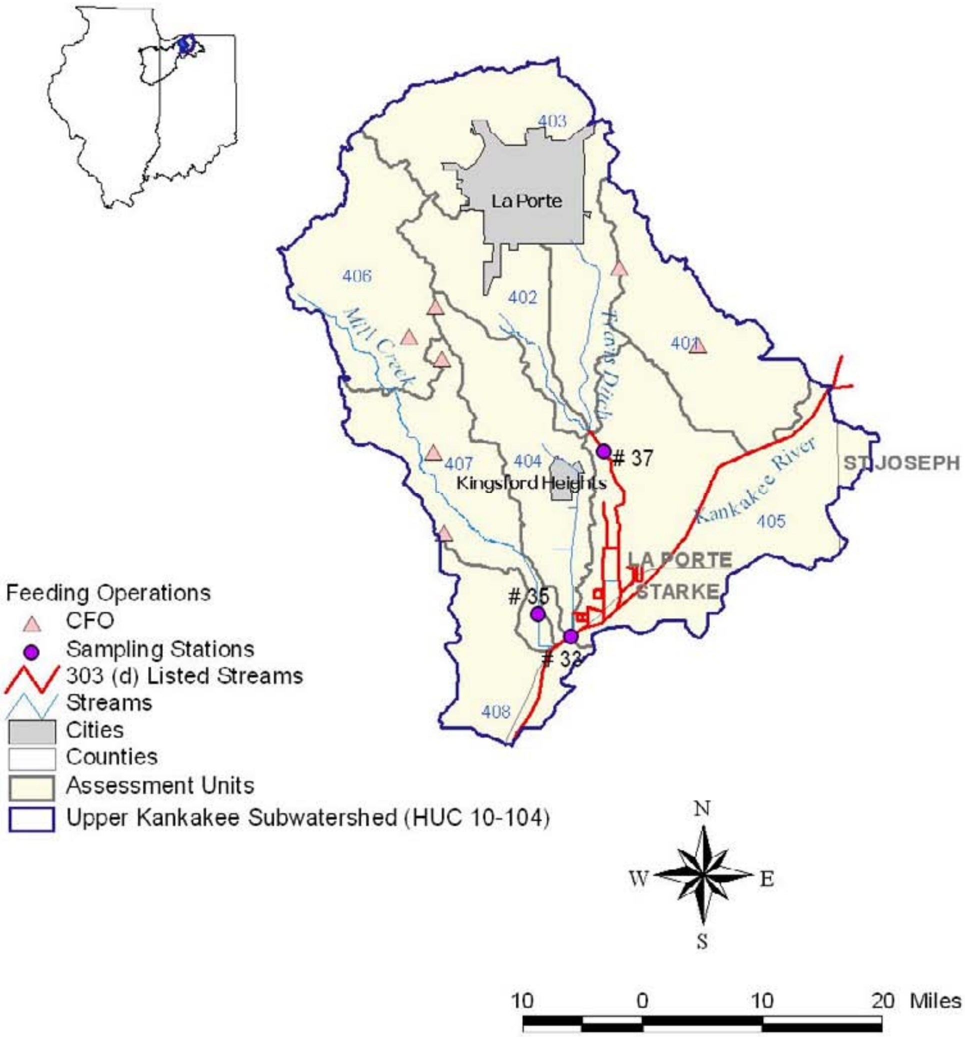


Figure 54. Feeding Operations in the Mill Creek-Kankakee River

Table 87. Land Use/Land Cover in the Mill Creek-Kankakee River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	85,029.88	132.86	65.48
Forested Land	18,252.09	28.52	14.06
Developed Land	14,443.82	22.57	11.12
Pasture/Hay	4,364.04	6.82	3.36
Grassland and Shrubs	3,948.60	6.17	3.04
Wetland	2,065.60	3.23	1.59
Open Water	1,752.69	2.74	1.35
Total	**129,856.72**	**202.90**	**100.00**

Table 88 through Table 90 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. There are no current 303(d) listings in HUC 407; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are six NPDES facilities upstream of the Mill Creek subwatershed outlet and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There are two MS4 communities within the Little Kankakee River subwatershed and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. The individual WLAs are presented in Table 276. There are two CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 88. Johanni Ditch-Kankakee River Characteristics and TMDL Summary (HUC 12-405)

Upstream Characteristics					
Drainage Area	399.16 square miles				
Sampling Station	37				
Listed Segments	INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004				
Land Use	Agriculture: 60.85%; Developed Land:10.38%; Forest:17.36%; Other: 11.41%				
Soils	A: 39.39%; B: 49.44%; C: 6.93%; D: 2.54%; Unknown:1.71%				
NPDES Facilities	North Liberty WWTP (IN0025801)				
	La Porte Municipal STP (IN0025577)				
	Walkerton Municipal WWTP (IN0040690)				
	Kingsbury Utility Corp (IN0045471)				
	Potato Creek State Park (IN0052272)				
MS4 Communities	La Porte County (INR040107): 14.93 square miles				
	South Bend (INR040114): 3.42 square miles				
CSO Communities	None				
CAFOs	Walkerton Farm (ING802239)				
	Scher-Way Dairy Farm (ING806085)				
CFOs	Meadowland Farms (250)				
	Tuholski Farms, Inc. (280)				
	C.L. Rhoade Corp (1110)				
	Farm No 2 (3600)				
	Farm #1 (4208)				
	Farm #2 (4209)				
	Sunset Dairy (6072)				
	Ginter (6135)				
	Leffert Dairy, LLC (6203)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1942.67	1136.47	807.12	602.55	432.77
WLA	143.88	47.96	47.96	47.96	47.96
MOS (10%)	231.84	131.6	95.01	72.28	53.41
TMDL = LA+WLA+MOS	2318.39	1316.03	950.09	722.79	534.14

Table 89. Hickleson Ditch-Mill Creek Characteristic s and TMDL Summary (HUC 12-407)

Upstream Characteristics					
Drainage Area	29.54 square miles				
Sampling Station	35				
Listed Segments	None				
Land Use	Agriculture: 73.98%; Developed Land:6.08%; Forest:13.10%; Other: 6.84%				
Soils	A: 36.95%; B: 57.63%; C: 3.05%; D: 2.37%; Unknown: 0%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Yon Ed Farm, Inc.(2187)				
	Minich (4255)				
	Wil-Minfarm (6096)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	154.42	87.65	63.28	48.14	35.58
WLA	0	0	0	0	0
MOS (10%)	17.15	9.74	7.03	5.35	3.95
TMDL = LA+WLA+MOS	171.57	97.39	70.31	53.49	39.53

Table 90. Marquardt Ditch-Kankakee River Characteristics and TMDL Summary (HUC 12-408)

Upstream Characteristics	
Drainage Area	463.58 square miles
Sampling Station	33
Listed Segments	INK013C_T1007
Land Use	Agriculture: 63.35%; Developed Land:9.80%; Forest:16.21%; Other: 10.64%
Soils	A: 42.02%; B: 47.76%; C: 6.30%; D: 2.39%; Unknown:1.53%
NPDES Facilities	North Liberty WWTP (IN0025801)
	La Porte Municipal STP (IN0025577)
	Walkerton Municipal WWTP (IN0040690)
	Kingsbury Utility Corp (IN0045471)
	Potato Creek State Park (IN0052272)
	Kingsford Heights Municipal WWTP (IN002337)
MS4 Communities	La Porte County (INR040107): 14.93 square miles
	South Bend (INR040114): 3.42 square miles
CSO Communities	None
CAFOs	Scher-Way Dairy Farm (ING806085)
	Walkerton Farm (ING802239)
CFOs	Meadowland Farms (250)
	Tuholski Farms, Inc. (280)
	C.L. Rhoade Corp (1110)
	Farm No 2 (3600)
	Farm #1 (4208)
	Farm #2 (4209)
	Sunset Dairy (6072)
	Ginter (6135)
	Leffert Dairy, LLC (6203)
	Yon Ed Farm, Inc.(2187)
	Schoof (3983)
	Applegarth (4169)
	Minich (4255)
	Wil-Minfarm (6096)

Table 90. Marquardt Ditch-Kankakee River Characteristics and TMDL Summary (HUC 12-408)

TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	2277.42	1325.62	943.12	705.54	508.35
WLA	145.88	49.96	49.96	49.96	49.96
MOS (10%)	269.26	152.84	110.34	83.94	62.03
TMDL = LA+WLA+MOS	2692.56	1528.42	1103.42	839.44	620.34

7.1.1.4 Robbins Ditch-Kankakee River Subwatershed (10-Digit HUC 107)

The Robbins Ditch subwatershed has an area of nearly 118 square miles. Walkerton and Koontz Lake are the two designated cities located in this subwatershed (Figure 55). Land use comprise of agriculture (67%), forest (17%), developed (8%) and the remaining land categories contribute to eight percent of the total subwatershed area (Table 94). A total of three NPDES facilities and one CAFO are present within this subwatershed as shown in Figure 56 and Figure 57, respectively.

There are two segments impaired for *E. coli* and IDEM sampled five *E. coli* monitoring locations in 2008 as shown in Table 91 and Table 92, respectively. The summary of 2008 data in the subwatershed is shown in Table 93. All five sites exceed the geomean standard. Reductions to meet the geomean criteria of 125 #/100 mL range from 39 to 81 percent.

Table 91. 303 (d) Listed Streams in the Robbins Ditch-Kankakee River

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
705	Laramore Ditch Kankakee River	INK0147_T1009	Kankakee River	7.29	*E. coli*
		INK0146_T1008	Kankakee River	1.39	*E. coli*

Table 92. Station Locations in the Robbins Ditch-Kankakee River

HUC 12	HUC 12 Name	Station #	Stream Name
701	Jain Ditch	ID# 61	Jain D
702	Amy Kelly Ditch-Robbins Ditch	ID# 59	Robbins D
703	Shearin Ditch-Robbins Ditch	ID# 23	Robbins D
704	Bailey Ditch-Kankakee River	ID# 21	Bailey D
705	Laramore Ditch-Kankakee River	ID# 11	Kankakee R

Table 93. Summary of Pathogen Data in the Robbins Ditch-Kankakee River

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
61	6/4/2008 - 7/2/2008	5	100	40	152	205	211	261	39%
59	6/4/2008 - 7/2/2008	5	100	80	185	243	246	276	49%
23	6/2/2008 - 7/14/2008	6	83	67	105	284	416	1,414	56%
21	6/2/2008 - 7/14/2008	6	100	100	276	662	848	2,419	81%
11	6/2/2008 - 6/30/2008	5	100	80	192	334	368	579	63%

Table 94. Land Use/Land Cover in the Robbins Ditch-Kankakee River

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	50,901.97	79.53	67.29
Forested Land	12,839.03	20.06	16.97
Developed Land	6,303.31	9.85	8.33
Wetland	2,602.68	4.07	3.44
Pasture/Hay	1,735.78	2.71	2.29
Grassland and Shrubs	796.84	1.25	1.05
Open Water	461.91	0.72	0.61
Total	**75,641.52**	**118.19**	**100.00**

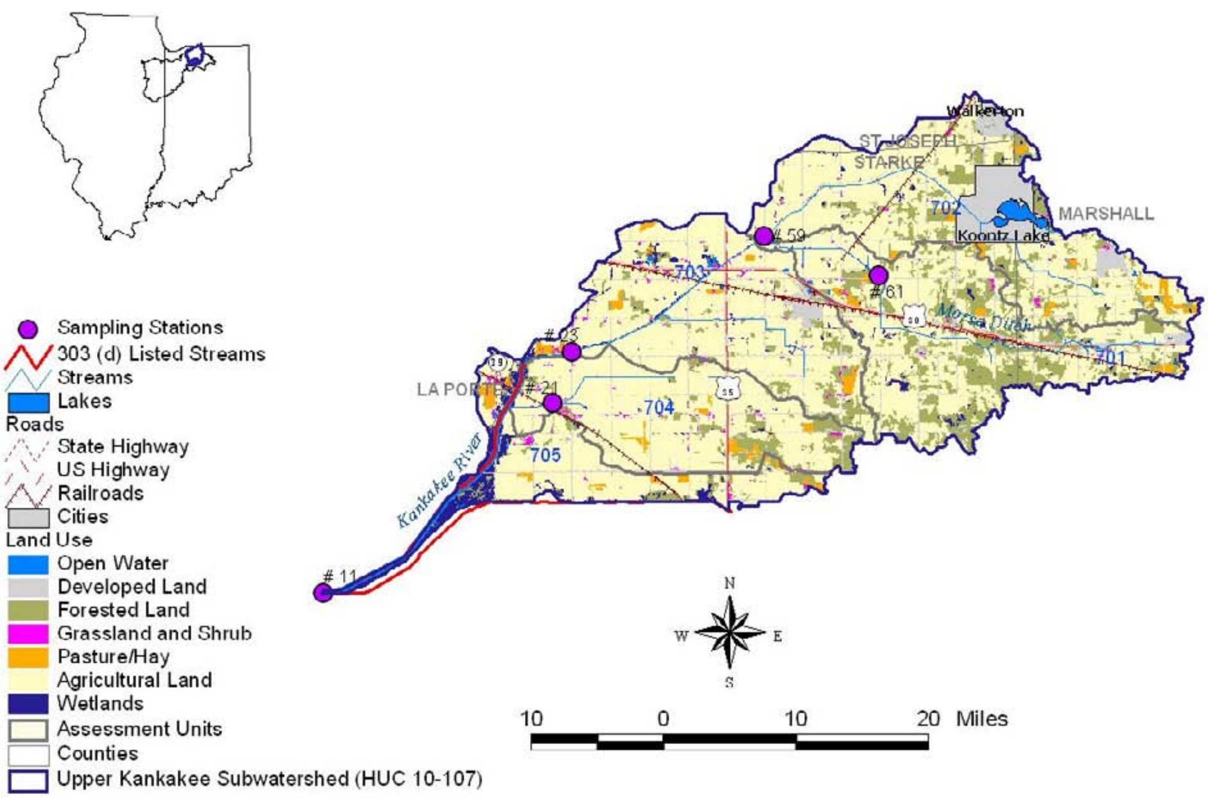


Figure 55. Location of Robbins Ditch-Kankakee River (HUC10-107)

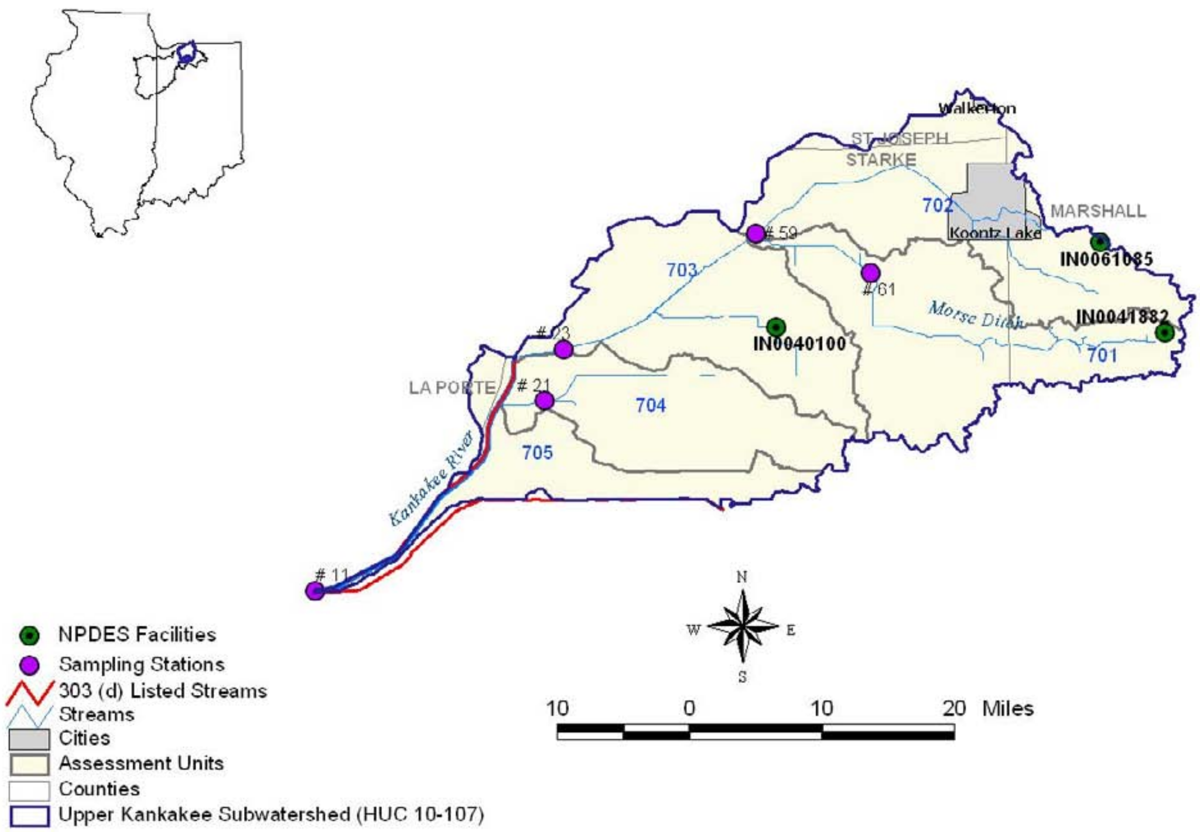


Figure 56. NPDES Facilities in the Robbins Ditch-Kankakee River (HUC10-107)

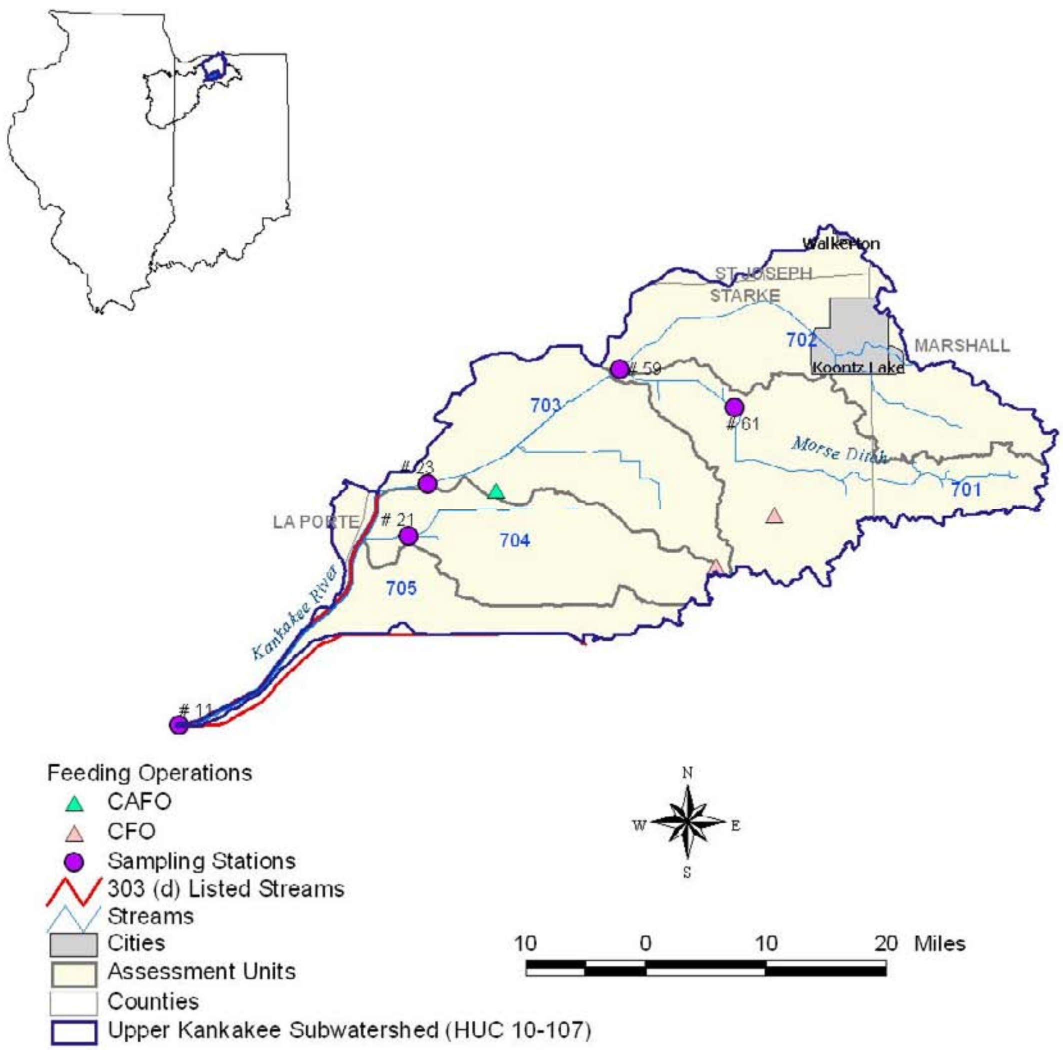


Figure 57. Feeding Operations in the Robbins Ditch-Kankakee River (HUC10-107)

Table 95 through Table 99 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. There are no current 303(d) listings in HUC 701, HUC 702, HUC 703, or HUC 704; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are three NPDES facilities within the Robbins Ditch subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There are two MS4 communities within the Robbins Ditch subwatershed and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. The individual WLAs are presented in Table 276. There is one CAFO within this subwatershed and it receives a WLA of zero as described further in Section 7.3.

Table 95. Jain Ditch Upstream Characteristics and TMDL Summary (HUC12-701)

Upstream Characteristics					
Drainage Area	28.87 square miles				
Sampling Station	61				
Listed Segments	None				
Land Use	Agriculture: 59.25%; Developed Land:8.86%; Forest:28.66%; Other: 3.22%				
Soils	A: 89.64%; B: 8.81%; C: 1.04%; D: 0.52%; Unknown: 0%				
NPDES Facilities	Yogi Bears Jellystone Park (IN0041882)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Tip Top Farms (4676)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	150.41	85.17	61.35	46.55	34.27
WLA	0.5	0.5	0.5	0.5	0.5
MOS (10%)	16.77	9.51	6.87	5.23	3.86
TMDL = LA+WLA+MOS	167.68	95.18	68.72	52.28	38.63

Table 96. Amy Kelly Ditch-Robbins Ditch-Kankakee River (HUC12-702)

Upstream Characteristics					
Drainage Area	30.46 square miles				
Sampling Station	59				
Listed Segments	None				
Land Use	Agriculture: 64.02%; Developed Land:9.70%; Forest:19.19%; Other: 7.09%				
Soils	A: 85.22%; B: 10.84%; C: 2.46%; D: 0.00%; 1.48%				
NPDES Facilities	Swan Lake Golf Resort (IN0061085)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	159.06	90.22	65.08	49.47	36.51
WLA	0.17	0.17	0.17	0.17	0.17
MOS (10%)	17.69	10.04	7.25	5.52	4.08
TMDL = LA+WLA+MOS	176.92	100.43	72.5	55.16	40.76

Table 97. Shearin Ditch-Robbins Ditch Characteristics and TMDL Summary (HUC12-703)

Upstream Characteristics					
Drainage Area	85.17 square miles				
Sampling Station	23				
Listed Segments	None				
Land Use	Agriculture: 65.96%; Developed Land:9.33%; Forest:19.27%; Other: 5.44%				
Soils	A: 90.48%; B: 7.41%; C: 1.23%; D: 0.18%; 0.71%				
NPDES Facilities	Yogi Bears Jellystone Park (IN0041882)				
	Swan Lake Golf Resort (IN0061085)				
	Hamlet Municipal STP (IN0040100)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	N&L Pork, Inc. - Lee Nagai - Home Site (149)				
CFOs	Tip Top Farms (4676)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	444.07	251.59	181.31	137.66	101.43
WLA	1.14	1.14	1.14	1.14	1.14
MOS (10%)	49.47	28.08	20.27	15.42	11.4
TMDL = LA+WLA+MOS	494.68	280.81	202.72	154.22	113.97

Table 98. Bailey Ditch-Kankakee River Characteristics and TMDL Summary (HUC12-704)

Upstream Characteristics					
Drainage Area	39.21 square miles				
Sampling Station	21				
Listed Segments	None				
Land Use	Agriculture: 77.71%; Developed Land:5.97%; Forest:12.03%; Other: 4.30%				
Soils	A: 93.33%; B: 0.74%; C: 0.00%; D: 5.93%; 0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Yankauskas Pork Production (430)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	204.97	116.35	84	63.9	47.22
WLA	0	0	0	0	0
MOS (10%)	22.77	12.93	9.33	7.1	5.25
TMDL = LA+WLA+MOS	227.74	129.28	93.33	71	52.47

Table 99. Laramore Ditch-Kankakee River Characteristics and TMDL Summary (HUC12-705)

Upstream Characteristics					
Drainage Area	581.78 square miles				
Sampling Station	11				
Listed Segments	INK0147_T1009, INK0146_T1008				
Land Use	Agriculture: 64.07%; Developed Land:9.53%; Forest:16.35%; Other: 10.05%				
Soils	A: 50.89%; B: 40.10%; C: 5.35%; D: 2.32%; Unknown:1.34%				
NPDES Facilities	All facilities upstream of HUC 12-408				
	Yogi Bears Jellystone Park (IN0041882)				
	Swan Lake Golf Resort (IN0061085)				
	Hamlet Municipal STP (IN0040100)				
MS4 Communities	La Porte County (INR040107): 14.93 square miles				
	South Bend (INR040114): 3.42 square miles				
CSO Communities	None				
CAFOs	All facilities upstream of HUC 12-408				
	N&L Pork, Inc. - Lee Nagai - Home Site (ING800149)				
CFOs	All facilities upstream of HUC 12-408				
	Tip Top Farms (4676)				
	Yankauskas Pork Production (430)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	2894.15	1675.22	1195.19	897.03	649.56
WLA	147.02	51.1	51.1	51.1	51.1
MOS (10%)	337.91	191.81	138.47	105.35	77.85
TMDL = LA+WLA+MOS	3379.08	1918.13	1384.76	1053.48	778.51

7.1.2 Middle Kankakee Subwatershed

The Middle Kankakee subwatershed covers approximately 984 square miles and is comprised of six HUC 10 subwatersheds and 44 HUC 12 units as shown in Table 100.

Table 100. Hydrologic Unit Code (HUC 10 and 12 in the Middle Kankakee Subwatershed)

HUC 10	HU C10 Name	HUC12	HU C 12 Name	Area (sq. miles)
108	Pitner Ditch-Kankakee River	801	Sheldon Arm Hunsley Ditch	19.66
		802	Hanna Arm Tuesburg Ditch	20.09
		803	Eckert Ditch-Kuehn Ditch	21.20
		804	Richman Ditch-Pitner Ditch	22.01
		805	Bessler Ditch-Pitner Ditch	16.85
		806	Origer Ditch-Kankakee River	14.47
		807	Rassmussen Ditch-Kankakee River	29.27
		808	Cook Ditch	26.11
		809	Davis Ditch-Kankakee River	24.18
109	Hodge Ditch	901	Headwaters Wolf Creek	18.01
		902	Hickam Lateral-Wolf Creek	19.83
		903	Delehanty Ditch-Hodge Ditch	19.71
		904	Cook Ditch-Hodge Ditch	26.69
110	Crooked Creek-Kankakee River	001	Bloom Ditch	25.71
		002	West Branch Crooked Creek	15.30
		003	Headwaters Crooked Creek	22.02
		004	Koselki Ditch-Crooked Creek	25.30
		005	Reeves Ditch	28.91
		006	Hannon Ditch-Crooked Creek	16.09
		007	Sievers Creek-Cobb Ditch	31.78
		008	Ahlgrim Ditch	21.12
		009	Cornell Ditch-Phillips Ditch	19.66
		010	Cobb Creek-Kankakee River	37.56
111	Knight Ditch-Kankakee River	101	Dehaan Ditch	36.50
		102	Wentworth Ditch-Knight Ditch	45.07
		103	Brown Levee Ditch-Kankakee River	27.66
112	Beaver Lake Ditch-Kankakee River	201	Gregory Ditch-Mud Lake Ditch	17.16
		202	Mud Lake Ditch-Beaver Lake Ditch	15.78
		203	Lawler Ditch-Beaver Lake Ditch	24.99
		204	Williams Ditch	16.31
		205	Beaver Lake Ditch-Kankakee River	24.46
113	Singleton Ditch	301	East Branch Stony Run	15.79
		302	Fisher Pond- Stony Run	18.27
		303	Spring Run	12.75
		304	Greisel Ditch	16.59
		305	Bryant Ditch-Singleton Ditch	23.52
		306	Cedar Creek	31.30
		307	Brown Ditch	21.37
		308	Bull Run-West Creek	21.52

Table 100. Hydrologic Unit Code (HUC 10 and 12 in the Middle Kankakee Subwatershed)

HUC 10	HU C10 Name	HUC12	HU C 12 Name	Area (sq. miles)
113	Singleton Ditch	309	Klaasville-West Creek	17.83
		310	West Creek	16.25
		311	Bruce Ditch-Singleton Ditch	24.71
		312	Bull Creek-Singleton Ditch	20.72
		313	Singleton Ditch	13.85

7.1.2.1 Pitner Ditch-Kankakee River Subwatershed (10-Digit HUC 108)

The Pitner Ditch subwatershed has an area of nearly 194 square miles and covers portions of LaPorte, Starke and Jasper Counties. Wanatah is the only designated city within this subwatershed (Figure 58). Most of the land is used for agriculture purposes as reported in Table 104. Figure 59 and Figure 60 show the NPDES facilities and feeding operations in this subwatershed.

There is only one listed segment (Table 101) and four monitoring locations (Table 102) in the subwatershed. Table 103 summarizes the 2008 data in this subwatershed. Three of the four sites sampled exceeded the geomean standard and necessary reductions range from 59 to 88 percent.

Table 101. 303 (d) Listed Streams in the Pitner Ditch-Kankakee River

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
806	Origer Ditch-Kankakee River	INK0183_M1011	Kankakee River-English Lake	3.51	*E. coli*

Table 102. Station Locations in the Pitner Ditch-Kankakee River

HUC 12	HUC 12 Name	Station #	Stream Name
802	Hanna Arm Tuesburg Ditch	ID# 31	Hunsley D
805	Bessler Ditch-Pitner Ditch	ID# 07	Pitner D
807	Rassmussen Ditch-Kankakee River	ID# 03	Kankakee River
		ID# 05	Elkheim D

Table 103. Summary of Pathogen Data in the Pitner Ditch-Kankakee River

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
31	6/4/2008 - 6/30/2008	5	100	100	548	1,079	1,223	2,420	88%
7	6/2/2008 - 6/30/2008	5	20	0	108	122	122	142	0%
3	6/2/2008 - 6/30/2008	5	100	60	186	307	330	461	59%
5	6/2/2008 - 6/30/2008	5	100	100	248	338	348	488	63%

Table 104. Land Use/Land Cover in the Pitner Ditch-Kankakee River

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	96158.26	150.25	77.60
Forested Land	12925.31	20.20	10.43
Developed Land	7502.91	11.72	6.05
Grassland and Shrubs	2760.35	4.31	2.23
Wetland	2553.53	3.99	2.06
Pasture/Hay	1473.14	2.30	1.19
Open Water	550.20	0.86	0.44
Total	**123,923.70**	**193.63**	**100.00**

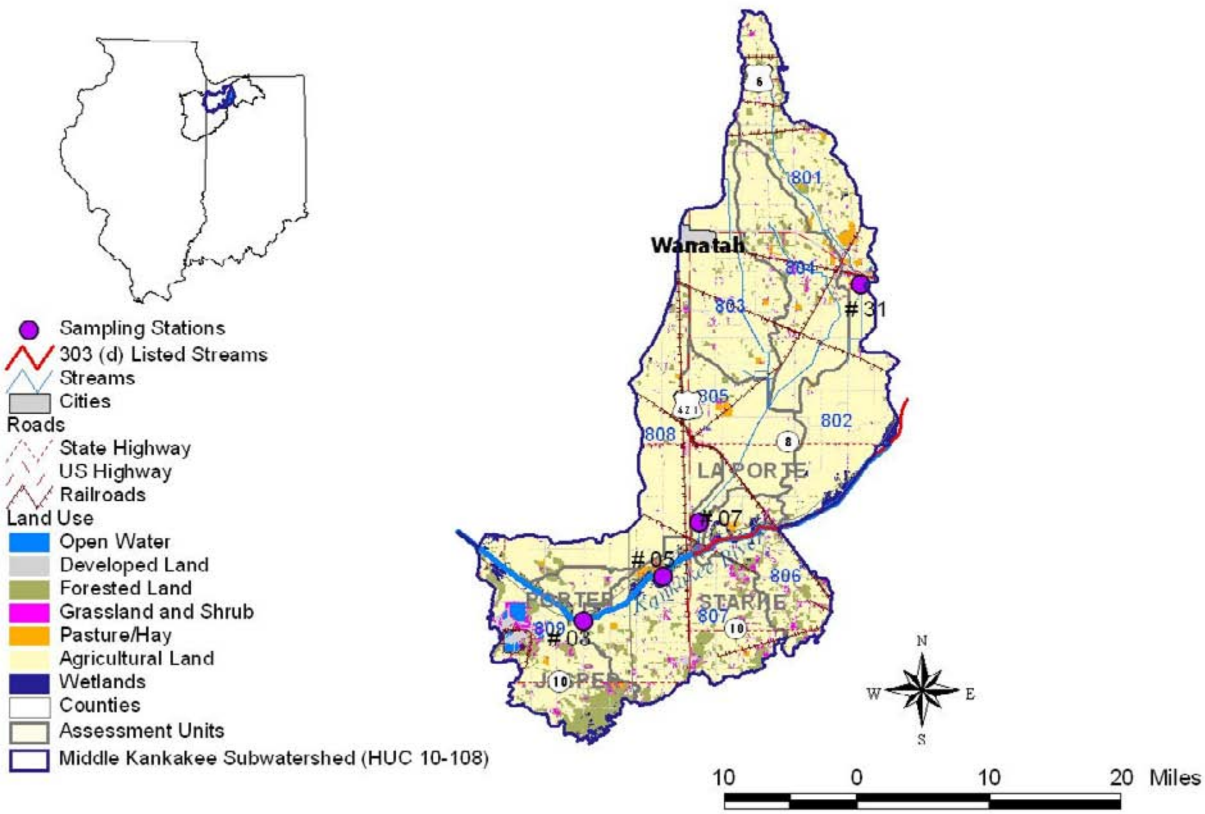


Figure 58. Location of Pitner Ditch-Kankakee River (HUC10-108)

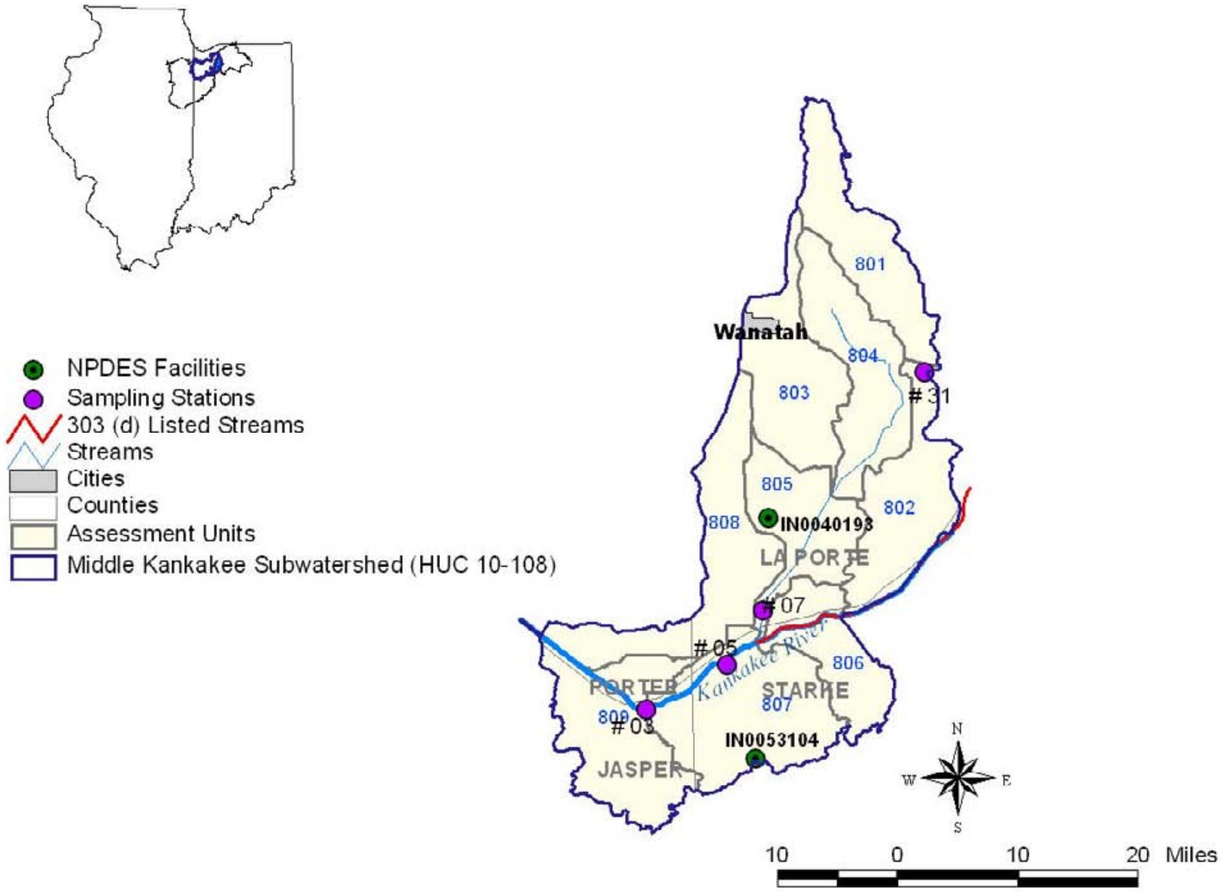


Figure 59. NPDES Facilities in the Pitner Ditch-Kankakee River (HUC10-108)

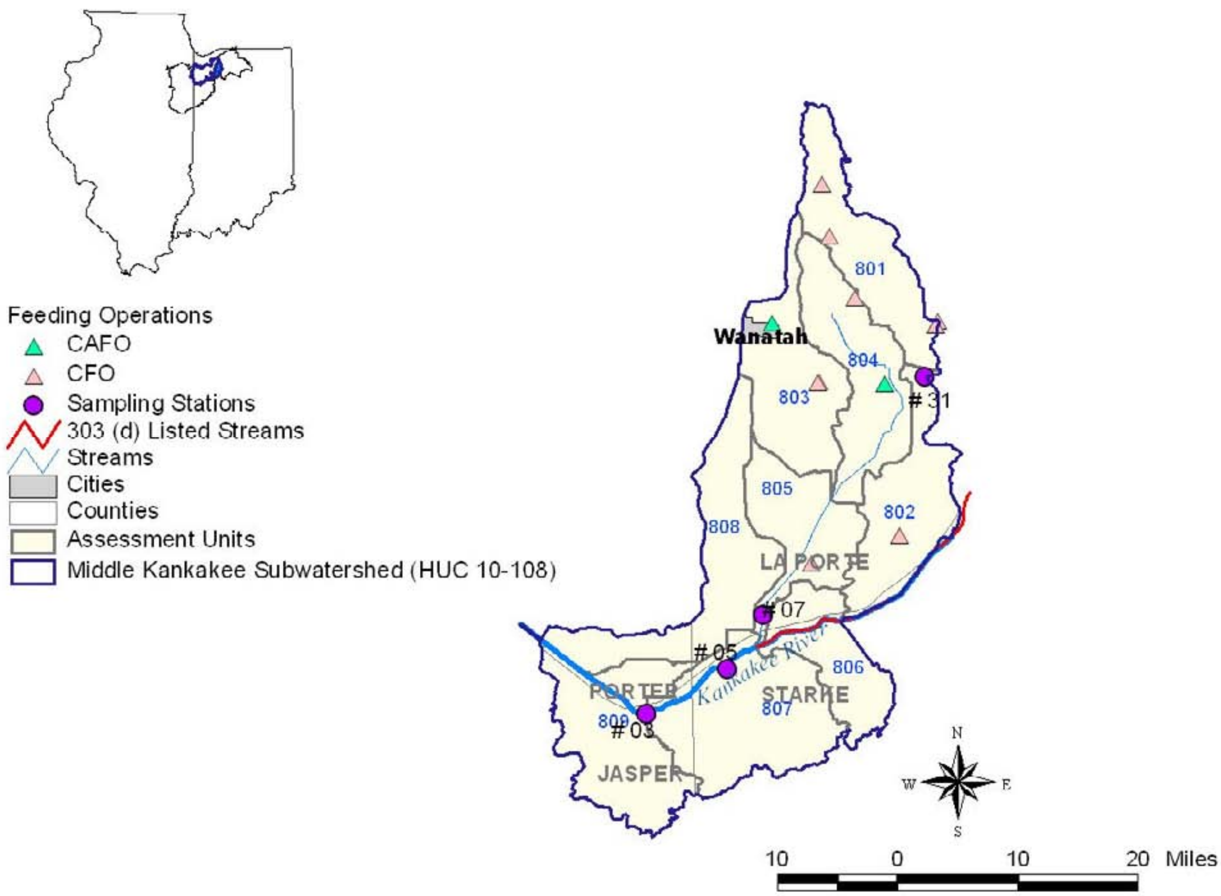


Figure 60. Feeding Operations in the Pitner Ditch-Kankakee River (HUC10-108)

Table 105 through Table 108 summarize the subwatershed characteristics and TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 802 or HUC 807; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are two NPDES facilities within the Pitner Ditch subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There are three MS4 communities upstream of the Pitner Ditch subwatershed outlet and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. There are three CSO communities with 26 outfalls upstream of this subwatersheds outlet. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall multiplied by the *E. coli* criteria. The individual WLAs are presented in Table 276. There are two CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 105. Hanna Arm Tuesburg Ditch Characteristics and TMDL Summary (HUC12-802)

Upstream Characteristics					
Drainage Area	37.14 square miles				
Sampling Station	31				
Listed Segments	None				
Land Use	Agriculture: 81.43%; Developed Land:9.53%; Forest:16.35%; Other: 10.05%				
Soils	A: 64.75%; B: 26.82%; C: 8.43%; D: 0.00%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Farm #2 (2547)				
	Hundt (3045)				
	Farm #1 (3548)				
	Dgm Pork (3992)				
	Hardin Farms (6109)				
	Hoover Farms (6114)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	244.04	89	40.2	18.09	9.77
WLA	0	0	0	0	0
MOS (10%)	27.12	9.89	4.46	2.01	1.08
TMDL = LA+WLA+MOS	271.16	98.89	44.66	20.1	10.85

Table 106. Bessler Ditch-Pitner Ditch Characteristics and TMDL Summary (HUC12-805)

Upstream Characteristics					
Drainage Area	59.99 square miles				
Sampling Station	7				
Listed Segments	None				
Land Use	Agriculture: 86.92%; Developed Land;5.97%; Forest:4.26%; Other: 2.85%				
Soils	A: 79.08%; B: 12.50%; C: 8.42%; D: 0.00%; Unknown:0.00%				
NPDES Facilities	La Crosse Municipal WWTP (IN0040193)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Smoker Farms (ING801092)				
	David And Brenda Wolfe (ING806292)				
CFOs	Brian Hunsley (85)				
	Stull Farm (3126)				
	Phegley (3896)				
	Rich-Lou Farms (3925)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	393.87	143.45	64.61	28.9	15.45
WLA	0.32	0.32	0.32	0.32	0.32
MOS (10%)	43.8	15.97	7.21	3.24	1.75
TMDL = LA+WLA+MOS	437.99	159.74	72.14	32.46	17.52

Table 107. Origer Ditch-Kankakee River Characteristics and TMDL Summary (HUC12-806)

Upstream Characteristics					
Drainage Area	1229.46 square miles				
Sampling Station	None				
Listed Segments	INK0183_M1011				
Land Use	Agriculture: 66.30%; Developed Land:9.03%; Forest:15.00%; Other: 9.67%				
Soils	A: 48.40%; B: 39.20%; C: 9.63%; D: 1.60%; Unknown:1.17%				
NPDES Facilities	All facilities upstream of HUC 12-705, HUC 12-506, HUC 12-604				
MS4 Communities	La Porte County (INR040107): 14.93 square miles				
	South Bend (INR040114): 3.42 square miles				
	Plymouth (INR040064): 6.97 square miles				
CSO Communities	North Judson Municipal (IN0020877)-1 outfall				
	Plymouth Municipal STP (IN0020991-10 outfalls				
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	All facilities upstream of HUC 12-705, HUC 12-506, HUC 12-604				
CFOs	All facilities upstream of HUC 12-705, HUC 12-506, HUC 12-604				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	7145.56	2623.55	1139.23	466.92	213.72
WLA	276.02	83.15	83.15	83.15	83.15
MOS (10%)	824.62	300.74	135.82	61.12	32.98
TMDL = LA+WLA+MOS	8246.2	3007.44	1358.2	611.19	329.85

Table 108. Rassmussen Ditch-Kankakee River Characteristics and TMDL Summary (HUC12-807)

Upstream Characteristics					
Drainage Area	1328.35 square miles				
Sampling Station	3, 5				
Listed Segments	None				
Land Use	Agriculture: 67.27%; Developed Land:8.83%; Forest:14.56%; Other: 9.34%				
Soils	A: 50.66%; B: 37.25%; C: 9.46%; D: 1.53%; Unknown:1.10%				
NPDES Facilities	All facilities upstream of HUC 12-705, HUC 12-506, HUC 12-604				
	La Crosse Municipal WWTP (IN0040193)				
	Little Co Of Mary Health Facility (IN0053104)				
MS4 Communities	La Porte County (INR040107): 14.93 square miles				
	South Bend (INR040114): 3.42 square miles				
	Plymouth (INR040064): 6.97 square miles				
CSO Communities	North Judson Municipal (IN0020877)-1 outfall				
	Plymouth Municipal STP (IN0020991-10 outfalls				
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	All facilities upstream of HUC 12-705, HUC 12-506, HUC 12-604				
	Smoker Farms (ING801092)				
	David And Brenda Wolfe (ING806292)				
CFOs	All facilities upstream of HUC 12-705, HUC 12-506, HUC 12-604				
	Farm #2 (2547)				
	Hundt (3045)				
	Farm #1 (3548)				
	Dgm Pork (3992)				
	Hardin Farms (6109)				
	Hoover Farms (6114)				
	Brian Hunsley (85)				
	Stull Farm (3126)				
	Rich-Lou Farms (3925)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	7731.51	2836.92	1235.31	509.88	236.66
WLA	276.53	83.66	83.66	83.66	83.66
MOS (10%)	889.78	324.51	146.55	65.95	35.59
TMDL = LA+WLA+MOS	8897.82	3245.09	1465.52	659.49	355.91

7.1.2.2 Hodge Ditch Subwatershed (HUC 10-109)

The Hodge Ditch subwatershed has an area of nearly 84 square miles. This subwatershed is covered by portions of Jasper and Porter counties (Figure 61). Nearly 61 percent of the land is used for agriculture (Table 111). There are three NPDES facilities in this subwatershed (Figure 62). No feeding operations exist within this subwatershed. There are no listed segments in the Hodge Ditch subwatershed. IDEM sampled two sites in this HUC 10 subwatershed (Table 109). Table 110 summarizes the 2008 data in this subwatershed. Both sites exceeded the geomean standard and both require a reduction of approximately 40 percent to meet the geomean standard.

Table 109. Station Locations in the Hodge Ditch Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
902	Hickam Lateral-Wolf Creek	ID# 10	Wolf Cr
904	Cook Ditch-Hodge Ditch	ID# 12	Hodge D

Table 110. Summary of Pathogen Data in the Hodge Ditch Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
10	6/3/2008 - 7/1/2008	5	100	60	155	215	221	291	42%
12	6/3/2008 - 7/1/2008	5	100	20	166	195	199	285	36%

Table 111. Land Use/Land Cover in the Hodge Ditch Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	39164.24	61.19	72.74
Forested Land	7855.40	12.27	14.59
Developed Land	3782.48	5.91	7.02
Grassland and Shrubs	2203.03	3.44	4.09
Pasture/Hay	610.03	0.95	1.13
Wetland	209.72	0.33	0.39
Open Water	16.90	0.03	0.03
Total	**53,841.80**	**84.13**	**100.00**

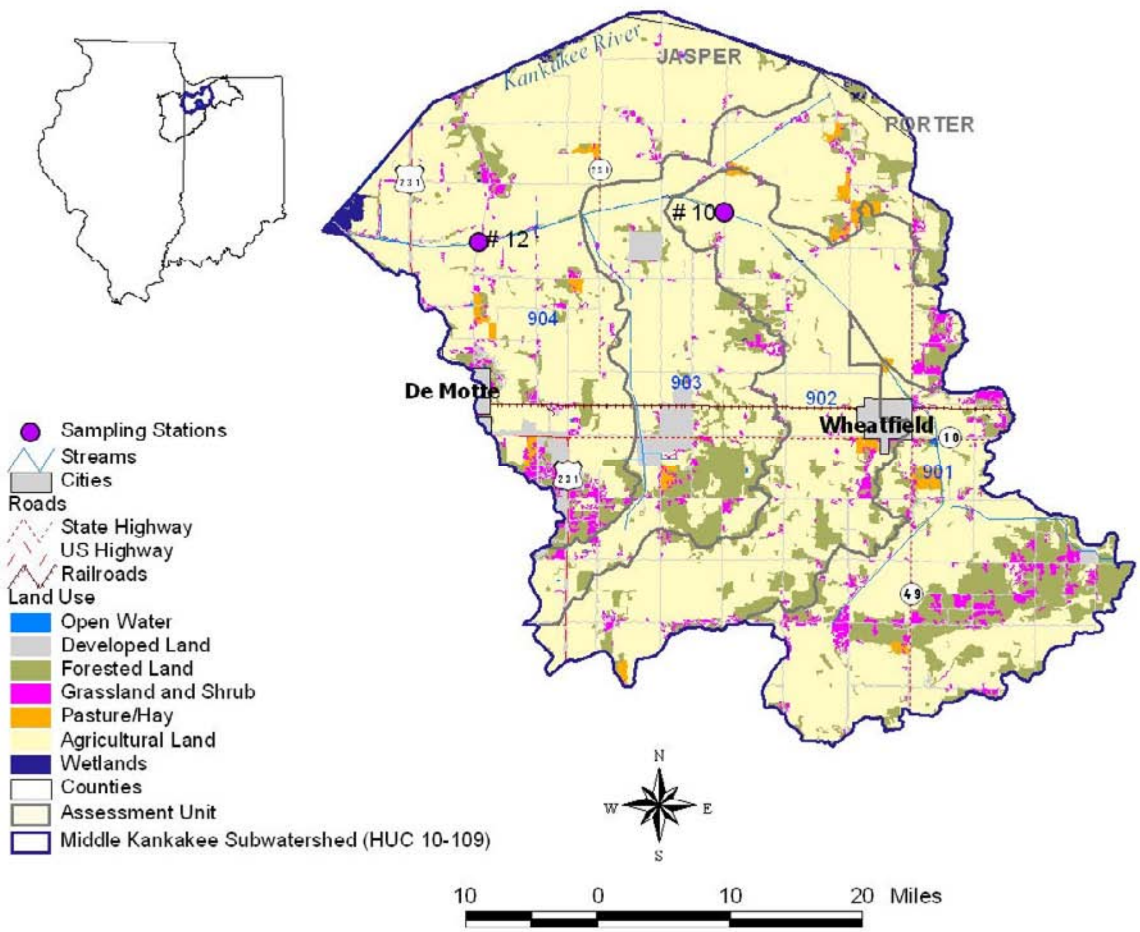


Figure 61. Location of Hodge Ditch Subwatershed (HUC10-109)

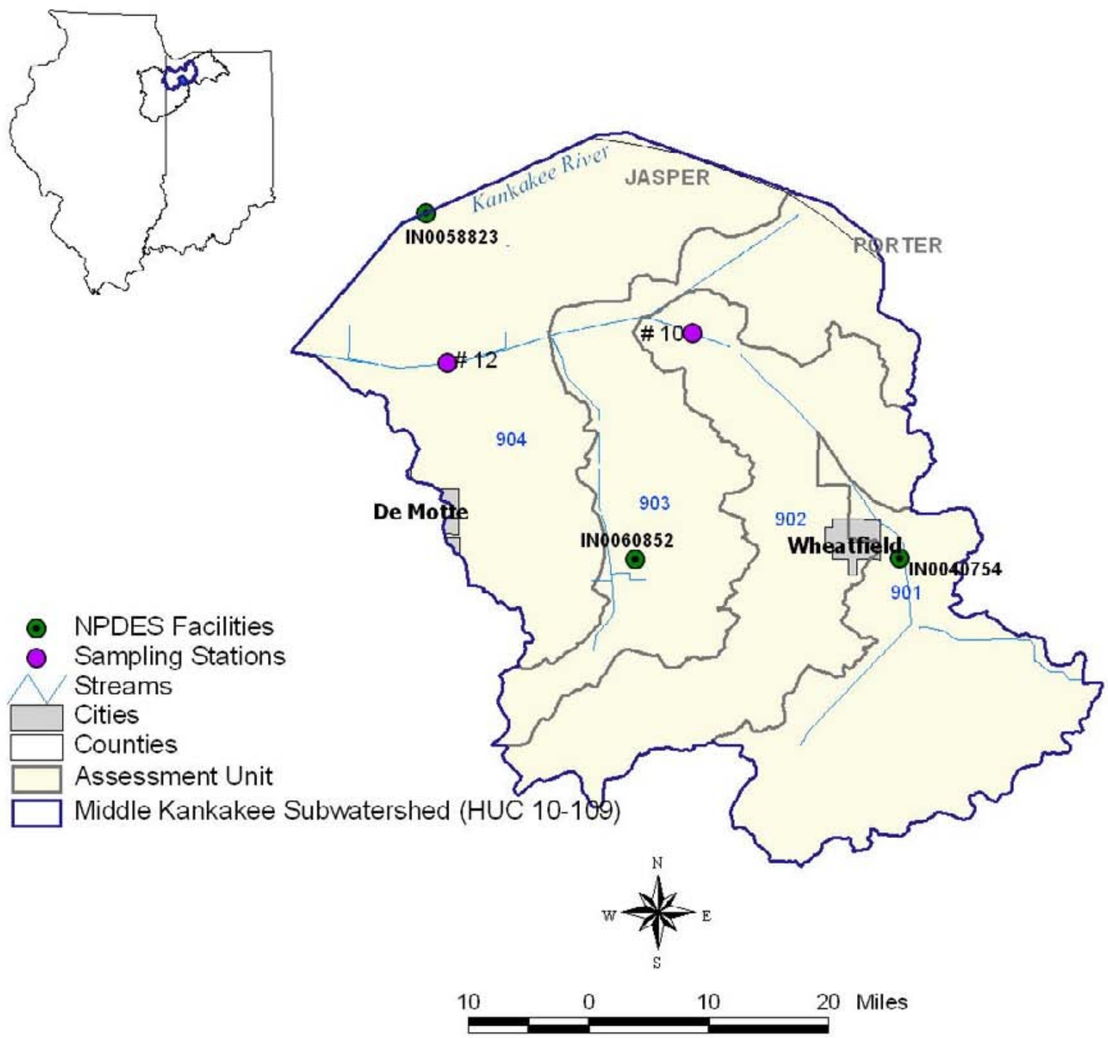


Figure 62. NPDES Facilities in the Hodge Ditch Subwatershed (HUC10-109)

Table 112 and Table 113 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in either HUC; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are three NPDES facilities within the Hodge Ditch subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. The individual WLAs are presented in Table 276.

Table 112. Hickman Lateral-Wolf Creek Characteristics and TMDL Summary (HUC12-902)

Upstream Characteristics					
Drainage Area	37.80 square miles				
Sampling Station	10				
Listed Segments	None				
Land Use	Agriculture: 69.68%; Developed Land:6.18%; Forest:18.13%; Other: 6.02%				
Soils	A: 60.96%; B: 35.06%; C: 1.99%; D: 1..99%; Unknown:0.00%				
NPDES Facilities	Wheatfield Municipal WWTP (IN0040754)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	248.02	90.22	40.55	18.05	9.58
WLA	0.36	0.36	0.36	0.36	0.36
MOS (10%)	27.6	10.07	4.55	2.04	1.1
TMDL = LA+WLA+MOS	275.98	100.65	45.46	20.45	11.04

Table 113. Crook Ditch-Hodge Ditch Characteristics and TMDL Summary (HUC12-904)

Upstream Characteristics					
Drainage Area	84.14 square miles				
Sampling Station	12				
Listed Segments	None				
Land Use	Agriculture: 72.73%; Developed Land:7.02%; Forest:14.59%; Other: 5.66%				
Soils	A: 63.64%; B: 25.13%; C: 10.34%; D: 0.89%; Unknown:0.00%				
NPDES Facilities	Wheatfield Municipal WWTP (IN0040754)				
	Martis Place Bomars River LDG (IN0058823)				
	Town Of Monterey WWTP (IN0060852)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	552.33	201.09	90.52	40.43	21.57
WLA	0.55	0.55	0.55	0.55	0.55
MOS (10%)	61.43	22.4	10.11	4.55	2.45
TMDL = LA+WLA+MOS	614.31	224.04	101.18	45.53	24.57

7.1.2.3 Crooked Creek-Kankakee River Subwatershed (HUC10-110)

The Crooked Creek subwatershed has an area of approximately 243 square miles and lies within Porter, La Porte and Jasper counties (Figure 63). As with above watersheds, agriculture is the dominant land use (Table 117). There are 11 facilities in the subwatershed as shown in Figure 64. There are no CAFOs; however, there is one CFO in the subwatershed (Figure 65).

Among the HUC12 units present in this subwatershed, HUC12-010 is the only one that has listed 303 (d) segments (Table 114). IDEM monitoring locations (Table 115) demonstrate impairments at all but one monitoring location (Table 116). Station # 06 did not exceed the geomean standard, however 20 percent of 2008 samples did exceed 235/100mL. The required reductions range from 0 to 87 percent.

Table 114. 303 (d) Listed Streams in the Crooked Creek-Kankakee River Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
010	Cobb Creek-Kankakee River	INK019F_M1113	Kankakee River	0.59	*E. coli*
		INK019F_M1104	Kankakee River	6.08	*E. coli*

Table 115. Station Locations in the Crooked Creek-Kankakee River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
001	Bloom Ditch	ID# 29	Slocum D
105	Reeves Ditch	ID# 04	Heinold Ditch
		ID# 25	Greiger D
006	Hannon Ditch-Crooked Creek	ID# 27	Crooked Cr
007	Sievers Creek-Cobb Ditch	ID# 06	Cobb D
009	Cornell Ditch-Phillips Ditch	ID# 08	Phillips Ditch
010	Cobb Creek-Kankakee River	ID# 02	Kankakee River
		ID# 16	Kankakee R

Table 116. Summary of Crooked Creek-Kankakee River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
29	6/4/2008 - 6/30/2008	5	100	100	613	949	1,096	2,419	87%
4	6/2/2008 - 6/30/2008	5	80	80	116	321	371	649	61%
25	6/2/2008 - 7/14/2008	6	100	67	158	284	306	488	56%
27	6/2/2008 - 7/14/2008	6	100	83	152	689	878	1,986	82%
6	6/3/2008 - 7/1/2008	5	20	20	31	64	120	435	0%
8	6/3/2008 - 7/1/2008	5	100	100	387	522	550	866	76%
2	6/3/2008 - 7/1/2008	5	100	60	140	241	258	411	48%
16	6/3/2008 - 7/1/2008	5	80	40	96	239	284	525	48%

Table 117. Land Use/Land Cover in the Crooked Creek-Kankakee River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	116508.41	182.04	74.84
Forested Land	12085.11	18.88	7.76
Developed Land	12801.89	20.00	8.22
Pasture/Hay	7533.15	11.77	4.84
Grassland and Shrubs	4577.09	7.15	2.94
Wetland	1601.68	2.50	1.03
Open Water	580.45	0.91	0.37
Total	**155,687.78**	**243.26**	**100.00**

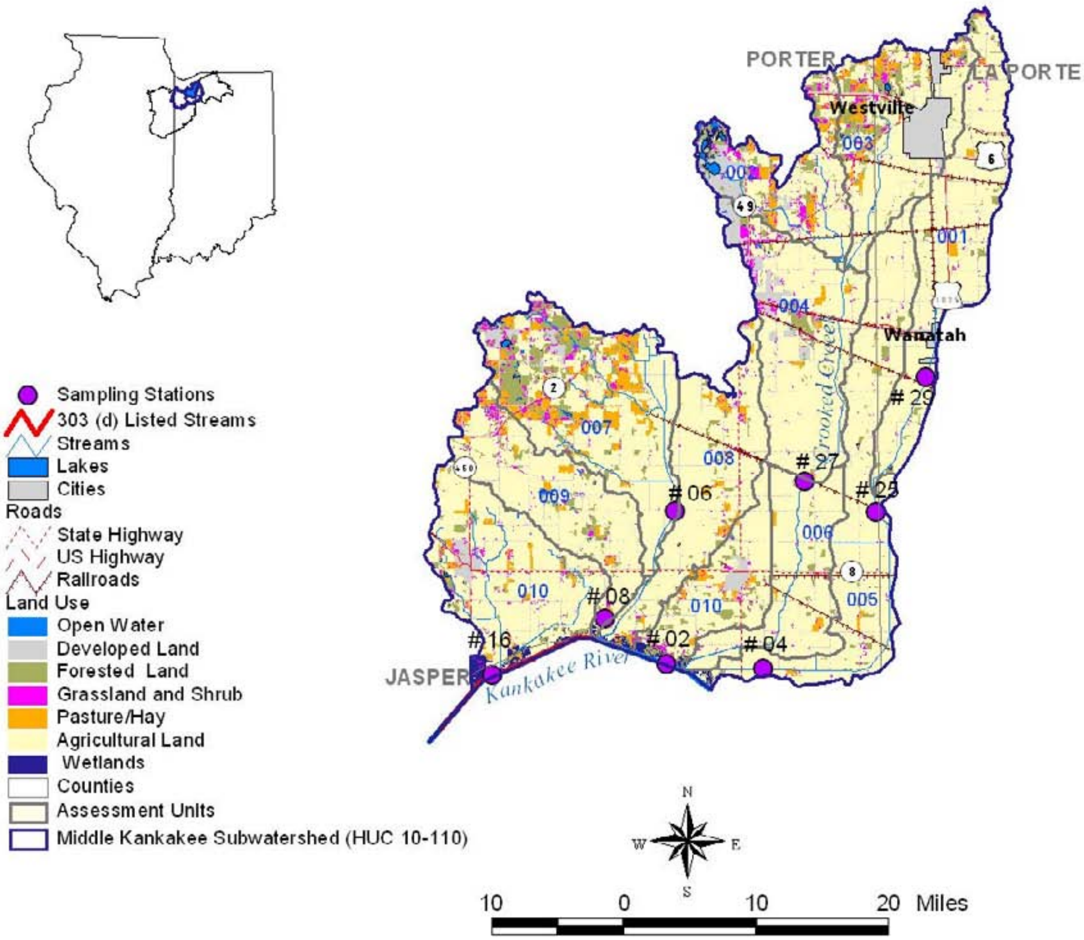


Figure 63. Location of Crooked Creek-Kankakee River (HUC10-110)

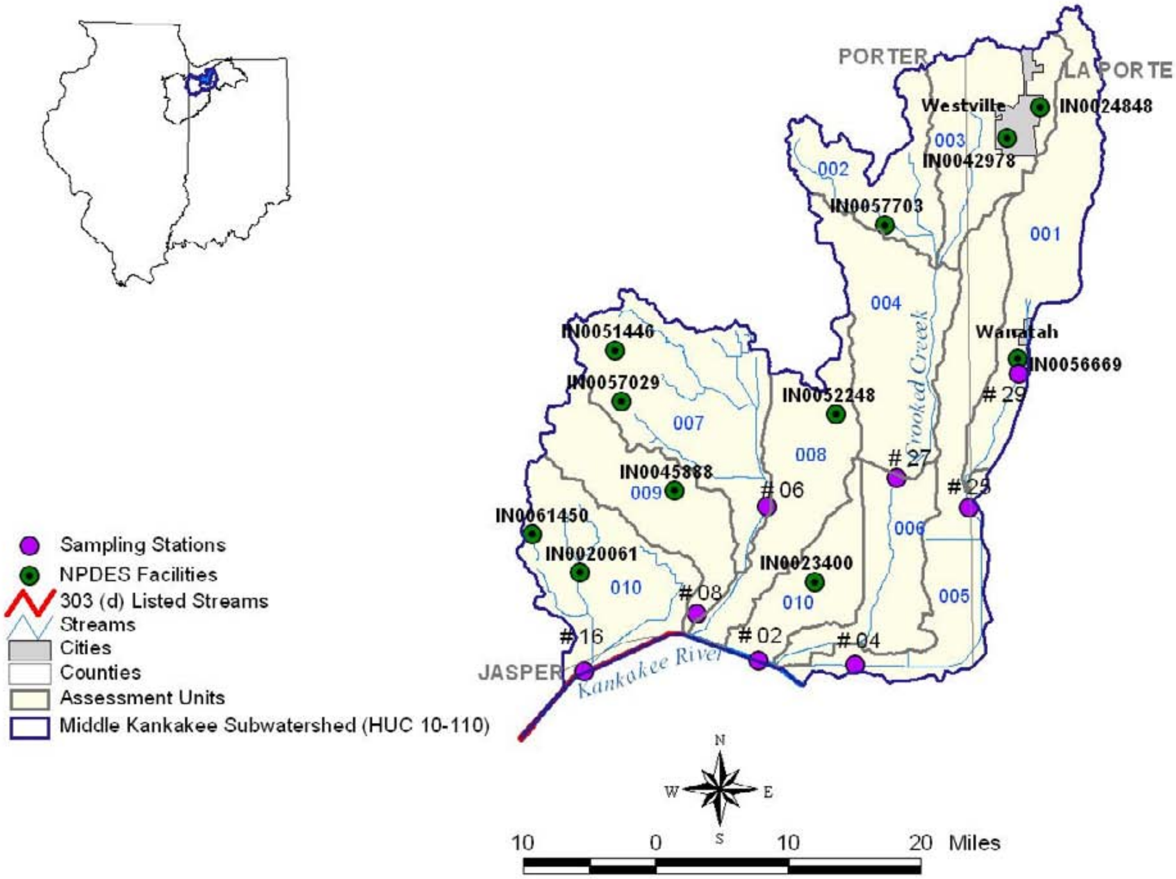


Figure 64. NPDES Facilities in the Crooked Creek-Kankakee River (HUC10-110)

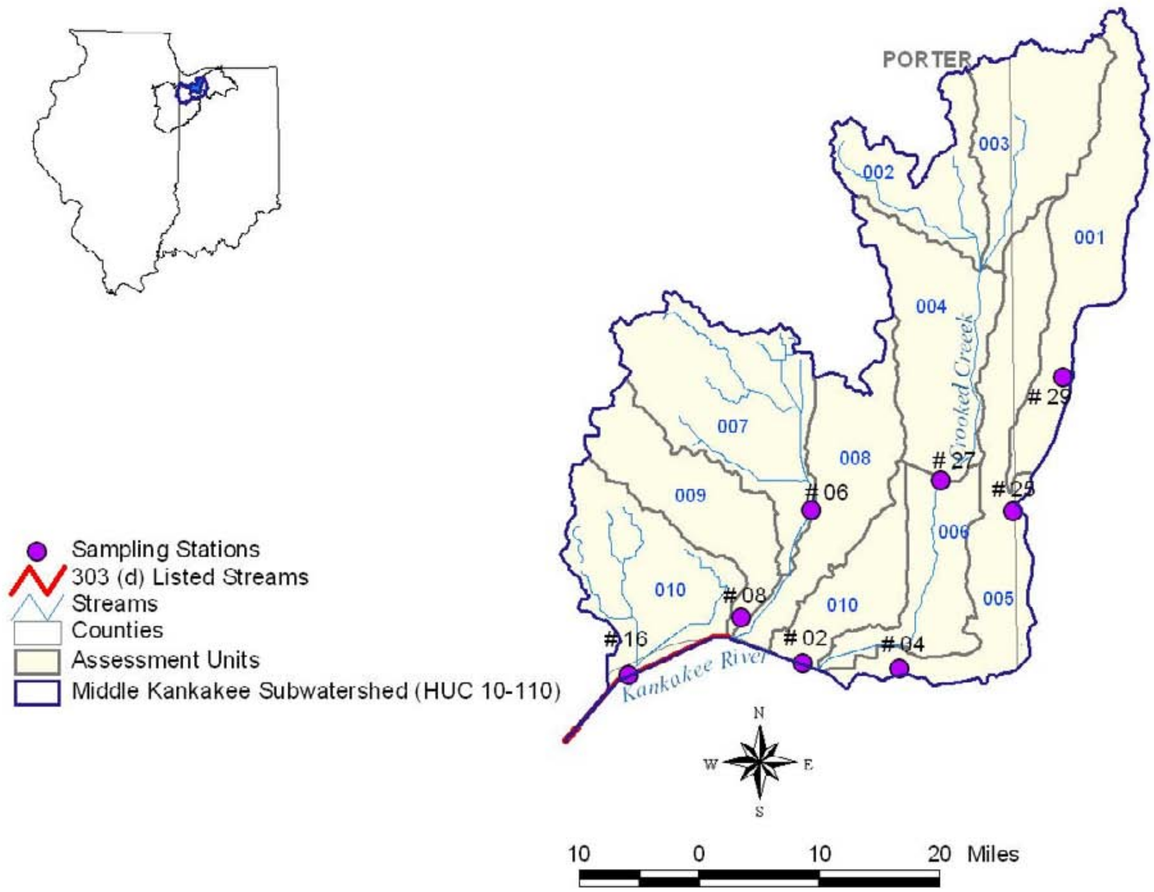


Figure 65. Feeding Operations in the Crooked Creek-Kankakee River (HUC10-110)

Table 118 through Table 123 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 001, HUC 005, HUC 006, HUC 007, and HUC 009; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are ten NPDES facilities within the Crooked Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There are five MS4 communities upstream of the Crooked Creek subwatershed outlet and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. There are three CSO communities with 26 outfalls upstream of this subwatersheds outlet. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are no CAFOs within this subwatershed, however WLAs of zero will apply to all CAFOs upstream of this subwatershed as described further in Section 7.3.

Table 118. Bloom Ditch Characteristics and TMDL Summary (HUC12-001)

Upstream Characteristics					
Drainage Area	24.32 square miles				
Sampling Station	29				
Listed Segments	None				
Land Use	Agriculture: 86.45%; Developed Land:6.86%; Forest:4.08%; Other: 2.61%				
Soils	A: 58.96%; B: 21.97%; C: 18.50%; D: 0.58%; Unknown:0.00%				
NPDES Facilities	Wanatah Wastewater Treatment Plant (IN0056669)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Taber Veal (3515)				
	Kresel (4898)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	196.29	54.59	26.84	14.32	6.16
WLA	0.37	0.37	0.37	0.37	0.37
MOS (10%)	21.84	6.11	3.02	1.63	0.73
TMDL = LA+WLA+MOS	218.5	61.07	30.23	16.32	7.26

Table 119. Reeves Ditch Characteristics and TMDL Summary (HUC12-005)

Upstream Characteristics					
Drainage Area	53.19 square miles				
Sampling Station	4, 25				
Listed Segments	None				
Land Use	Agriculture: 88.66%; Developed Land:5.18%; Forest:3.67%; Other: 2.48%				
Soils	A: 67.57%; B: 20.81%; C: 11.08%; D: 0.54%; Unknown:0.00%				
NPDES Facilities	Wanatah Wastewater Treatment Plant (IN0056669)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Taber Veal (3515)				
	Bucher Hog Farm (1053)				
	Kresel (4898)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	429.73	119.83	59.14	31.76	13.91
WLA	0.37	0.37	0.37	0.37	0.37
MOS (10%)	47.79	13.36	6.61	3.57	1.59
TMDL = LA+WLA+MOS	477.89	133.56	66.12	35.70	15.87

Table 120. Hannon Ditch-Crooked Creek Characteristics and TMDL Summary (HUC12-006)

Upstream Characteristics					
Drainage Area	77.32 square miles				
Sampling Station	27				
Listed Segments	None				
Land Use	Agriculture: 69.77%; Developed Land:12.18%; Forest:8.42%; Other: 9.62%				
Soils	A: 28.24%; B: 60.98%; C: 9.61%; D: 0.98%; Unknown:0.20%				
NPDES Facilities	Westville WWTP (IN0024848)				
	Westville Correctional Center (IN0042978)				
	Washington Twp School WWTP (IN0057703)				
MS4 Communities	Porter County (INR040140): 0.58 square miles				
	Hillsborough County-Valparaiso (INR04073): 0.27 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	Good (2325)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	612.95	169.34	81.11	41.32	15.37
WLA	12.27	5.39	5.39	5.39	5.39
MOS (10%)	69.47	19.41	9.61	5.19	2.31
TMDL = LA+WLA+MOS	694.69	194.14	96.11	51.9	23.07

Table 121. Sievers Creek-Cobb Ditch Characteristics and TMDL Summary (HUC12-007)

Upstream Characteristics					
Drainage Area	31.79 square miles				
Sampling Station	6				
Listed Segments	None				
Land Use	Agriculture: 58.25%; Developed Land:6.70%; Forest:16.72%; Other: 18.33%				
Soils	A: 3.41%; B: 40.49%; C: 55.12%; D: 0.98%; Unknown:0.00%				
NPDES Facilities	Lake Eliza Conservancy Dist (IN0051446)				
	Boone Grove High School WWTP (IN0057029)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	256.56	71.34	35.07	18.71	8.04
WLA	0.5	0.5	0.5	0.5	0.5
MOS (10%)	28.56	7.98	3.95	2.13	0.94
TMDL = LA+WLA+MOS	285.62	79.82	39.52	21.34	9.48

Table 122. Cornell Ditch-Phillips Ditch Characteristics and TMDL Summary (HUC12-009)

Upstream Characteristics					
Drainage Area	19.64 square miles				
Sampling Station	8				
Listed Segments	None				
Land Use	Agriculture: 78.94%; Developed Land:5.48%; Forest:6.92%; Other: 8.67%				
Soils	A: 3.73%; B: 37.31%; C: 58.21%; D: 0.00%; Unknown:0.75%				
NPDES Facilities	Boone Grove Elementary & Middle Schools (IN0045888)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	158.7	44.27	21.86	11.76	5.16
WLA	0.11	0.11	0.11	0.11	0.11
MOS (10%)	17.65	4.93	2.44	1.31	0.59
TMDL = LA+WLA+MOS	176.46	49.31	24.41	13.18	5.86

Table 123. Cobb Creek-Kankakee River Characteristics and TMDL Summary (HUC12-010)

Upstream Characteristics	
Drainage Area	1,507.83 square miles
Sampling Station	2,16
Listed Segments	INK019F_M1113, INK019F_M1104
Land Use	Agriculture: 68.56%; Developed Land:8.68%; Forest:13.52%; Other: 9.237%
Soils	A: 48.50%; B: 37.50%; C: 11.63%; D: 1.38%; Unknown:0.98%
NPDES Facilities	All facilities upstream of HUC12-807
	Wanatah Wastewater Treatment Plant (IN0056669)
	Westville WWTP (IN0024848)
	Westville Correctional Center (IN0042978)
	Washington Twp School WWTP (IN0057703)
	Lake Eliza Conservancy Dist (IN0051446)
	Boone Grove High School WWTP (IN0057029)
	Boone Grove Elementary & Middle Schools (IN0045888)
	Hebron WWTP (IN0061450)
	Hebron Municipal WWTP (IN0020061)
	Kouts Municipal WWTP (IN0023400)
MS4 Communities	La Porte County (INR040107): 14.93 square miles
	South Bend (INR040114): 3.42 square miles
	Plymouth (INR040064): 6.97 square miles
	Porter County (INR040140): 2.96 square miles
	Hillsborough County-Valparaiso (INR04073): 1.90 square miles
CSO Communities	North Judson Municipal (IN0020877)-1 outfall
	Plymouth Municipal STP (IN0020991-10 outfalls
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed
CAFOs	All facilities upstream of HUC12-807
CFOs	All facilities upstream of HUC12-807
	Bucher Hog Farm (1053)
	Kresel (4898)
	Taber Veal (3515)
	Good (2325)

TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	11,830	3,316	1,595	819	313
WLA	362	92	92	92	92
MOS (10%)	1,355	378	187	101	45
TMDL = LA+WLA+MOS	13,547	3,786	1,874	1,012	450

7.1.2.4 Knight Ditch-Kankakee River Subwatershed (HUC10-111)

The Knight Ditch subwatershed has an area of approximately 109 square miles and includes the cities of DeMotte and Roselawn (Figure 66). About 70 percent of the land is used for agriculture (Table 126). There are five NPDES facilities (Figure 67) and three CAFOs (Figure 68) in the subwatershed. The available E. coli data are summarized in Table 125 and indicate that reductions of 37 to 79 percent are needed to achieve a geomean of 125 #/100 mL.

Table 124. Station Locations in the Knight Ditch-Kankakee River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
101	Dehaan Ditch	ID# 20	Dehaan D
103	Brown Levee Ditch-Kankakee River	ID# 14	Kankakee R

Table 125. Summary of Pathogen Data in the Knight-Kankakee River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
20	6/3/2008 - 7/1/2008	5	100	100	249	602	700	1,300	79%
14	6/3/2008 - 7/1/2008	5	100	20	153	198	203	285	37%

Table 126. Land Use/Land Cover in the Knight Ditch-Kankakee River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	44670.94	69.80	63.96
Forested Land	11641.88	18.19	16.67
Developed Land	6360.245	9.94	9.11
Grassland and Shrubs	3079.712	4.81	4.41
Wetland	2920.255	4.56	4.18
Pasture/Hay	700.541	1.09	1.00
Open Water	464.5826	0.73	0.67
Total	**69,838.15**	**109.12**	**100.00**

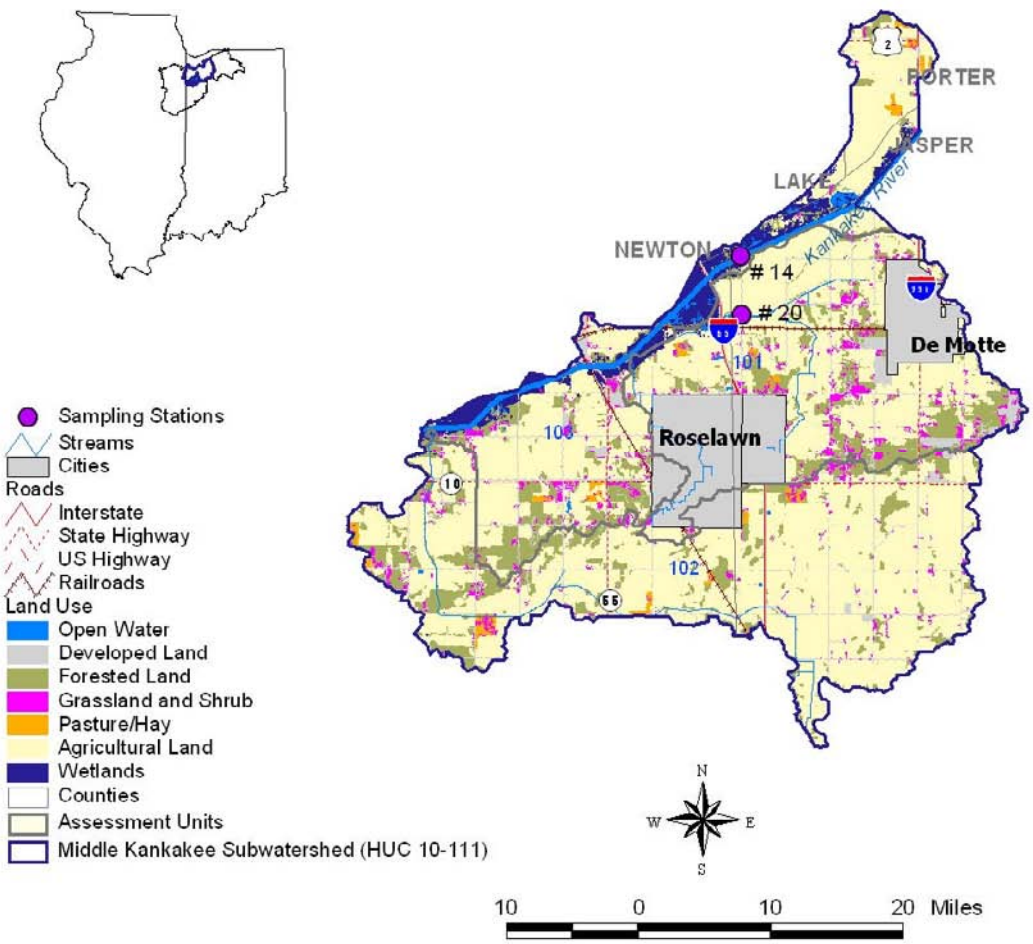


Figure 66. Location of Knight Ditch-Kankakee River (HUC10-111)

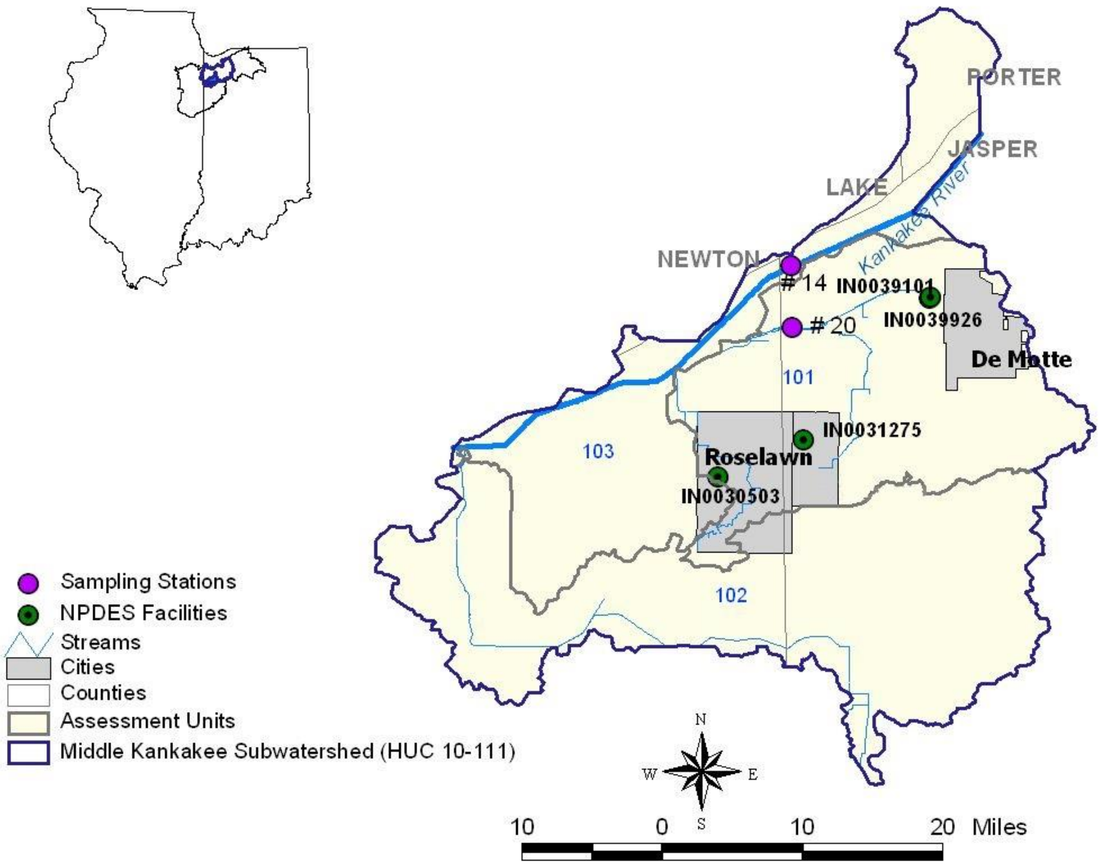


Figure 67. NPDES Facilities in the Knight Ditch-Kankakee River (HUC10-111)

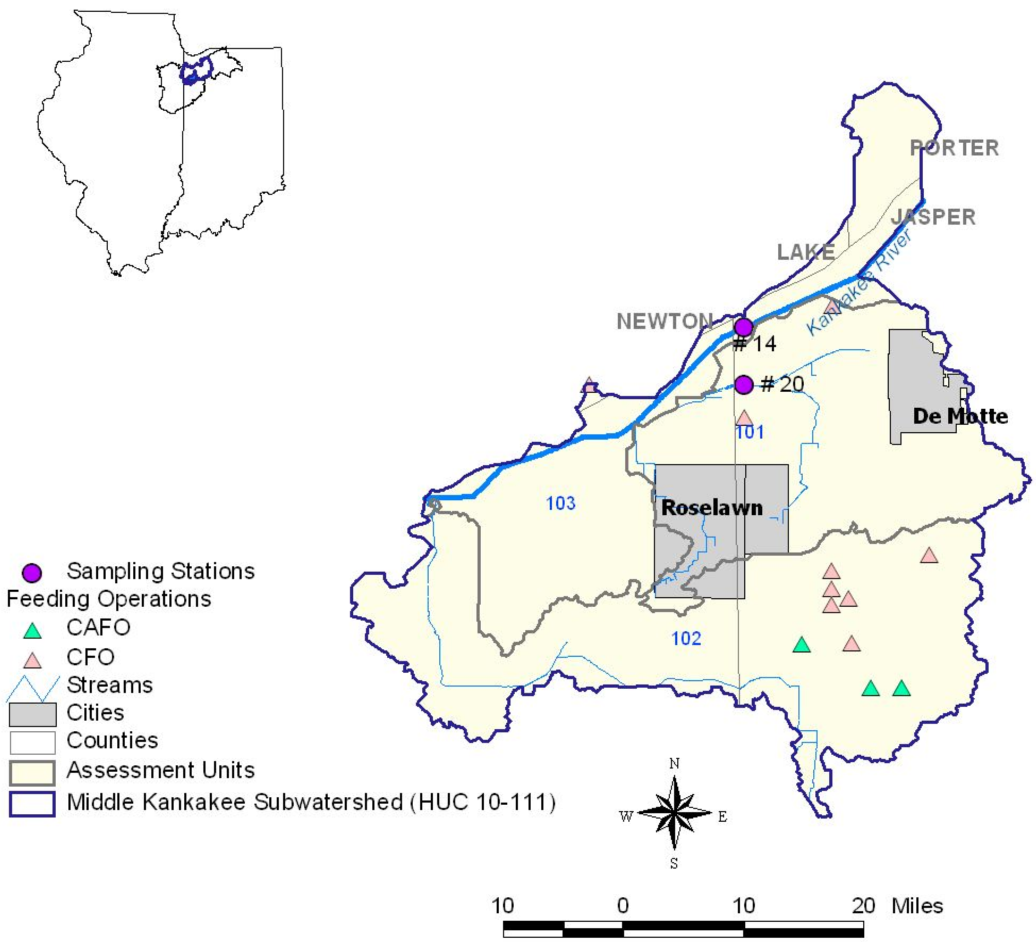


Figure 68. Feeding Operations in the Knight Ditch-Kankakee River (HUC10-111)

Table 127 and Table 128 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in either HUC; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are four NPDES facilities within the Knight Ditch subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There are five MS4 communities upstream of the Knight Ditch subwatershed outlet and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. There are three CSO communities with 26 outfalls upstream of this subwatersheds outlet. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are three CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

A reserve capacity has been established in this subwatershed for future growth of new, expanded, or unidentified sources. The reserve capcity is available for use by either point or nonpoint sources to accommodate future growth (e.g., new facilities, urban development) as well as to provide an allocation to any existing source that may not have been identified during the development of the TMDL. IDEM will contact U.S. EPA regarding the use of this reserve capacity via modifications to the revised January 13, 2020 TMDL.

Table 127. Dehann Ditch Characteristics and TMDL Summary (HUC12-101)

Upstream Characteristics					
Drainage Area	36.46 square miles				
Sampling Station	20				
Listed Segments	None				
Land Use	Agriculture: 57.40%; Developed Land:14.64%; Forest:19.43%; Other: 8.54%				
Soils	A: 80.65%; B: 14.92%; C: 3.23%; D: 0.40%; Unknown:0.81%				
NPDES Facilities	Lincoln Elementary School (IN0030503)				
	Kankakee Rest Area (IN0031275)				
	Water Services Co Of Indiana (IN0039101)				
	Demotte Municipal WWTP (IN0039926)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Walstra (3993)				
	Devries Farms Inc (92)				
TMDL Allocations (billion/day)*					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	238.28	86.08	38.16	16.46	8.29
WLA	3.48	3.48	3.48	3.48	3.48
MOS (10%)	27.91	11.00	5.68	3.27	2.36
Reserve Capacity	9.46	9.46	9.46	9.46	9.46
TMDL = LA+WLA+MOS	279.13	110.02	56.78	32.67	23.59

* Design flows from the NPDES facilities were added to the flow estimates to account for the possibility that the facilities could discharge at this level. Without these modifications the WLA would exceed the TMDL during low flows.

Table 128. Brown Levee Ditch-Kankakee River Characteristics and TMDL Summary (HUC12-103)

Upstream Characteristics	
Drainage Area	1,701.08 square miles
Sampling Station	14
Listed Segments	None
Land Use	Agriculture: 68.56%; Developed Land:8.68%; Forest:13.52%; Other: 9.237%
Soils	A: 48.50%; B: 37.50%; C: 11.63%; D: 1.38%; Unknown:0.98%
NPDES Facilities	All facilities upstream of HUC12-010 and HUC12-904
	Lincoln Elementary School (IN0030503)
	Kankakee Rest Area (IN0031275)
	Water Services Co Of Indiana (IN0039101)
	Demotte Municipal WWTP (IN0039926)
MS4 Communities	La Porte County (INR040107): 14.93 square miles
	South Bend (INR040114): 3.42 square miles
	Plymouth (INR040064): 6.97 square miles
	Porter County (INR040140): 2.96 square miles
	Hillsborough County-Valparaiso (INR04073): 1.90 square miles
CSO Communities	North Judson Municipal (IN0020877)-1 outfall
	Plymouth Municipal STP (IN0020991-10 outfalls
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed
CAFOs	All facilities upstream of HUC12-010 and HUC12-904
	Bos Dairy Site # 4 (ING806155)
	Dekock Feedlot, Inc. (ING804410)
	Dekock Feedlot Inc. (ING801782)
CFOs	All facilities upstream of HUC12-010 and HUC12-904
	Hamstrafarms (1063)
	Vander Molen (3716)
	Walstra (3993)
	Hamstra Brothers (4344)
	Jonkman (2466)
	H & H Feedlots (4432)
	Northern Trust Farm #180 (4692)
	Devries Farms Inc (92)
	Mathis (2003)

TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	10,848	3,972	1,736	724	342
WLA	320.54	95.54	95.54	95.54	95.54
MOS (10%)	1,242	453	205	92	50
Reserve Capacity	9.46	9.46	9.46	9.46	9.46
TMDL = LA+WLA+MOS	12,420	4,530	2,046	921	497

7.1.2.5 Beaver Lake Ditch-Kankakee River Subwatershed (HUC 10-112)

The Beaver Lake Ditch has an area of approximately 99 square miles lies within Jasper Kankakee, Lake, and Newton counties and does not encompass any urban areas (Figure 69). As in all of the above discussed subwatersheds, agriculture is the dominant land use here as well (Table 131). There is only one NPDES facility and two CAFOs as shown in Figure 70 and Figure 71 respectively. None of the impaired segments lie within this subwatershed; however, sampling at the two HUC 12s (Table 129) has indicated impaired conditions (Table 130). The reductions needed to achieve a geomean of 125 #/100 mL range from 29 to 78 percent.

Table 129. Stations Located in the Beaver Lake Ditch-Kankakee River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
203	Lawler Ditch-Beaver Lake Ditch	ID# 40	Lawler D
		ID# 42	Beaver Lake
205	Beaver Lake Ditch-Kankakee River	ID# 36	Kankakee R
		ID# 38	Beaver Lake

Table 130. Summary of Pathogen Data in the Beaver Lake Ditch-Kankakee River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
40	6/3/2008 - 7/1/2008	5	80	40	96	204	232	411	39%
42	6/3/2008 - 7/1/2008	5	100	60	133	222	231	308	44%
36	6/3/2008 - 7/1/2008	5	80	40	112	175	184	249	29%
38	6/3/2008 - 7/1/2008	5	100	100	365	560	595	866	78%

Table 131. Land Use/Land Cover in the Beaver Lake Ditch-Kankakee River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	44,267.74	69.17	70.18
Forested Land	9,086.57	14.20	14.41
Developed Land	4,136.31	6.46	6.56
Grassland and Shrubs	2,393.18	3.74	3.79
Wetland	1,318.13	2.06	2.09
Pasture/Hay	1,150.89	1.80	1.82
Open Water	723.45	1.13	1.15
Total	**63,076.26**	**98.56**	**100.00**

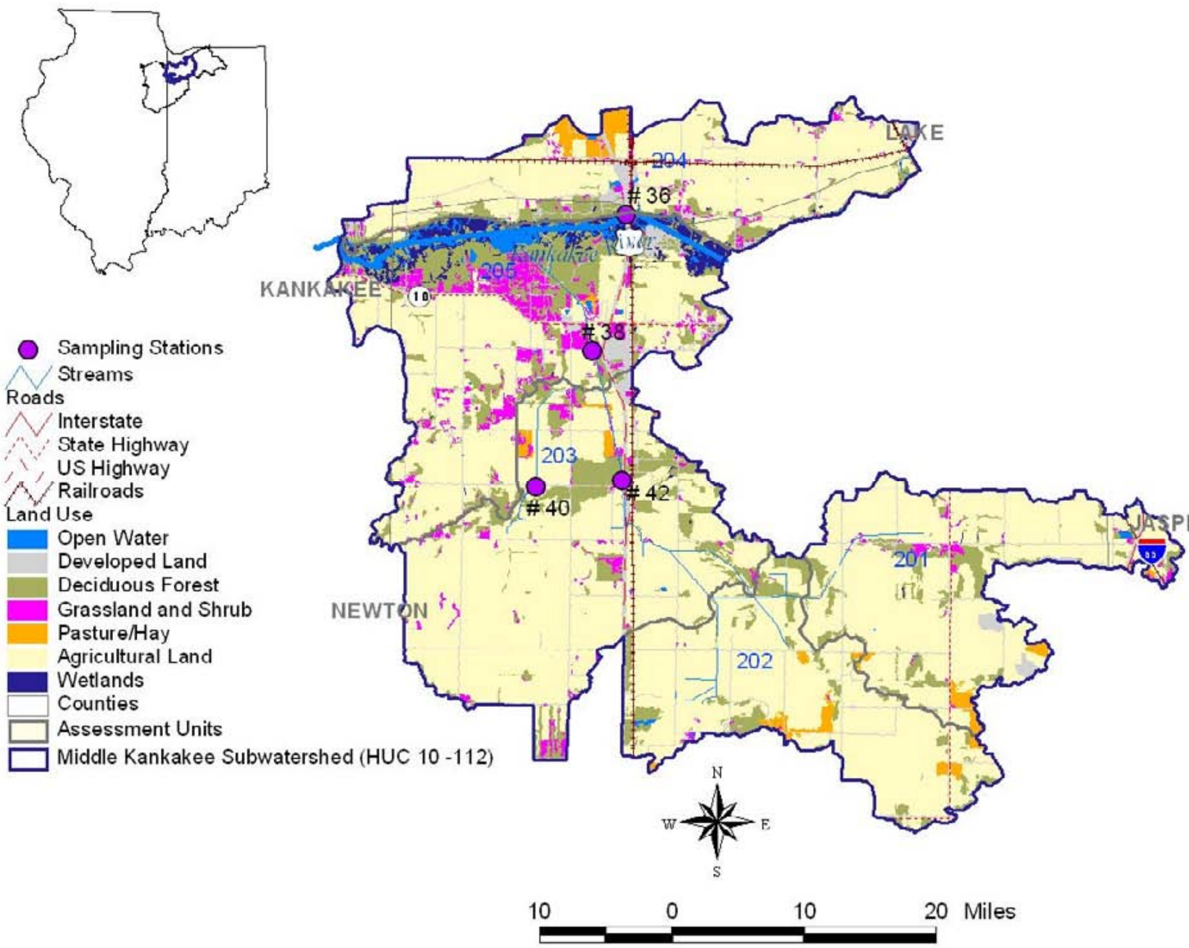


Figure 69. Location of Beaver Lake Ditch-Kankakee River Subwatershed (HUC10-112)

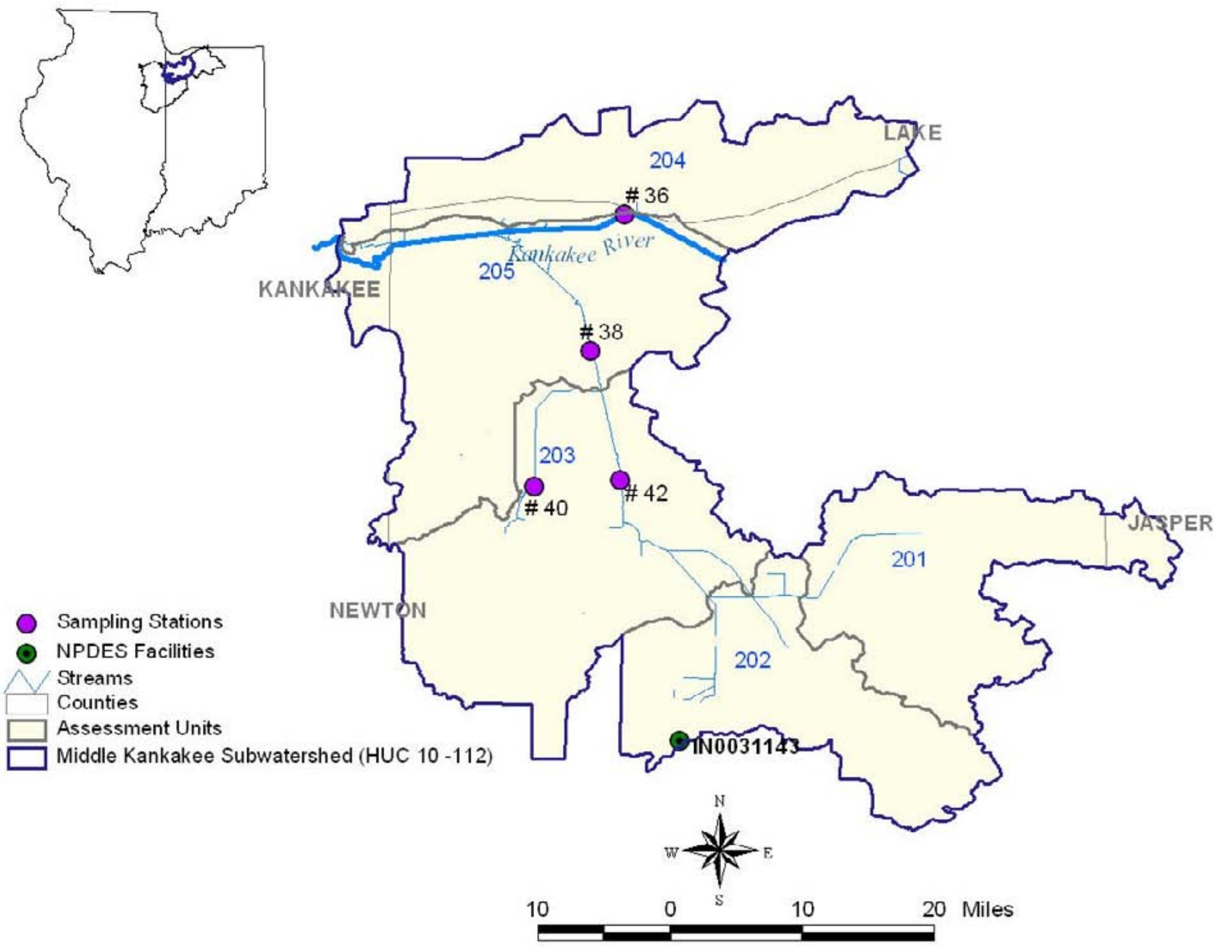


Figure 70. NPDES Facilities in the Beaver Lake Ditch-Kankakee River Subwatershed (HUC10-112)

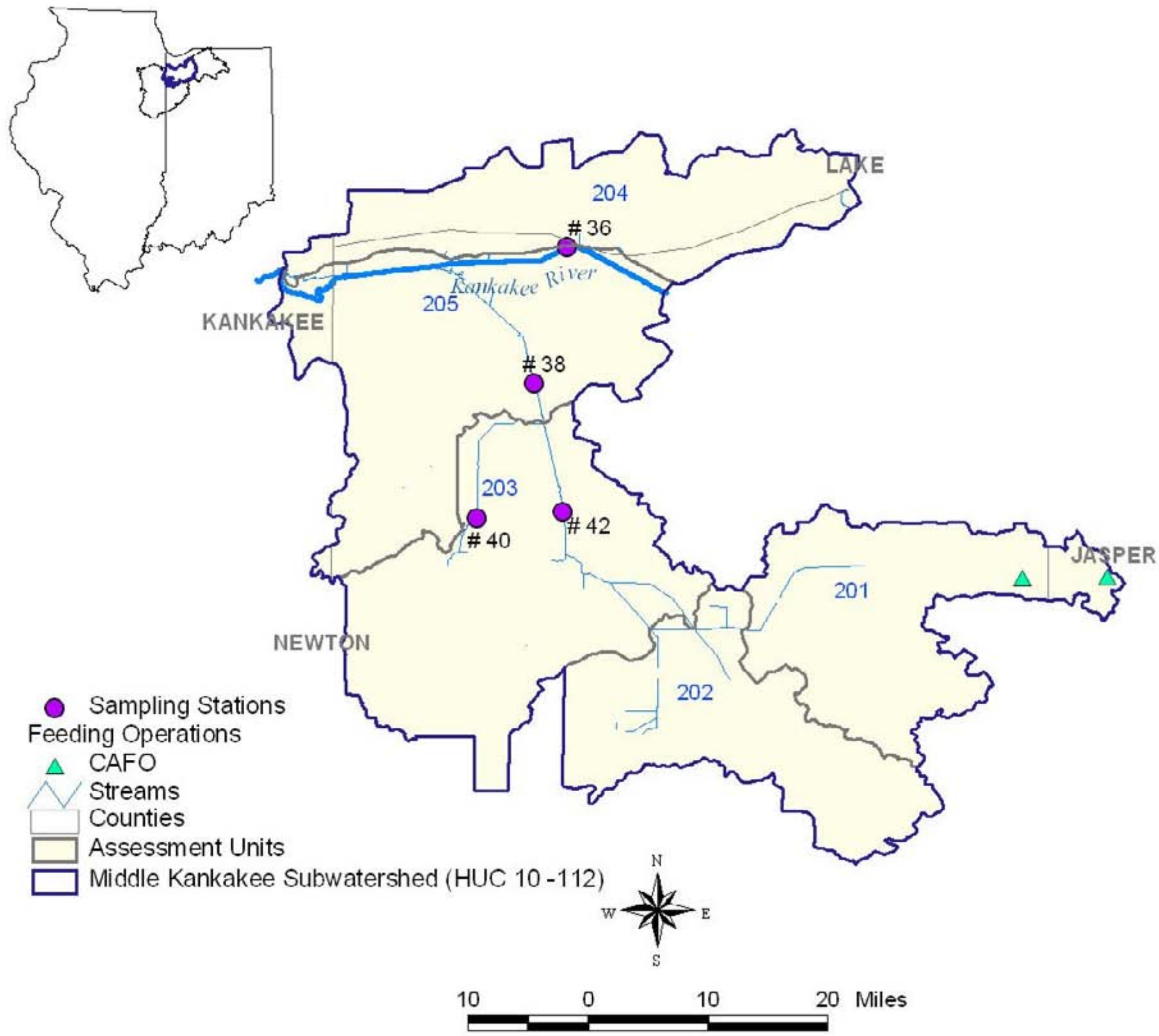


Figure 71. Feeding Operations in the Beaver Lake Ditch-Kankakee River Subwatershed (HUC10-112)

Table 132 and Table 133 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in these HUCs; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There is one NPDES facility within the Beaver Lake Ditch subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There are five MS4 communities upstream of the Beaver Lake Ditch subwatershed outlet and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. There are three CSO communities with 26 outfalls upstream of this subwatersheds outlet. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are two CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 132. Lawler Ditch-Beaver Lake Ditch Characteristics and TMDL Summary (HUC12-203)

Upstream Characteristics					
Drainage Area	57.86 square miles				
Sampling Station	40,42				
Listed Segments	None				
Land Use	Agriculture: 78.62%; Developed Land:5.38%; Forest:11.90%; Other: 4.90%				
Soils	A: 79.22%; B: 16.36%; C: 4.42%; D: 0.00%; Unknown:0.00%				
NPDES Facilities	North Newton Jr Sr High School (IN0031143)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Fair Oaks Dairy Farm North (ING806015)				
	Herrema Dairy (ING806154)				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	380.06	138.52	62.48	28.04	15.07
WLA	0.14	0.14	0.14	0.14	0.14
MOS (10%)	42.24	15.41	6.96	3.13	1.69
TMDL = LA+WLA+MOS	422.44	154.07	69.58	31.31	16.90

Table 133. Beaver Lake Ditch-Kankakee River Characteristics and TMDL Summary (HUC12-205)

Upstream Characteristics					
Drainage Area	1,799.67 square miles				
Sampling Station	36, 38				
Listed Segments	None				
Land Use	Agriculture: 68.56%; Developed Land:8.52%; Forest:13.80%; Other: 9.12%				
Soils	A: 51.10%; B: 35.96%; C: 10.62%; D: 1.43%; Unknown:0.90%				
NPDES Facilities	All facilities upstream of HUC12-103[a]				
	North Newton Jr Sr High School (IN0031143)				
MS4 Communities	La Porte County (INR040107): 14.93 square miles				
	South Bend (INR040114): 3.42 square miles				
	Plymouth (INR040064): 6.97 square miles				
	Porter County (INR040140): 2.96 square miles				
	Hillsborough County-Valparaiso (INR04073): 1.90 square miles				
CSO Communities	North Judson Municipal (IN0020877)-1 outfall				
	Plymouth Municipal STP (IN0020991-10 outfalls				
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	All facilities upstream of HUC12-103[a]				
	Fair Oaks Dairy Farm North (ING806015)				
	Herrema Dairy (ING806154)				
CFOs	All facilities upstream of HUC12-103[a]				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	11,495	4,207	1,842	771	367
WLA	330	106	106	106	106
MOS (10%)	1,314	479	216	97	53
TMDL = LA+WLA+MOS	13,139	4,792	2,164	974	526

[a] Refers to Middle Kankakee HUC12

7.1.2.6 Singleton Ditch Subwatershed (HUC10-113)

The Singleton Ditch subwatershed has an area of nearly 254 square miles. Lake Delecarlia and Lowell are the two cities that lie completely within the subwatershed (Figure 72). Agriculture is the dominant land use in this subwatershed (Table 137). NPDES facilities and feeding operations in this subwatershed are displayed in Figure 73 and Figure 74, respectively. As listed in Table 134, one 303(d) listed segment is reported in this subwatershed. This segment was not sampled in 2008. *E. coli* data at seven locations (Table 135) suggested impaired conditions (Table 136). Station # 22 samples did not exceed the geomean standard, however 20 percent of samples did exceed the not-to-exceed standard. The required reduction based on the geomean of five samples ranges from 0 to 80 percent in this subwatershed.

Table 134. 303 (d) Streams in the Singleton Ditch Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
305	Bryant Ditch-Singleton Ditch	INK01D3_00	Singleton Ditch-Bryant Ditch	39.69	*E. coli*

Table 135. Station Locations in the Singleton Ditch Subwatershed

HUC 12	HU C 12 Name	Station #	Stream Name
302	Fisher Pond- Stony Run	ID# 18	Stony Run D
304	Greisel Ditch	ID# 24	Griesel D
306	Cedar Creek	ID# 26	Cedar Cr
		ID# 28	Cedar Cr
307	Brown Ditch	ID# 22	Brown D
308	Bull Run-West Creek	ID# 30	West Cr
310	West Creek	ID# 32	West Cr
311	Bruce Ditch-Singleton Ditch	ID# 34	Singleton D

Table 136. Summary of Pathogen Data in the Singleton Ditch Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
18	6/3/2008 - 7/1/2008	5	100	100	517	635	641	770	80%
24	6/3/2008 - 7/1/2008	5	100	100	282	429	489	1,046	71%
26	6/3/2008 - 7/1/2008	5	100	100	378	485	500	687	74%
28	6/3/2008 - 7/1/2008	5	100	80	192	426	575	1,553	71%
22	6/3/2008 - 7/1/2008	5	60	20	42	125	152	291	0%
30	6/3/2008 - 7/1/2008	5	100	100	248	509	589	1,120	75%
32	6/3/2008 - 7/1/2008	5	100	100	245	561	740	1,733	78%
34	6/3/2008 - 7/1/2008	5	100	100	291	379	388	517	67%

Table 137. Land Use/Land Cover in the Singleton Ditch Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	111,924.88	174.88	68.87
Forested Land	14,865.92	23.23	9.15
Developed Land	16,737.59	26.15	10.30
Grassland and Shrubs	9,321.87	14.57	5.74
Pasture/Hay	7,149.52	11.17	4.40
Open Water	2,090.28	3.27	1.29
Wetland	429.67	0.67	0.26
Total	**162,519.72**	**253.94**	**100.00**

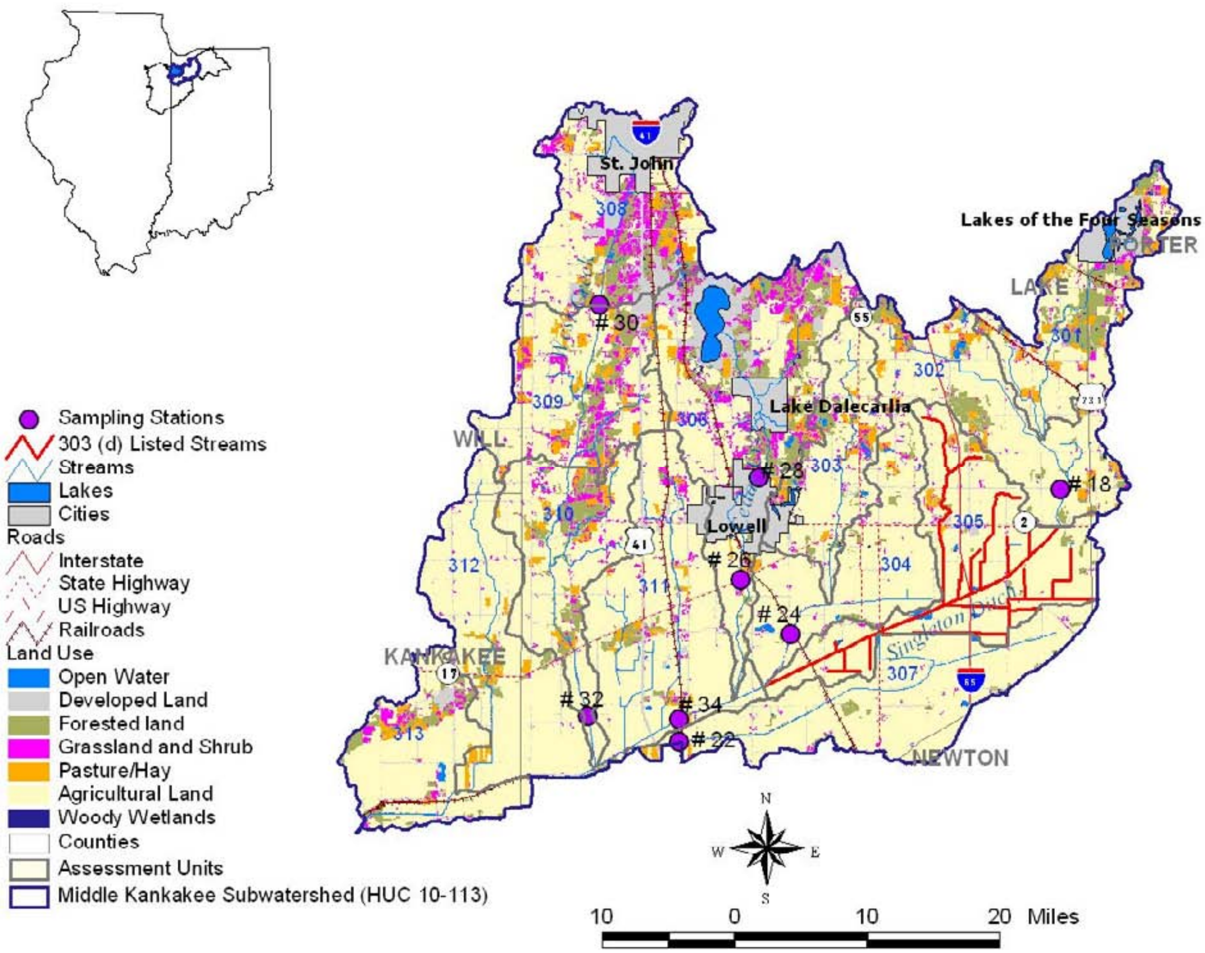


Figure 72. Location of Singleton Ditch Subwatershed (HUC10-113)

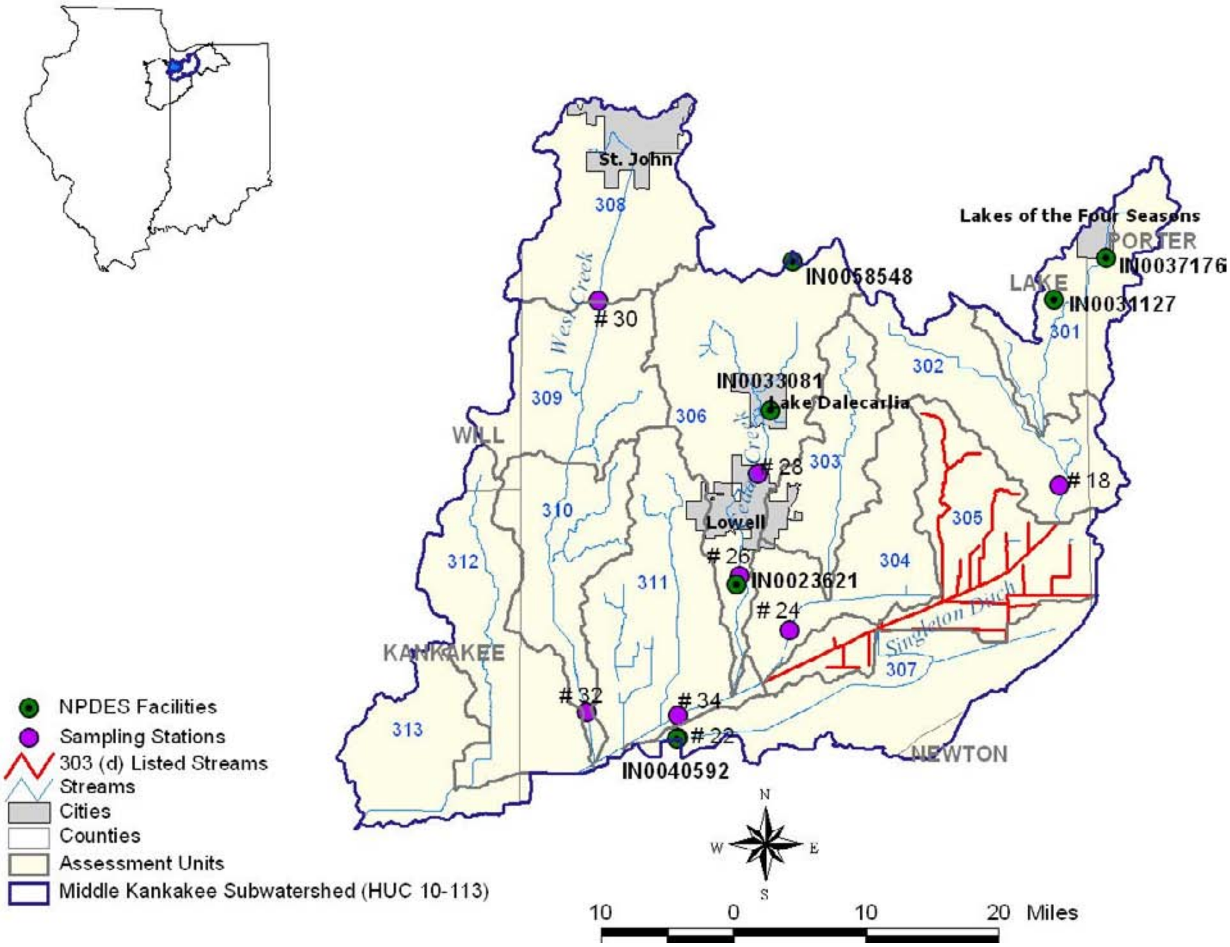


Figure 73. NPDES Facilities in the Singleton Ditch Subwatershed (HUC10-113)

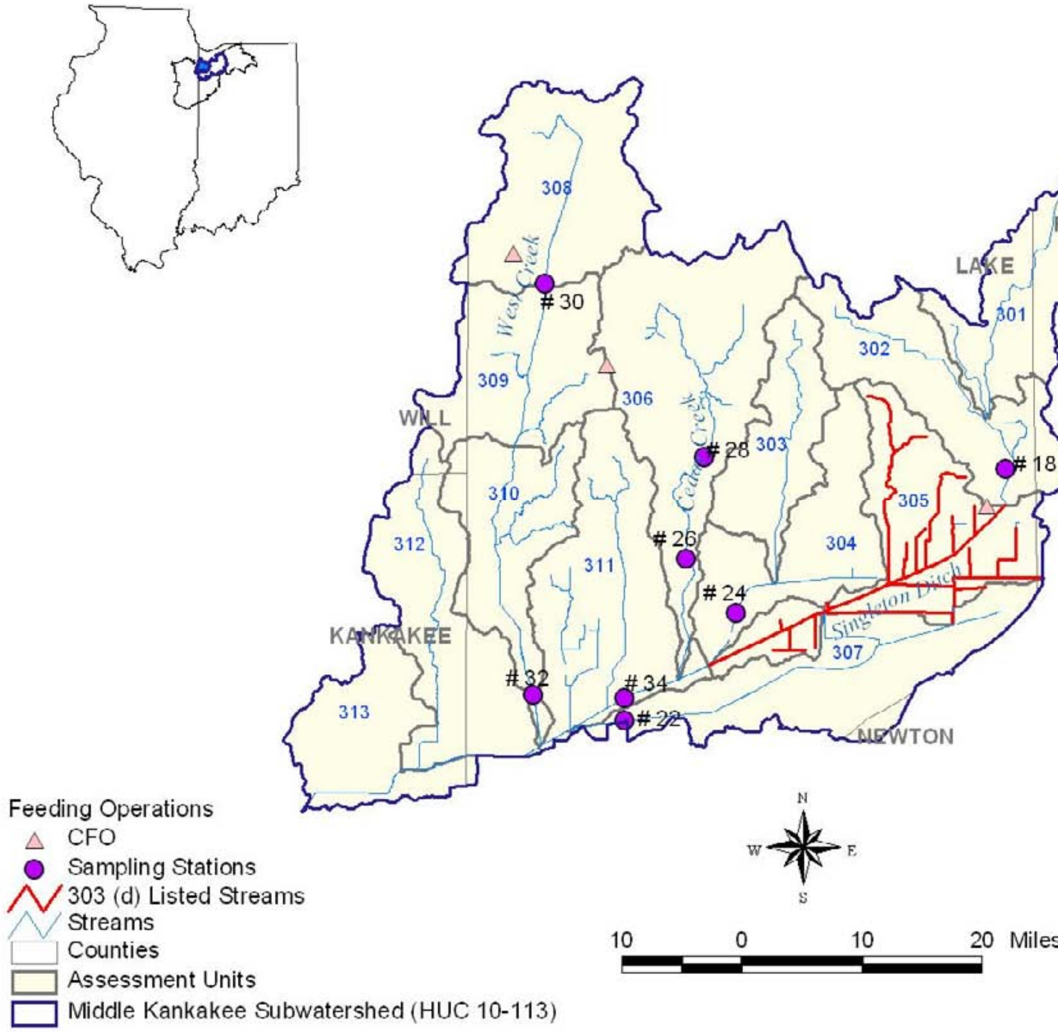


Figure 74. Feeding Operations in the Singleton Ditch Subwatershed (HUC10-113)

Table 138 through Table 145 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 407; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are six NPDES facilities within the Mill Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits There are six MS4 communities upstream of the Beaver Lake Ditch subwatershed outlet and the WLAs for the communities were calculated based on their area within the subwatershed and *E. coli* standards. There is one CSO community with 1 outfall upstream of this subwatersheds outlet. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are no CAFOs within this subwatershed.

Table 138. Fish Pond-Stony Run Characteristics and TMDL Summary (HUC12-302)

Upstream Characteristics					
Drainage Area	34.07 square miles				
Sampling Station	18				
Listed Segments	None				
Land Use	Agriculture: 61.59%; Developed Land:10.76%; Forest:14.29%; Other: 13.36%				
Soils	A: 2.68%; B: 11.61%; C: 82.59%; D: 0.89%; Unknown:2.23%				
NPDES Facilities	Winfield Elementary School (IN0031127)				
	Twin Lakes Utilities (IN0037176)				
MS4 Communities	Lakes of the Four Seasons POA (INR040007): 1.09 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	261.43	71.75	32.87	15.33	3.9
WLA	14.07	5.25	5.25	5.25	5.25
MOS (10%)	30.6	8.55	4.23	2.29	1.01
TMDL = LA+WLA+MOS	306.1	85.55	42.35	22.87	10.16

Table 139. Greisel Ditch Characteristics and TMDL Summary (HUC12-304)

Upstream Characteristics					
Drainage Area	29.30 square miles				
Sampling Station	24				
Listed Segments	None				
Land Use	Agriculture: 80.37%; Developed Land:7.03%; Forest:5.43%; Other: 7.17%				
Soils	A: 9.47%; B: 29.47%; C: 57.89%; D: 2.11%; Unknown:1.05%				
NPDES Facilities	None				
MS4 Communities	Town of Lowell (INR040046): 0.91 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	229.57	66.21	32.78	17.70	7.87
WLA	7.36	0.00	0.00	0.00	0.00
MOS (10%)	26.32	7.36	3.64	1.97	0.87
TMDL = LA+WLA+MOS	263.25	73.57	36.42	19.67	8.74

Table 140. Bryant Ditch-Singleton Ditch Characteristics and TMDL Summary (HUC12-305)

Upstream Characteristics					
Drainage Area	57.57 square miles				
Sampling Station	None				
Listed Segments	INK01D3_00				
Land Use	Agriculture: 71.87%; Developed Land:9.01%; Forest:9.59%; Other: 9.54%				
Soils	A: 16.45%; B: 22.72%; C: 58.49%; D: 0.52%; Unknown:1.83%				
NPDES Facilities	Winfield Elementary School (IN0031127)				
	Twin Lakes Utilities (IN0037176)				
MS4 Communities	Lakes of the Four Seasons POA (INR040007): 1.09 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	Bryantfarm (1467)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	451.45	124.85	59.15	29.53	10.2
WLA	14.07	5.25	5.25	5.25	5.25
MOS (10%)	51.72	14.45	7.16	3.86	1.72
TMDL = LA+WLA+MOS	517.24	144.55	71.56	38.64	17.17

Table 141. Cedar Creek Characteristics and TMDL Summary (HUC12-306)

Upstream Characteristics					
Drainage Area	31.29 square miles				
Sampling Station	26,28				
Listed Segments	None				
Land Use	Agriculture: 37.56%; Developed Land:21.75%; Forest:17.79%; Other: 22.90%				
Soils	A: 3.88%; B: 9.22%; C: 80.58%; D: 0.49%; Unknown:5.83%				
NPDES Facilities	Lowell WWTP (IN0023621)				
	Dalecarlia Utilities Lake Dale (IN0033081)				
	Buckhill Estates WWTP (IN0058548)				
MS4 Communities	Town of Lowell (INR040046): 2.82 square miles				
	City of Crown Point (INR040054): 0.35 square miles				
	Town of Cedar Lake (INR040075): 6.35 square miles				
	Lake County (INR040124): 9.38 square miles				
CSO Communities	Lowell Municipal STP (IN0023621)-1 outfall				
CAFOs	None				
CFOs	Huseman Farm Inc.(810)				
TMDL Allocations (billion/day)*					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	450.73	95.74	34.83	17.68	4.94
WLA	496.84	19.23	19.23	19.23	19.23
MOS (10%)	105.29	12.77	6	4.09	2.68
TMDL = LA+WLA+MOS	1052.86	127.74	60.06	41	26.85

* Design flows from the NPDES facilities and Lowell Municipal STP CSO were added to the originally estimated flows. Without these modifications the WLA would exceed the TMDL during high and low flows.

Table 142. Brown Ditch Characteristics and TMDL Summary (HUC12-307)

Upstream Characteristics					
Drainage Area	21.35 square miles				
Sampling Station	22				
Listed Segments	None				
Land Use	Agriculture: 89.24%; Developed Land:4.24%; Forest:2.99%; Other: 3.53%				
Soils	A: 63.89%; B: 36.11%; C: 0.00%; D: 0.00%; Unknown:0.00%				
NPDES Facilities	Schneider WWTP (IN0040592)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	172.33	47.94	23.58	12.59	5.42
WLA	0.31	0.31	0.31	0.31	0.31
MOS (10%)	19.18	5.36	2.65	1.43	0.64
TMDL = LA+WLA+MOS	191.82	53.61	26.54	14.33	6.37

Table 143. Bull Run -West Creek Characteristics and TMDL Summary (HUC12-308)

Upstream Characteristics					
Drainage Area	21.53 square miles				
Sampling Station	30				
Listed Segments	None				
Land Use	Agriculture: 39.24%; Developed Land:25.16%; Forest:12.95%; Other: 22.65%				
Soils	A: 4.20%; B: 11.19%; C: 81.12%; D: 2.10%; Unknown:1.40%				
NPDES Facilities	None				
MS4 Communities	Town of Cedar Lake (INR040075): 0.96 square miles				
	Town of St. John (INR040047): 4.29 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	Kleine (661)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	131.65	48.65	24.09	13.01	5.78
WLA	42.45	0	0	0	0
MOS (10%)	19.34	5.41	2.67	1.44	0.64
TMDL = LA+WLA+MOS	193.44	54.06	26.76	14.45	6.42

Table 144. West Creek Characteristics and TMDL Summary (HUC12-310)

Upstream Characteristics					
Drainage Area	55.57 square miles				
Sampling Station	32				
Listed Segments	None				
Land Use	Agriculture: 54.49%; Developed Land:13.45%; Forest:13.06%; Other: 19%				
Soils	A: 4.85%; B: 15.09%; C: 77.36%; D: 2.16%; Unknown:0.54%				
NPDES Facilities	None				
MS4 Communities	Town of Cedar Lake (INR040075): 1.35 square miles				
	Town of St. John (INR040047): 4.29 square miles				
CSO Communities	None				
CAFOs	None				
CFOs	Kleine (661)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	403.74	125.58	62.17	33.57	14.92
WLA	45.61	0.00	0.00	0.00	0.00
MOS (10%)	49.92	13.95	6.90	3.73	1.66
TMDL = LA+WLA+MOS	499.27	139.53	69.07	37.30	16.58

Table 145. Bruce Ditch-Singleton Ditch Characteristics and TMDL Summary (HUC12-311)

Upstream Characteristics					
Drainage Area	219.77 square miles				
Sampling Station	34				
Listed Segments	None				
Land Use	Agriculture: 66.57%; Developed Land:11.16%; Forest:9.73%; Other: 12.54%				
Soils	A: 14.41%; B: 23.47%; C: 59.44%; D: 1.03%; Unknown:1.65%				
NPDES Facilities	Winfield Elementary School (IN0031127)				
	Dalecarlia Utilities Lake Dale (IN0033081)				
	Twin Lakes Utilities (IN0037176)				
	Schneider WWTP (IN0040592)				
	Buckhill Estates WWTP (IN0058548)				
	Lowell WWTP (IN0023621)				
MS4 Communities	Town of Lowell (INR040046): 4.16 square miles				
	City of Crown Point (INR040054): 0.35 square miles				
	Town of Cedar Lake (INR040075): 7.70 square miles				
	Lake County (INR040124): 9.38 square miles				
	Lakes of the Four Seasons POA (INR040007): 1.09 square miles				
	Town of St. John (INR040047): 4.29 square miles				
CSO Communities	Lowell Municipal STP (IN0023621)-1 outfall				
CAFOs	None				
CFOs	Bryantfarm (1467)				
	Huseman Farm Inc. (810)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1513.98	471.85	221.08	107.98	34.22
WLA	263.11	24.79	24.79	24.79	24.79
MOS (10%)	197.45	55.18	27.31	14.75	6.55
TMDL = LA+WLA+MOS	1974.54	551.82	273.18	147.52	65.56

7.1.3 Yellow River Subwatershed

Within the Yellow River major subwatershed there are three HUC 10 watersheds and 23 HUC 12 subwatersheds as shown in Table 146. The following sections provide a brief description of each HUC 10 subwatershed and the TMDL allocations.

Table 146. Hydrologic Unit Code (HUC 10 and 12) in the Yellow River Subwatershed

HUC 10	HUC 10 Name	HUC 12	HUC 12 Name	Area (sq. miles)
103	Headwaters Yellow River	301	Lateral Ditch No 5	16.81
		302	Kline Rouch Ditch-Yellow River	37.27
		303	Amery Ditch	27.02
		304	Headwaters Stock Ditch	22.71
		305	West Bunch Branch-Stock Ditch	26.14
		306	Fleugel Ditch-Dausman Ditch	17.87
		307	Lemler Ditch-Dausman Ditch	27.03
		308	Dausman Ditch	25.99
		309	Lake of the Woods-Yellow river	34.03
		310	Stone Ditch-Yellow River	22.24
		311	Elmer Seltenright Ditch-Yellow River	18.40
		312	Milner Seltenright Ditch-Yellow River	17.26
105	Yellow River	501	Town of Argos-Wolf Creek	33.97
		502	Dixon Lake-Yellow River	26.18
		503	Clifton Ditch-Yellow River	18.84
		504	Eagle Creek	37.96
		505	Bickle Ditch-Yellow River	21.27
		506	Cavanaugh Ditch-Yellow River	7.66
106	Kline Arm	601	Hook Run-Bogus Run	26.71
		602	Cedar Lake Ditch-Craigmile Ditch	19.90
		603	Craigmile Ditch-Kline Arm	33.12
		604	Pine Creek-Bogus Run	20.37

7.1.3.1 Headwaters Yellow River Subwatershed (HUC10-103)

The Headwaters Yellow River HUC 10 subwatershed has a drainage area of approximately 293 square miles and lies in St. Joseph, Elkhart, Marshall and Kosciusko counties (Figure 75). Cities within the subwatershed include Plymouth, Bremen and Nappanee. Agriculture is the dominant land use and constitutes about 76 percent of the subwatershed area (Table 150). NPDES facilities and CAFOs located in this subwatershed are shown in Figure 76 and Figure 77, respectively. Six waterbody segments are impaired for *E. coli* in this subwatershed as shown in Table 147 and the sampling stations in this subwatershed are listed in Table 148. A summary of the *E. coli* data is shown in Table 149. All samples in this subwatershed exceeded the maximum 235 #/100 mL standard. The required reduction of pathogen concentrations based on the geomean standard of 5 samples ranges from 85 to 93 percent.

Table 147. 303 (d) Listed Streams in the Headwaters Yellow River Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
302	Kline Rouch Ditch-Yellow River	INK0153_T1016	Unnamed Ditch	0.76	*E. coli*
303	Amery Ditch	INK0154_00	Armey Ditch - Headwaters	17.41	*E. coli*
		INK0155_00	Yellow River - Armey Ditch - Albert Zeiger Ditch	9.57	*E. coli*
309	Lake of the Woods-Yellow River	INK0158_00	Yellow River - Riverside Church	14.73	*E. coli*
305	West Bunch Branch-Stock Ditch	INK0157_00	Stock Ditch - Bunch Branches	14.4	*E. coli*
312	Milner Seltenright Ditch-Yellow River	INK015F_00	Yellow River - Milner Seltenright Ditch	17.14	*E. coli*

Table 148. Station Locations in the Headwaters Yellow River Subwatershed

HUC 12	HU C 12 Name	Station #	Stream Name
311	Elmer Seltenright Ditch-Yellow River	77	Elmer Seltenright Ditch
312	Milner Seltenright Ditch-Yellow River	79	Yellow River
309	Lake of the Woods-Yellow river	81	Yellow River
307	Lemler Ditch-Dausman Ditch	83	Dausman D
303	Amery Ditch	85	Armey D
305	West Bunch Branch-Stock Ditch	87	Stock D
309	Lake of the Woods-Yellow river	89	Yellow River

Table 149. Summary of Pathogen Data in the Yellow River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
85	6/3/2008 - 7/1/2008	5	100	100	770	1,112	1,164	1,733	89%
87	6/3/2008 - 7/1/2008	5	100	100	517	983	1,173	2,419	87%
83	6/3/2008 - 7/1/2008	5	100	100	1,120	1,676	1,762	2,420	93%
81	6/3/2008 - 7/1/2008	5	100	100	461	943	1,205	2,419	87%
89	6/3/2008 - 7/1/2008	5	100	100	1,046	1,347	1,418	2,419	91%
77	6/3/2008 - 7/1/2008	5	100	100	579	1,225	1,384	2,419	90%
79	6/3/2008 - 7/1/2008	5	100	100	461	853	1,050	2,419	85%

Table 150. Land Use/Land Cover in the Headwaters Yellow River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	142,914	223	76.38
Developed Land	14,462	23	7.73
Forested Land	13,808	22	7.38
Pasture/Hay	10,112	16	5.4
Wetland	4,235	7	2.26
Grassland and Shrubs	863	1	0.46
Open Water	707	1	0.38
Total	**187,101**	**292**	**100**

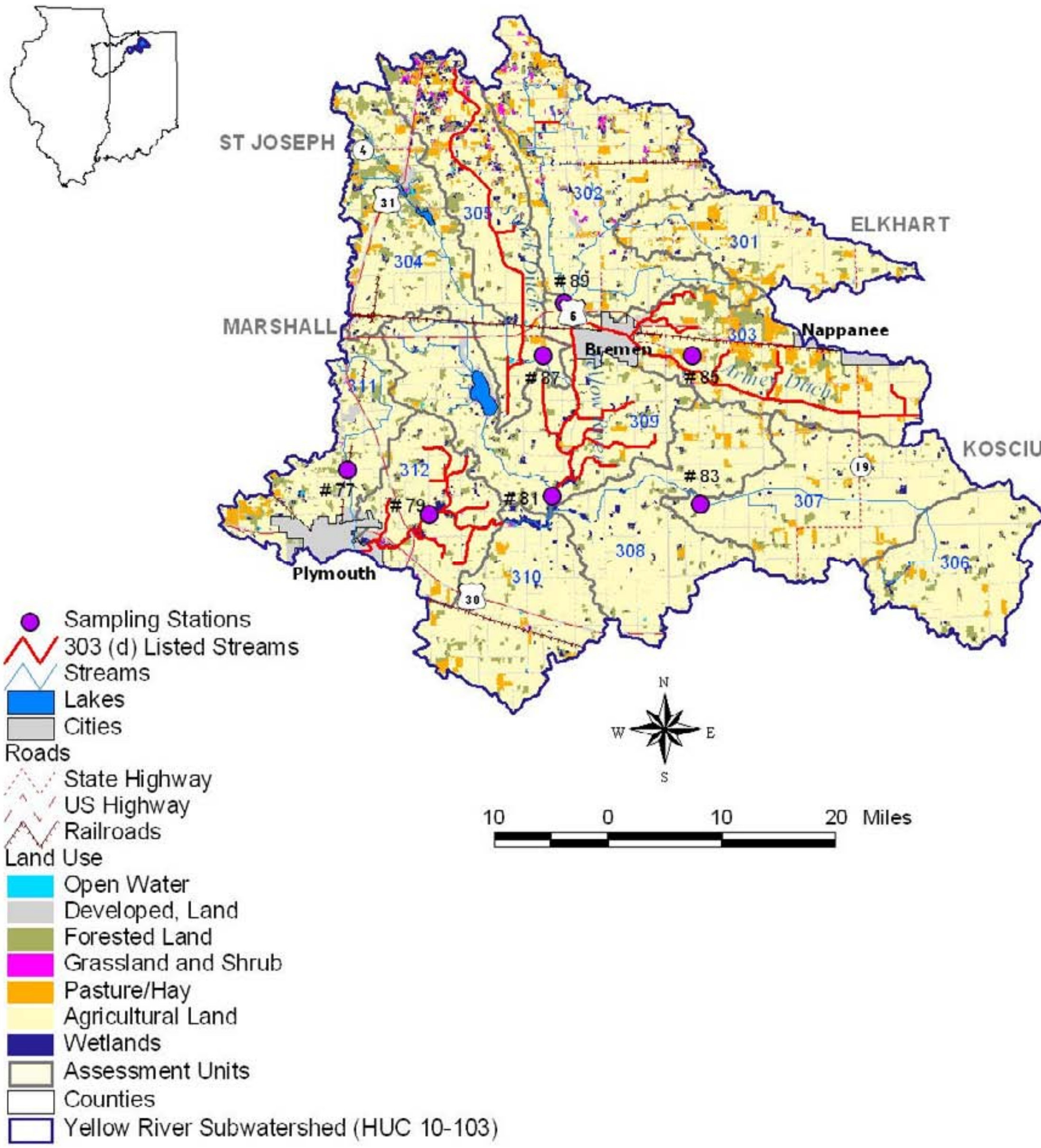


Figure 75. Location of Yellow River Subwatershed (HUC 10-103)

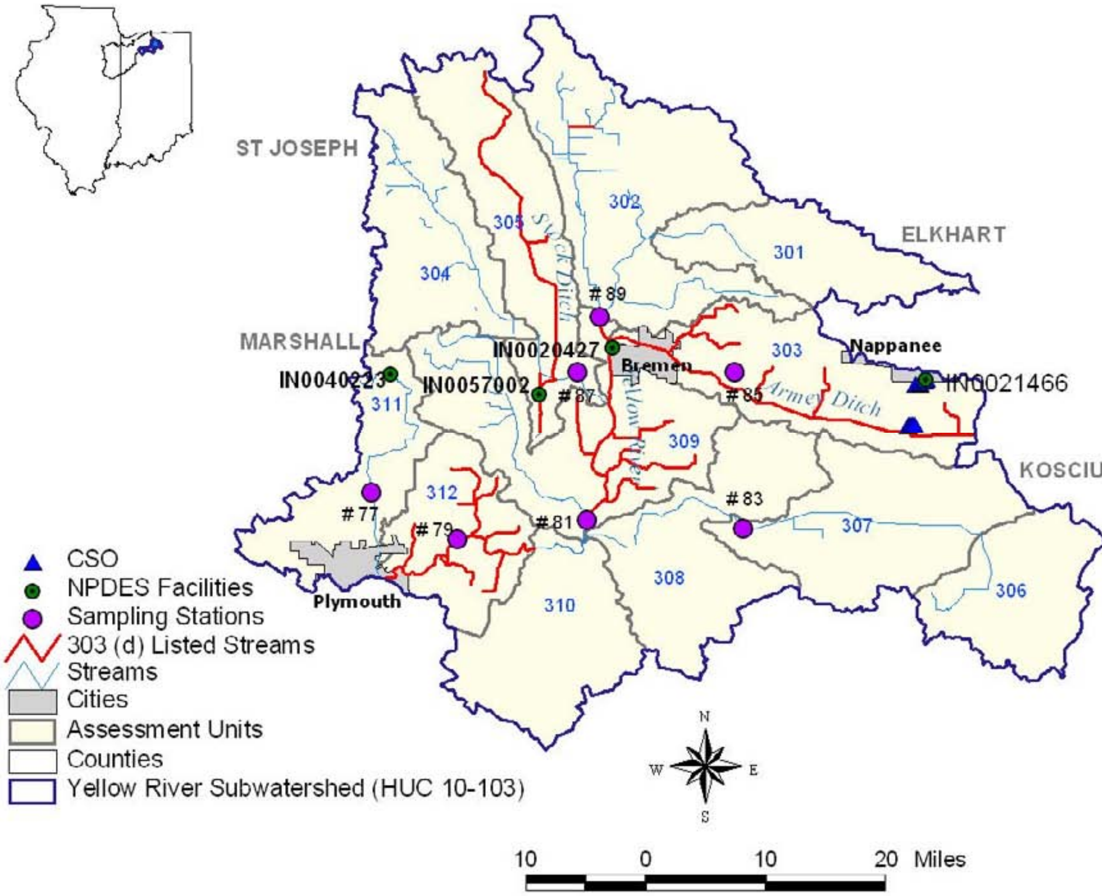


Figure 76. NPDES Facilities in Yellow River Subwatershed (HUC 10-103)

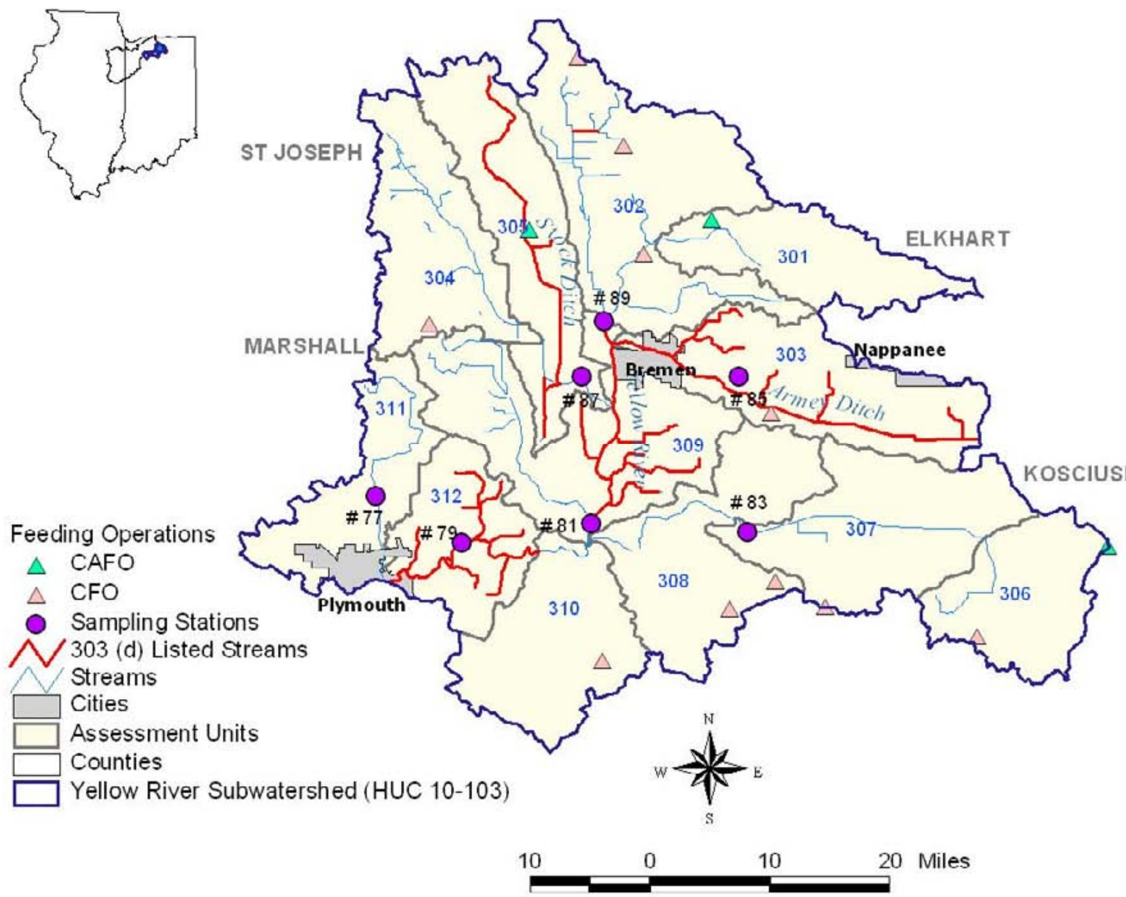


Figure 77. Feeding Operations in the Yellow River Subwatershed (HUC 10-103)

Table 151 through Table 156 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 307 or HUC 311; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are four NPDES facilities within the Headwaters Yellow River subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There is one MS4 community upstream of the Headwaters Yellow River subwatershed outlet and the WLAs for the community were calculated based on the area within the watersheds drainage and *E. coli* standards WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are three CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 151. Kline Rouch Ditch-Yellow River Characteristics and TMDL Summary (HUC 12-302)

Upstream Characteristics					
Drainage Area	54.09 square miles				
Sampling Station	None				
Listed Segments	INK0_153_T1016				
Land Use	Agriculture: 76%; Developed Land: 6%; Forest: 5%; Other: 13%				
Soils	A: 5%; B: 43%; C: 51%; D 1%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Laidig Farm And Management - Site 331 (ID #2240)				
	Pick Of The Chick (ID#3891)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	455.69	111.90	54.18	29.37	16.20
WLA	0	0	0	0	0
MOS (10%)	50.63	12.43	6.02	3.26	1.80
TMDL = LA+WLA+MOS	506.32	124.33	60.20	32.63	18.00

Table 152. Armery Ditch Characteristics and TMDL Summary (HUC 12-303)

Upstream Characteristics					
Drainage Area	27.02 square miles				
Sampling Station	85				
Listed Segments	INK0154, INK0155_00				
Land Use	Agriculture: 66%; Developed Land: 13%; Forest: 9%; Other: 12%				
Soils	A: 7%; B: 54%; C: 38%; D: 1%				
NPDES facilities	Nappanee Municipal STP (IN0021466)-Discharges outside of the Kankakee/Iroquois Watershed				
MS4 Communities	None				
CSO Communities	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	None				
CFOs	Evan L Huff (ID # 4254)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	227.64	55.90	27.06	14.67	8.09
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	25.29	6.21	3.01	1.63	0.90
TMDL = LA+WLA+MOS	252.93	62.11	30.07	16.30	8.99

Table 153. West Bunch Branch-Stock Ditch Characteristics and TMDL Summary (HUC 12-305)

Upstream Characteristics					
Drainage Area	44.47 square miles				
Sampling Station	87				
Listed Segments	INK0157_00				
Land Use	Agriculture: 73%; Developed Land: 5%; Forest: 8%; Other: 14%				
Soils	A: 10%; B: 55%; C: 33%; D: 2%				
NPDES Facilities	Lake of the Woods Regional Sewer District (IN0057002)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Walnut Grove Dairy (INA006440)				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	374.01	91.36	43.9	23.51	12.68
WLA	0.64	0.64	0.64	0.64	0.64
MOS (10%)	41.62	10.22	4.95	2.68	1.48
TMDL = LA+WLA+MOS	416.27	102.22	49.49	26.83	14.8

Table 154. Lemler Ditch Dausman Ditch Subwatershed Characteristics and TMDL Summary (HUC 12-307)

Upstream Characteristics					
Drainage Area	40.11 square miles				
Sampling Station	83				
Listed Segments	None				
Land Use	Agriculture: 86%; Developed Land: 5%; Forest: 5%; Other: 4%				
Soils	A: 22%; B: 58%; C: 19%; D 1%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Freed Beer Farms (ID # 2240)				
CFOs	Charles L. Long - Farm #1 (ID# 4330)				
	Shively Veal Inc (ID#)3050				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	337.91	82.98	40.18	21.78	12.02
WLA	0	0	0	0	0
MOS (10%)	37.55	9.22	4.46	2.42	1.33
TMDL = LA+WLA+MOS	375.46	92.2	44.64	24.2	13.35

Table 155. Lake of the Woods-Yellow River Characteristics and TMDL Summary (HUC12-309)

Upstream Characteristics					
Drainage Area	158.33 square miles				
Sampling Station	89				
Listed Segments	INK0158_00				
Land Use	Agriculture: 73%; Developed Land: 7%; Forest: 8%; Other: 12%				
Soils	A: 13%; B: 53%; C: 32%; D: 0.5%; Unknown:1.5%				
NPDES Facilities	Nappanee Municipal STP (IN0021466) -Discharges Outside of The Kankakee/Iroquois Watershed				
	Bremen Municipal WWTP				
	Lake of the Woods Regional Sewer District (IN0057002)				
MS4 Communities	None				
CSO Communities	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	Fred Beer Farms (ING804010)				
	J & T Laidig Farms (ING800005)				
	Walnut Gove Dairy, LLC (INA006440)				
CFOs	Laidig Farm And Management - Site 331 (ID #2240)				
	Pick Of The Chick (ID#3891)				
	Evan L Huff (ID #4254)				
	Billie Fisher (ID#2276)				
	Todd Lemler (ID#)2372				
	Shively Veal Inc (ID#)3050				
	Charles L. Long - Farm #1 (ID# 4330)				
	Don Haas (ID# 4388)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1327.08	320.75	151.79	79.17	40.64
WLA	6.79	6.79	6.79	6.79	6.79
MOS (10%)	148.21	36.39	17.62	9.55	5.27
TMDL = LA+WLA+MOS	1482.08	363.93	176.20	95.51	52.70

Table 156. Elmer Seltenright Ditch-Yellow River Characteristics and TMDL Summary (HUC12-311)

Upstream Characteristics					
Drainage Area	13.44 square miles				
Sampling Station	77				
Listed Segments	None				
Land Use	Agriculture: 61%; Developed Land: 20%; Forest: 12%; Other: 7%				
Soils	A: 26%; B: 62%; C: 10%; D 2%				
NPDES Facilities	Lapaz Municipal WWTP (IN0040223)				
MS4 Communities	Plymouth (INR040064): 2.36 Square Miles				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	92.75	27.21	12.87	6.7	3.43
WLA	20.48	0.6	0.6	0.6	0.6
MOS (10%)	12.58	3.08	1.49	0.81	0.44
TMDL = LA+WLA+MOS	125.81	30.89	14.96	8.11	4.47

Table 157. Milner-Seltenright Ditch-Yellow River Characteristics and TMDL Summary (HUC 12-312)

Upstream Characteristics					
Drainage Area	257.20 square miles				
Sampling Station	79				
Listed Segments	INK015F_00				
Land Use	Agriculture: 77%; Developed Land: 7%; Forest: 7%; Other: 9%				
Soils	A: 17%; B: 55%; C: 26%; D: 0.5%; Unknown:1.6%				
NPDES Facilities	Nappanee Municipal STP (IN0021466) -Discharges Outside of The Kankakee/Iroquois Watershed				
	Bremen Municipal WWTP (IN0020427)				
	Lake of the Woods Regional Sewer District (IN0057002)				
MS4 Communities	Plymouth (INR040064): 0.55 Square Miles				
CSO Communities	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	Fred Beer Farms (ING804010)				
	J & T Laidig Farms (ING800005)				
	Walnut Gove Dairy, LLC (INA006440)				
CFOs	Laidig Farm And Management - Site 331 (ID #2240)				
	Pick Of The Chick (ID#3891)				
	Linda Lizzi (ID # 3710)				
	Evan L Huff (ID #4254)				
	David Dunis (ID # 4388)				
	Billie Fisher (ID#2276)				
	Todd Lemler (ID#)2372				
	Shively Veal Inc (ID#)3050				
	Charles L. Long - Farm #1 (ID# 4330)				
	Don Haas (ID# 4388)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	2155.40	525.28	250.82	132.85	70.25
WLA	11.42	6.79	6.79	6.79	6.79
MOS (10%)	240.76	59.12	28.62	15.52	8.56
TMDL = LA+WLA+MOS	2407.58	591.19	286.23	155.16	85.60

7.1.3.2 Yellow River Subwatershed (HUC10-Digit 105)

The Yellow River subwatershed has an area of approximately 146 square miles and lies within Stark and Marshall counties. Cities within this subwatershed include Argos, Plymouth and Knox (Figure 78). Agriculture is the dominant land use followed by forest and developed land (Table 161). Possible pathogen sources such as NPDES facilities and feeding operations in this subwatershed are shown in Figure 79 and Figure 80. As listed in Table 158 and Table 159, there are three impaired segments and eight *E. coli* monitoring locations within this subwatershed. Impairments are prevalent at these monitoring sites (Table 160). The required reductions range from 48 to 88 percent in this subwatershed.

Table 158. 303 (d) Listed Streams in the Yellow River Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
503	Clifton Ditch-Yellow River	INK0165_00	Yellow River - Listenberger/Cliffton Ditches	19.72	*E. coli*
505	Bickle Ditch-Yellow River	INK0166_00	Yellow River - Ober	29.34	*E. coli*
506	Cavanaugh Ditch-Yellow River	INK016A_00	Yellow River-Knox	20.69	*E. coli*

Table 159. Station Locations in the Yellow River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
501	Town of Argos-Wolf Creek	ID# 73	Wolf Cr
503	Clifton Ditch-Yellow River	ID# 71	Clifton D
504	Eagle Creek	ID# 67	Harry Cool D
		ID# 75	Unnamed D
505	Bickle Ditch-Yellow River	ID# 69	Yellow River
506	Cavanaugh Ditch-Yellow River	ID# 19	Yellow River
		ID# 63	Yellow River
		ID# 65	Yellow River

Table 160. Summary of Pathogen Data in the Yellow River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 Ml)	Geomean (#/ 100 Ml)	Average (#/ 100 Ml)	Maximum (#/ 100 Ml)	Percent Reduction Based on Geomean (125/ 100Ml)
			125	235					
73	6/4/2008 – 7/2/2008	5	100	100	517	1,085	1,153	1,414	88%
71	6/4/2008 – 7/2/2008	5	100	100	291	589	775	1,986	79%
67	6/4/2008 – 7/2/2008	5	100	80	186	330	370	649	62%
75	6/4/2008 – 7/2/2008	5	100	100	248	772	948	1,414	84%
69	6/4/2008 – 7/2/2008	5	80	40	102	239	293	649	48%
19	6/2/2008 – 6/30/2008	5	100	80	140	591	722	1,046	79%
63	6/2/2008 – 7/14/2008	6	100	83	214	461	543	980	73%
65	6/2/2008 – 7/14/2008	6	100	83	204	445	545	1,300	72%

Table 161. Land Use/Land Cover in the Yellow River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	54249.89	84.77	58.18
Forested Land	18912.60	29.55	20.28
Developed Land	10653.78	16.65	11.43
Wetland	4607.34	7.20	4.94
Pasture/Hay	2842.86	4.44	3.05
Open Water	1060.60	1.66	1.14
Grassland and Shrubs	915.82	1.43	0.98
Total	**93,242.89**	**145.69**	**100.00**

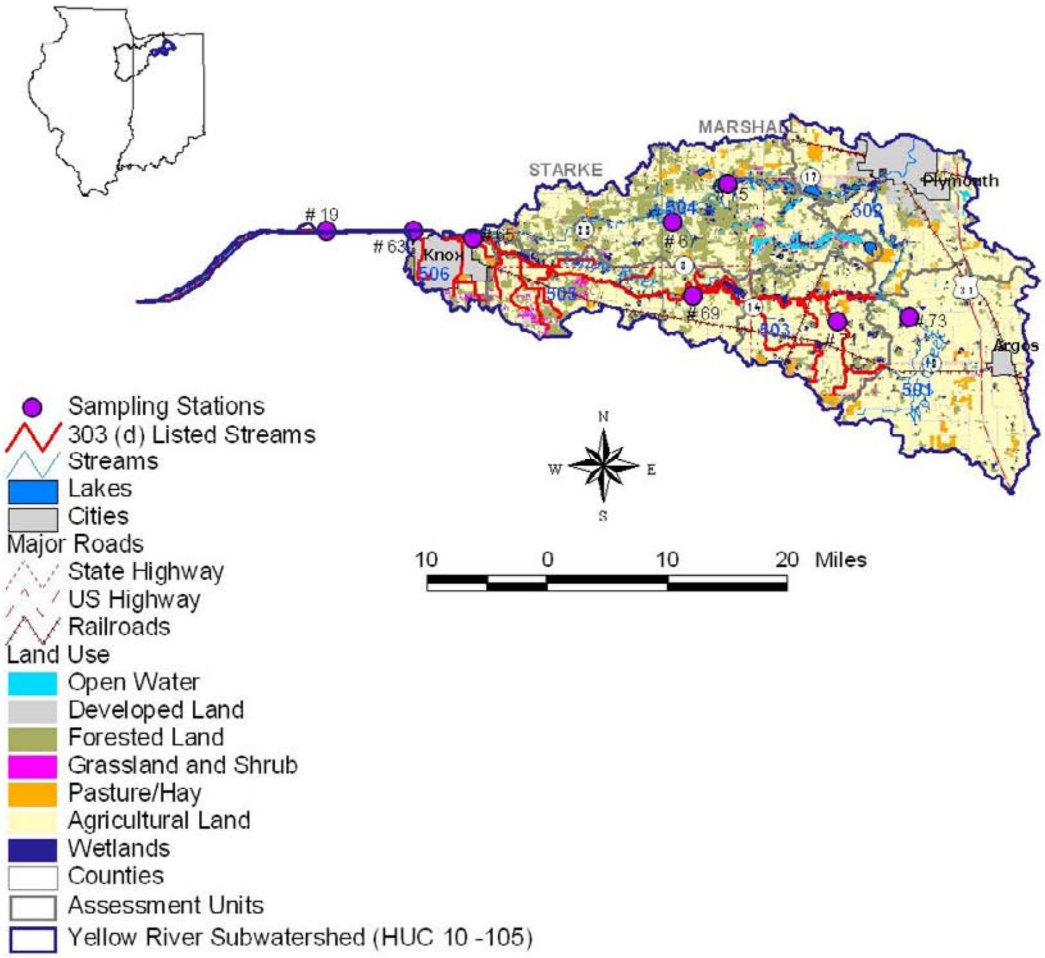


Figure 78. Location of Yellow River Subwatershed (HUC10-105)

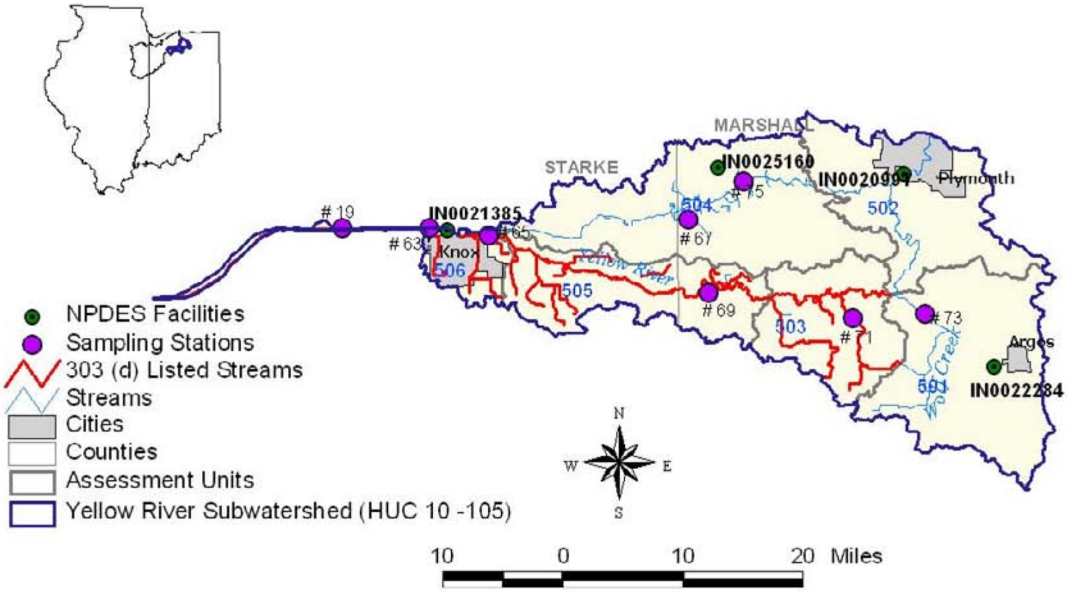


Figure 79. NPDES Facilities in the Yellow River Subwatershed (HUC10-105)

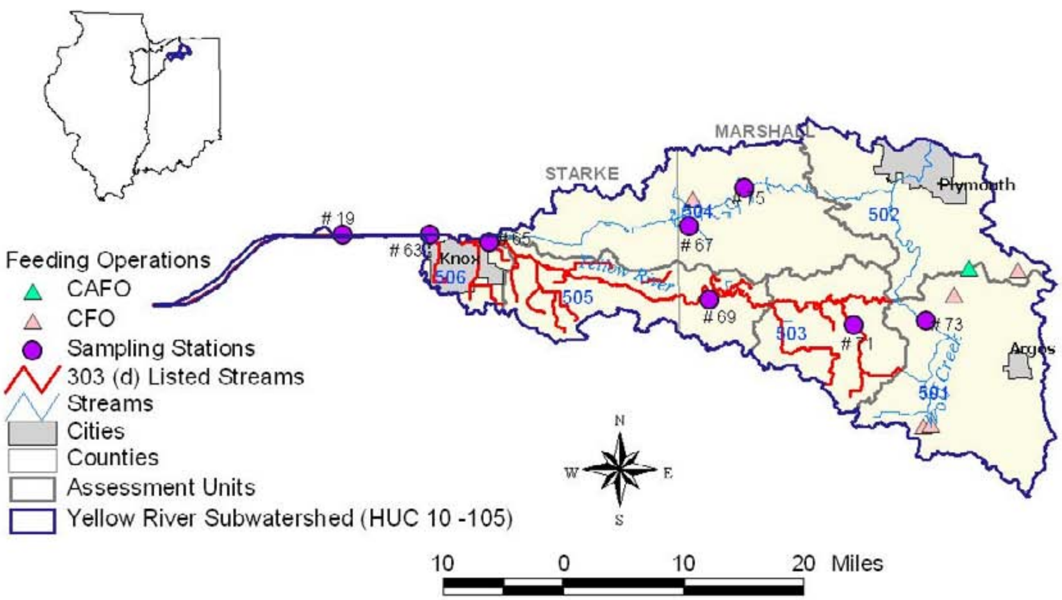


Figure 80. Feeding Operations in the Yellow River Subwatershed (HUC10-105)

Table 162 through Table 166 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 501 or HUC 504; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are four NPDES facilities within the Mill Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There is one MS4 community upstream of the Little Kankakee River subwatershed outlet and the WLA for the community was calculated based on the area with the watersheds drainage and *E. coli* standards. There are two CSO communities with 25 outfalls upstream of this subwatershed. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There is one CAFO within this subwatershed and it receives a WLA of zero as described further in Section 7.3.

Table 162. Town of Argos-Wolf Creek Characteristics and TMDL Summary (HUC12-501)

Upstream Characteristics					
Drainage Area	33.96 square miles				
Sampling Station	73				
Listed Segments	None				
Land Use	Agriculture: 79.81%; Developed Land: 8.85%; Forest: 6.07%; Other: 5.27%				
Soils	A: 24.89%; B: 63.56%; C: 9.33%; D 1.78%; Unknown:0.44				
NPDES Facilities	Argos Municipal WWTP (IN0022284)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Argos Holsteins (2100)				
	Dan Houin (6151)				
	Argos Holsteins (6208)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	217.96	52.77	25.03	13.11	6.78
WLA	1.00	1.00	1.00	1.00	1.00
MOS (10%)	24.33	5.97	2.89	1.57	0.87
TMDL = LA+WLA+MOS	243.29	59.74	28.92	15.68	8.65

Table 163. Clifton Ditch-Yellow River Characteristics and TMDL Summary (HUC12-503)

Upstream Characteristics					
Drainage Area	329.16 square miles				
Sampling Station	71				
Listed Segments	INK0165_00				
Land Use	Agriculture: 74.46%; Developed Land: 9.01%; Forest: 8.06%; Other: 8.47%				
Soils	A: 22.75%; B: 54.71%; C: 21.52%; D 0.66%; Unknown:0.37				
NPDES Facilities	All the facilities upstream of HUC 12-312 and HUC 12-311				
	Plymouth WWTP (IN0020991)				
	Argos Municipal WWTP (IN0022284)				
MS4 Communities	Plymouth (INR040064): 6.97 Square Miles				
CSO Communities	Plymouth Municipal STP (IN0020991)-10 outfalls				
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	All the facilities upstream of HUC 12-312 and HUC 12-311				
	Homestead Dairy (ING804918)				
CFOs	All the facilities upstream of HUC 12-312 and HUC 12-311				
	Houin Brothers Farms(7916)				
	Argos Holsteins (2100)				
	Argos Holsteins (6208)				
	Dan Houin (6151)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	2687.12	655.99	304.74	153.76	73.65
WLA	85.94	24.95	24.95	24.95	24.95
MOS (10%)	308.12	75.66	36.63	19.85	10.95
TMDL = LA+WLA+MOS	3081.18	756.6	366.32	198.56	109.55

Table 164. Eagle Creek Characteristics and TMDL Summary (HUC 12-504)

Upstream Characteristics					
Drainage Area	37.92 square miles				
Sampling Station	67,75				
Listed Segments	None				
Land Use	Agriculture: 45.12%; Developed Land: 6.76%; Forest: 36.42%; Other: 11.70%				
Soils	A: 70.36%; B: 19.76%; C: 3.95%; D 2.37%; Unknown:3.56				
NPDES Facilities	Convent Ancilla Domini (IN0025160)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Herbert W Schaller (2215)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	319.25	78.23	37.76	20.37	11.14
WLA	0.22	0.22	0.22	0.22	0.22
MOS (10%)	35.49	8.71	4.22	2.29	1.26
TMDL = LA+WLA+MOS	354.96	87.16	42.2	22.88	12.62

Table 165. Bickel Ditch-Yellow River Characteristics and TMDL Summary (HUC 12-505)

Upstream Characteristics					
Drainage Area	350.42 square miles				
Sampling Station	69				
Listed Segments	INK0166_00				
Land Use	Agriculture: 73.48%; Developed Land: 8.86%; Forest: 9.05%; Other: 8.60%				
Soils	A: 26.21%; B: 52.31%; C: 20.39%; D 0.74%; Unknown:0.35				
NPDES Facilities	All the facilities upstream of HUC 12-503				
MS4 Communities	Plymouth (INR040064): 6.97 Square Miles				
CSO Communities	Plymouth Municipal STP (IN0020991)-10 outfalls				
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	All the facilities upstream of HUC 12-503				
CFOs	All the facilities upstream of HUC 12-503				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	2866.22	699.97	326.03	165.30	80.02
WLA	85.94	24.95	24.95	24.95	24.95
MOS (10%)	328.02	80.55	39.00	21.14	11.66
TMDL = LA+WLA+MOS	3280.18	805.47	389.98	211.39	116.63

Table 166. Cavanaugh Ditch-Yellow River Characteristics and TMDL Summary (HUC 12-506)

Upstream Characteristics					
Drainage Area	395.99 square miles				
Sampling Station	19,63,65				
Listed Segments	INK0166A_00				
Land Use	Agriculture: 70.27%; Developed Land: 8.96%; Forest: 11.66%; Other: 9.11%				
Soils	A: 31.16%; B: 48.59%; C: 18.58%; D 1.01%; Unknown:0.66				
NPDES Facilities	All the facilities upstream of HUC 12-505 and HUC 12-504				
	Knox Municipal WWTP (IN0021385)				
MS4 Communities	Plymouth (INR040064): 6.97 Square Miles				
CSO Communities	Plymouth Municipal STP (IN0020991)-10 outfalls				
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed				
CAFOs	All the facilities upstream of HUC 12-505 and HUC 12-504				
CFOs	All the facilities upstream of HUC 12-505 and HUC 12-504				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	3246.61	790.71	368.14	186.51	90.14
WLA	89.47	28.48	28.48	28.48	28.48
MOS (10%)	370.67	91.02	44.07	23.89	13.18
TMDL = LA+WLA+MOS	3706.75	910.21	440.69	238.88	131.8

7.1.3.3 Kline Arm Subwatershed (HUC10-Digit 106)

The Kline Arm subwatershed has an area of nearly 100 square miles. The subwatershed lies in Starke and Pulaski Counties and contains the city of North Hudson (Figure 81). About 57 percent of the land is used for agriculture (Table 169). The NPDES facilities and feeding operations in this subwatershed are presented in Figure 82 and Figure 83. No listed segments lie in this subwatershed. However, the five monitoring stations (Table 167) show pathogen violations (Table 168). The required reductions of pathogen concentrations based on the geomean of five samples ranges from 68 to 81 percent in this subwatershed.

Table 167. Station Locations in the Kline Arm Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
601	Hook Run-Bogus Run	ID# 01	Bogus Run
603	Craigmile Ditch-Kline Arm	ID# 15	Craigmile D
		ID# 17	Kline Arm D
604	Pine Creek-Bogus Run	ID# 09	Yellow River
		ID# 13	Bogus Run

Table 168. Summary of Pathogen Data in the Kline Arm Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
1	6/2/2008 - 6/30/2008	5	100	100	236	522	625	1,414	76%
15	6/2/2008 - 6/30/2008	5	100	100	285	667	773	1,414	81%
17	6/2/2008 - 6/30/2008	5	100	100	326	499	518	770	75%
9	6/2/2008 - 6/30/2008	5	100	60	199	427	499	816	71%
13	6/2/2008 - 6/30/2008	5	100	100	299	395	419	727	68%

Table 169. Land Use/Land Cover in the Kline Arm Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	36,773.51	57.46	57.46
Forested Land	15,012.26	23.46	23.46
Developed Land	5,258.73	8.22	8.22
Grassland and Shrubs	3,496.92	5.46	5.46
Open Water	1,556.76	2.43	2.43
Pasture/Hay	1,219.83	1.91	1.91
Wetland	676.52	1.06	1.06
Total	**63,994.53**	**99.99**	**100.00**

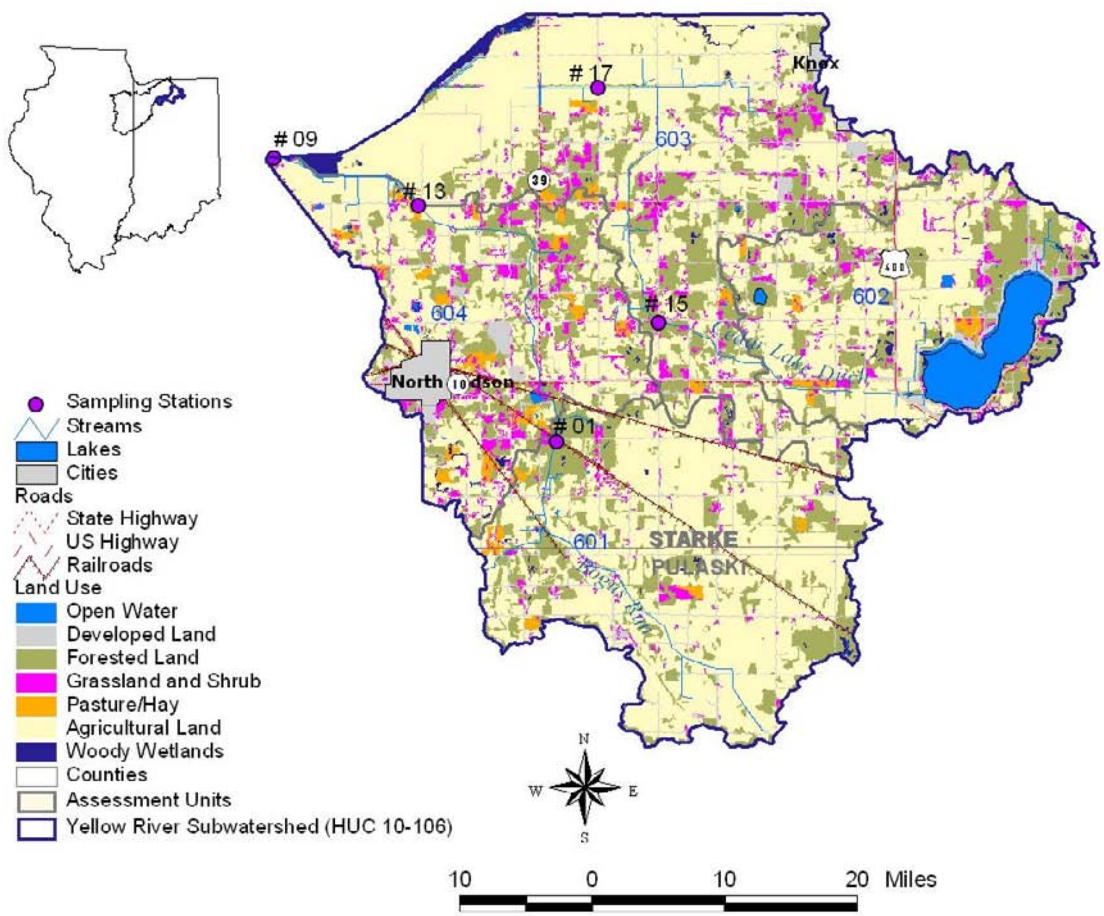


Figure 81. Location of Kline Arm Subwatershed (HUC10-106)

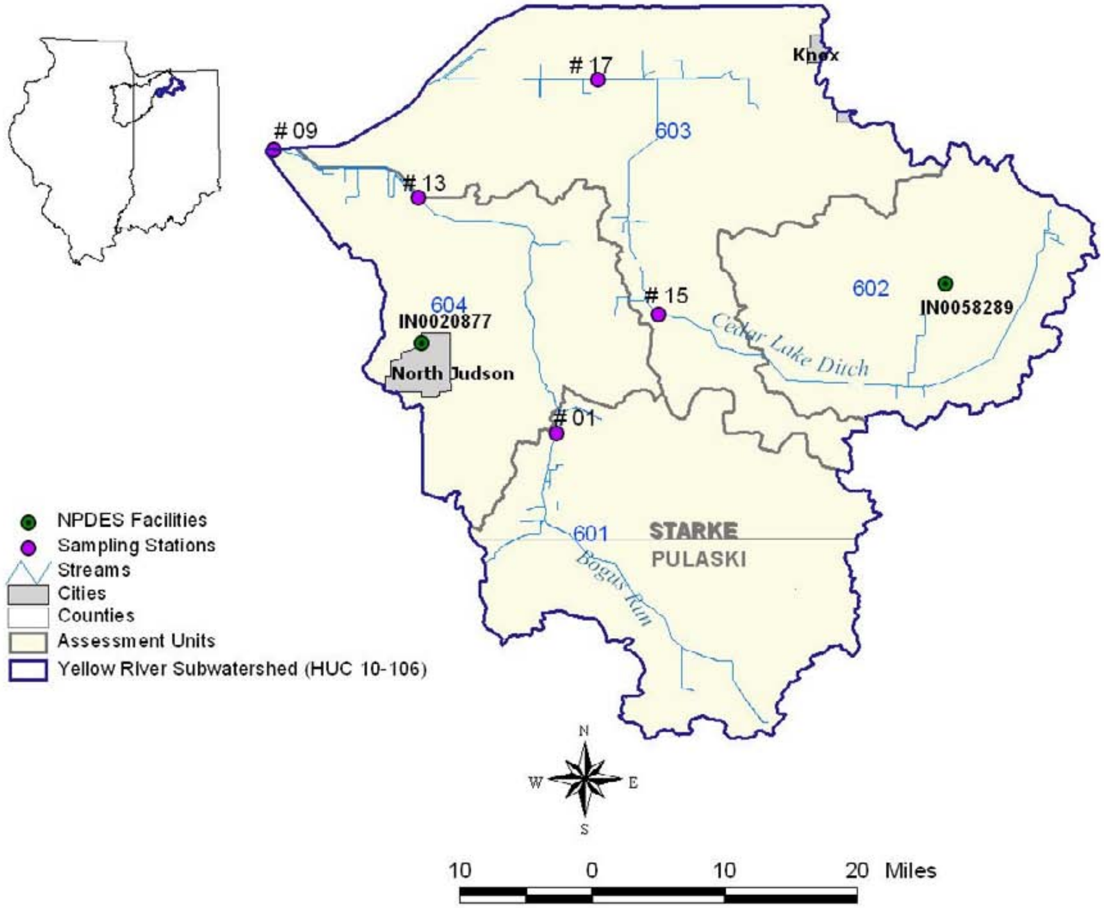


Figure 82. NPDES Facilities in the Kline Arm Subwatershed (HUC10-106)

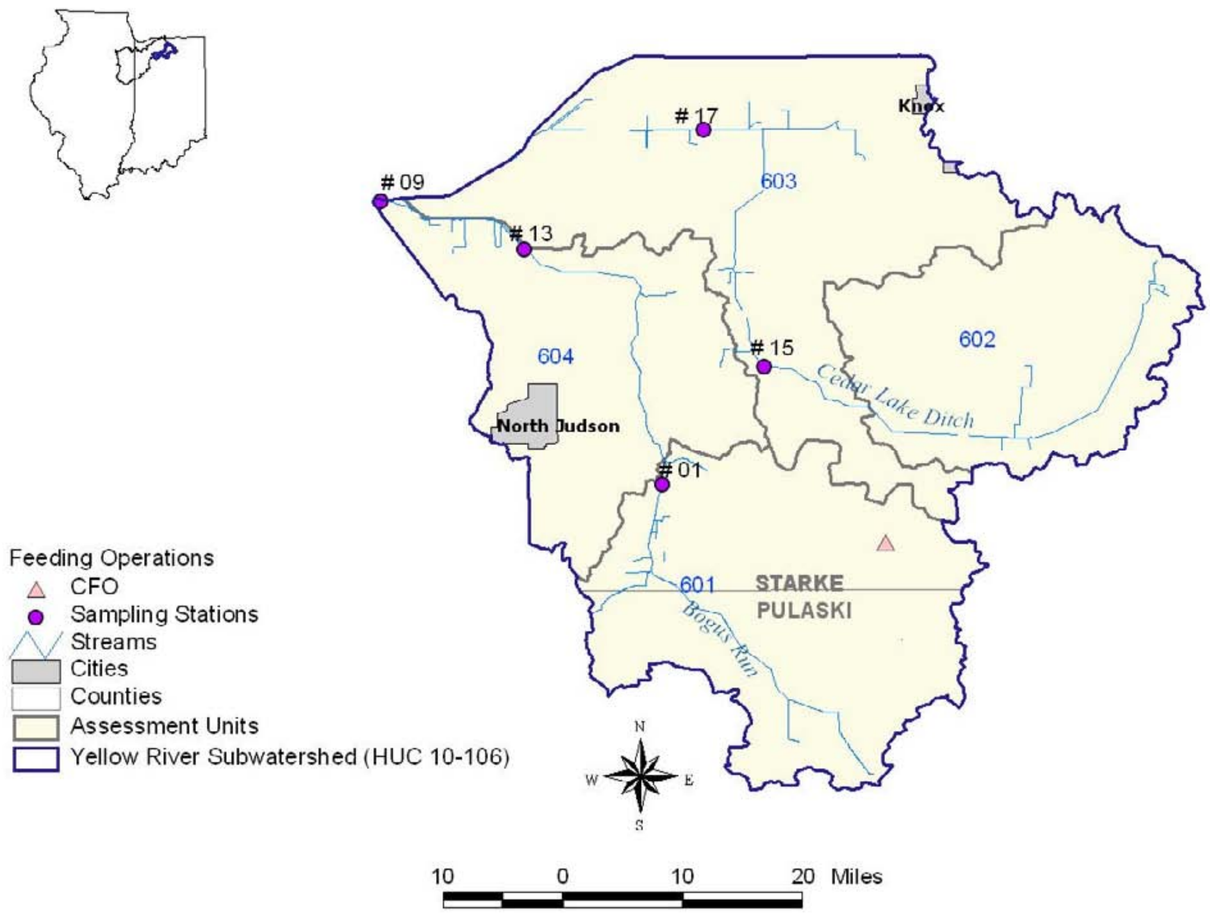


Figure 83. Feeding Operations in the Kline Arm Subwatershed (HUC10-106)

Table 170 through Table 172 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in this subwatershed; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are two NPDES facilities within the Kline Arm subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There is one CSO community with 1 outfall upstream of this subwatershed. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276.

Table 170. Hook Run-Bogus Run Characteristics and TMDL Summary (HUC12-601)

Upstream Characteristics					
Drainage Area	26.71 square miles				
Sampling Station	1				
Listed Segments	None				
Land Use	Agriculture: 68.24%; Developed Land: 4.80%; Forest: 22.60%; Other: 4.36%				
Soils	A: 95.56%; B: 3.89%; C: 0.00%; D 0.56%; Unknown:0.00				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Bope Farm (3908)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	175.51	64.01	28.91	13.01	7.02
WLA	0	0	0	0	0
MOS (10%)	19.5	7.11	3.21	1.44	0.78
TMDL = LA+WLA+MOS	195.01	71.12	32.12	14.45	7.8

Table 171. Craigmile Ditch-Kline Arm Characteristics and TMDL Summary (HUC12-603)

Upstream Characteristics					
Drainage Area	53.00 square miles				
Sampling Station	15,17				
Listed Segments	None				
Land Use	Agriculture: 55.72%; Developed Land: 8.13%; Forest: 23.55%; Other: 12.59%				
Soils	A: 93.18%; B: 1.99%; C: 0.00%; D 0.57%; Unknown:4.26				
NPDES Facilities	Bass Lake Conservancy District (IN0058289)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	346.91	125.67	56.02	24.47	12.59
WLA	1.34	1.34	1.34	1.34	1.34
MOS (10%)	38.70	14.11	6.37	2.87	1.55
TMDL = LA+WLA+MOS	386.95	141.12	63.73	28.68	15.48

Table 172. Pine Creek-Bogus Run Characteristics and TMDL Summary (HUC12-604)

Upstream Characteristics					
Drainage Area	100.08 square miles				
Sampling Station	9,13				
Listed Segments	None				
Land Use	Agriculture: 57.41%; Developed Land: 8.21%; Forest: 23.44%; Other: 10.94%				
Soils	A: 94.63%; B: 2.39%; C: 0.00%; D 0.45%; Unknown:2.54				
NPDES Facilities	Bass Lake Conservancy District (IN0058289)				
	North Judson Municipal WWTP (IN0020877)				
MS4 Communities	None				
CSO Communities	North Judson Municipal (IN0020877)-1 outfall				
CAFOs	None				
CFOs	Bope Farm (3908)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	630.39	236.27	104.75	45.17	22.74
WLA	27.23	3.57	3.57	3.57	3.57
MOS (10%)	73.07	26.65	12.03	5.42	2.92
TMDL = LA+WLA+MOS	730.69	266.49	120.35	54.16	29.23

7.1.4 Upper Iroquois Subwatershed

The Upper Iroquois subwatershed has five HUC 10 watersheds and 27 HUC 12 watersheds. Brief descriptions of the HUC 10 watersheds are provided in the following sections.

Table 173. Hydrologic Unit Code (HUC 10 and 12) in the Upper Iroquois Subwatershed

HUC 10	HU C10 Name	HUC 12	HU C12 Name	Area (sq. miles)
201	Oliver Ditch	101	Ringneck Lake-Oliver Ditch	26.58
		102	Lateral No 77 Ditch-Oliver Ditch	25.47
		103	Jungles Ditch-Oliver Ditch	30.32
202	Slough Creek	201	Keefe Ditch	17.00
		202	Jordan Ditch-Slough Creek	32.67
		203	Nessius Ditch-Bice Ditch	21.84
		204	Headwaters Carpenter Creek	23.47
		205	Carpenter Creek	30.67
		206	Bice Ditch-Slough Creek	19.55
203	Bruner Ditch-Iroquois River	301	Headwaters Iroquois River	25.86
		302	Iliff Slough Lateral-Ryan Ditch	25.70
		303	Dexter Ditch-Iroquois River	27.06
		304	Ryan Ditch	28.18
		305	Moore Ditch-Iroquois River	28.82
204	Curtis Creek-Iroquois River	401	Headwaters Curtis Creek	38.65
		402	Turner Ditch-Iroquois River	21.95
		403	Hunter Ditch	42.71
		404	Bower Ditch-Darroch Ditch	17.13
		405	Hickory Branch-Iroquois River	41.34
205	Montgomery Ditch - Iroquois River	501	Clark Ditch-Thompson Ditch	17.54
		502	Whaley Ditch	21.39
		503	Strole Ditch-Iroquois River	20.27
		504	Headwaters Montgomery Ditch	17.67
		505	Kent Ditch-Montgomery Ditch	31.50
		506	Montgomery Ditch	26.25
		507	North Sheldon South Concord Ditch-Iroquois River	11.72
		508	Blackstone Branch-Iroquois River	14.14

7.1.4.1 Oliver Ditch Subwatershed (HUC10-201)

The Oliver Ditch subwatershed has an area of approximately 82 square miles and lies within Jasper, Starke and Pulaski counties (Figure 84). Agriculture (58.03%) followed by forested land (14.83%) are the primary land uses in this subwatershed (Table 176). There is one CAFO and no NPDES facilities within this subwatershed (Figure 85). Sampling at four locations (Table 174) has exceeded the geomean standard (Table 175). The required reductions range from 62 to 80 percent in this subwatershed.

Table 174. Station Locations in the Oliver Ditch Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
103	Jungles Ditch-Oliver Ditch	ID# 50	Oliver D
		ID# 52	Jungle D
		ID# 54	Oliver D
		ID# 56	Oliver D

Table 175. Summary of Pathogen Data in the Oliver Ditch Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
50	6/2/2008 - 6/30/2008	5	100	60	131	392	527	980	68%
52	6/2/2008 - 6/30/2008	5	100	100	387	628	657	866	80%
54	6/2/2008 - 6/30/2008	5	100	60	199	395	469	921	68%
56	6/2/2008 - 6/30/2008	5	100	40	179	325	419	1,046	62%

Table 176. Land Use/Land Cover in the Oliver Ditch Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	37139.12	58.03	70.52
Forested Land	9490.44	14.83	18.02
Developed Land	2600.01	4.06	4.94
Grassland and Shrubs	1184.47	1.85	2.25
Pasture/Hay	1161.12	1.81	2.20
Wetland	904.25	1.41	1.72
Open Water	188.59	0.29	0.36
Total	**52,668.00**	**82.29**	**100.00**

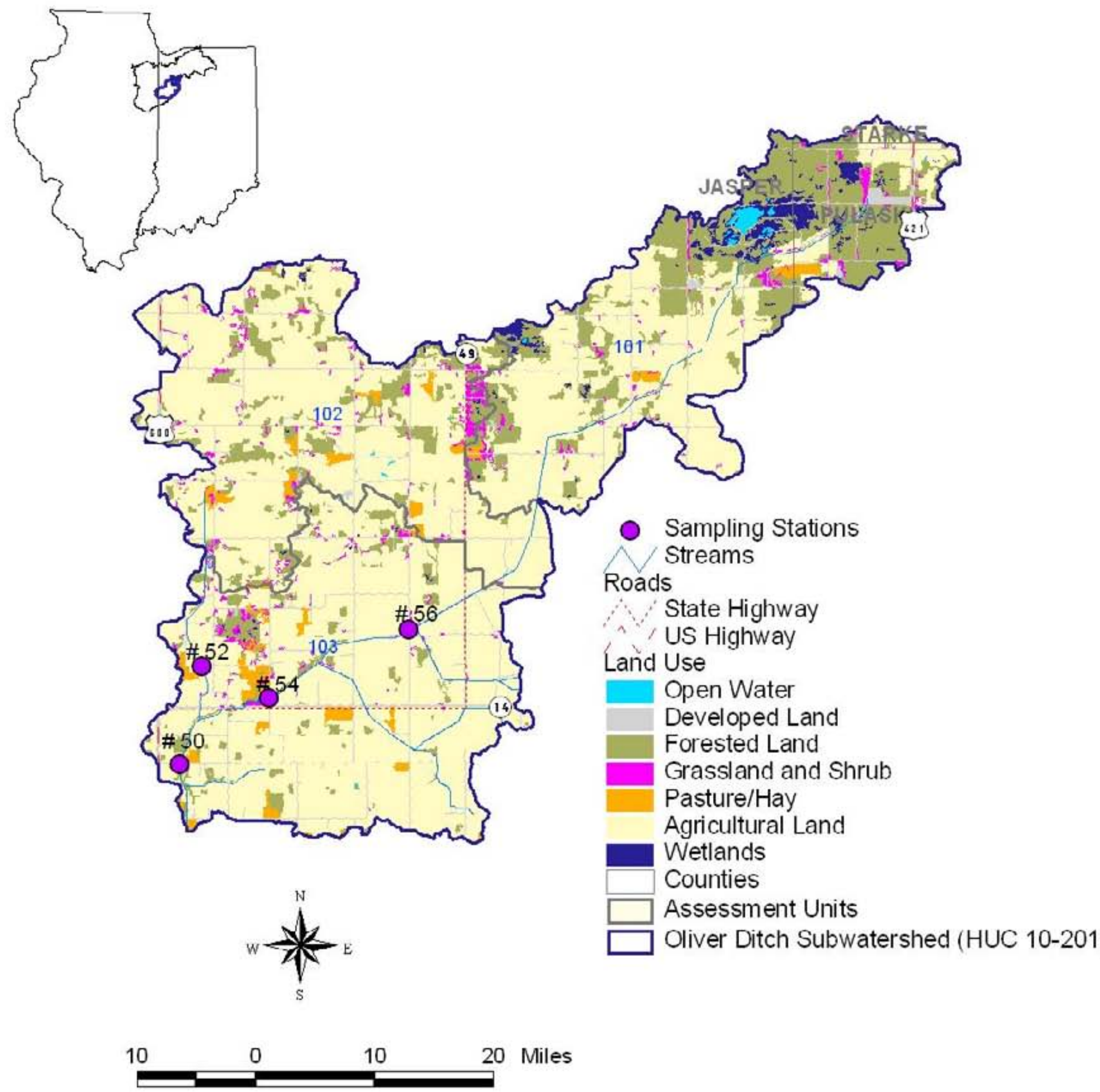


Figure 84. Location of Oliver Ditch Subwatershed (HUC10-201)

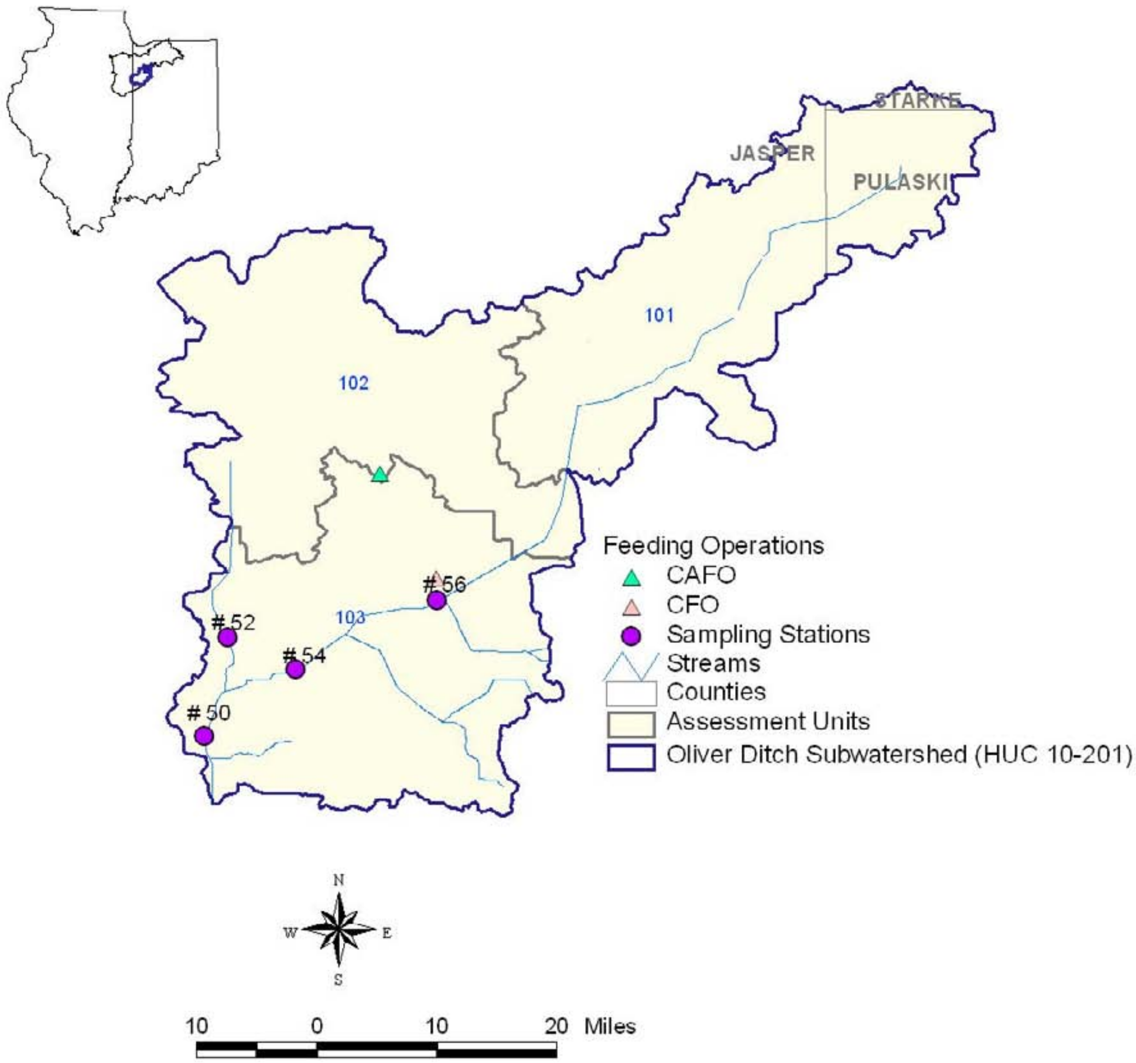


Figure 85. Feeding Operations in the Oliver Ditch Subwatershed (HUC10-201)

Table 177 summarizes the subwatershed characteristics as well as the TMDL results for HUC12-103. It should be noted that there are no current 303(d) listings in HUC 103; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There is one CAFO within this subwatershed and it receives a WLA of zero as described further in Section 7.3.

Table 177. Jungles Ditch-Oliver Ditch Characteristics and TMDL Summary (HUC12-103)

Upstream Characteristics					
Drainage Area	82.35 square miles				
Sampling Station	50,52,54,56				
Listed Segments	None				
Land Use	Agriculture: 70.46%; Developed Land:4.93%; Forest:18.01%; Other: 6.60%				
Soils	A: 63.37%; B: 30.55%; C: 3.09%; D: 2.18%; Unknown:0.91%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Newberry Farms, LLC (ING806083)				
CFOs	Whitaker Farms (6355)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	725.67	194.26	80.38	31.26	12.29
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	80.63	21.58	8.93	3.47	1.36
TMDL = LA+WLA+MOS	806.30	215.84	89.31	34.73	13.65

7.1.4.2 Slough Creek Subwatershed (HUC10-202)

The Slough Creek subwatershed has an area of nearly 145 square miles and includes the cities of Collegeville and Remington (Figure 86). Agriculture account for 84.77 percent of the total subwatershed area followed by forested (6.73%) and developed land (6.05%) as shown in Table 181. Wastewater treatment plants and feeding operations are displayed in Figure 87 and Figure 88, respectively.

There are two listed segments (Table 178) and four sampling stations (Table 179) within this subwatershed. The summary of 2008 data in this subwatershed is shown in Table 180 and the required reductions range from 51 to 86 percent.

Table 178. 303 (d) Listed Streams in the Slough Creek Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
206	Bice Ditch-Slough Creek	INK0235_T1019	Slough Creek	6.8	*E. coli*
205	Carpenter Creek	INK0238_00	Slough Creek-Carpenter Creek (Lower)	10.21	*E. coli*

Table 179. Station Locations in the Slough Creek Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
204	Headwaters Carpenter Creek	ID# 70	Carpenter Cr
205	Carpenter Creek	ID# 68	Carpenter Cr
206	Bice Ditch-Slough Creek	ID# 64	Slough Cr
		ID# 66	Slough Cr

Table 180. Summary of Slough Creek Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 Ml)	Geomean (#/ 100 Ml)	Average (#/ 100 Ml)	Maximum (#/ 100 Ml)	Percent Reduction Based on Geomean (125/ 100Ml)
			125	235					
70	6/4/2008 – 7/2/2008	5	60	40	76	253	636	2,419	51%
68	6/4/2008 – 7/2/2008	5	100	100	411	919	1,128	2,419	86%
64	6/4/2008 – 7/2/2008	5	100	100	365	711	915	2,419	82%
66	6/4/2008 – 7/2/2008	5	100	60	179	583	994	2,419	79%

Table 181. Land Use/Land Cover in the Slough Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	78,614.71	122.84	84.77
Forested Land	6,242.60	9.75	6.73
Developed Land	5,608.78	8.76	6.05
Pasture/Hay	1,871.89	2.92	2.02
Grassland and Shrubs	171.69	0.27	0.19
Open Water	146.34	0.23	0.16
Wetland	89.18	0.14	0.10
Total	**92,745.18**	**144.91**	**100.00**

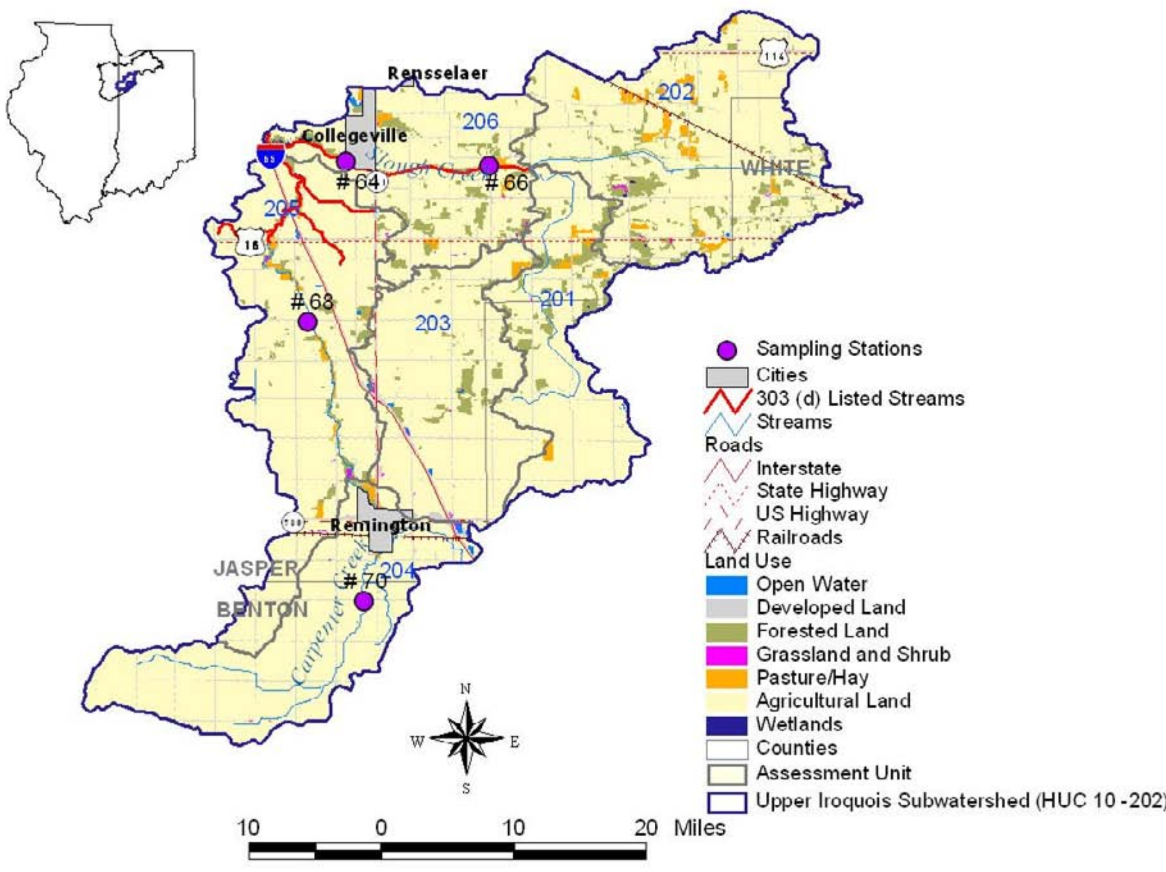


Figure 86. Location of Slough Creek Subwatershed (HUC10-202)

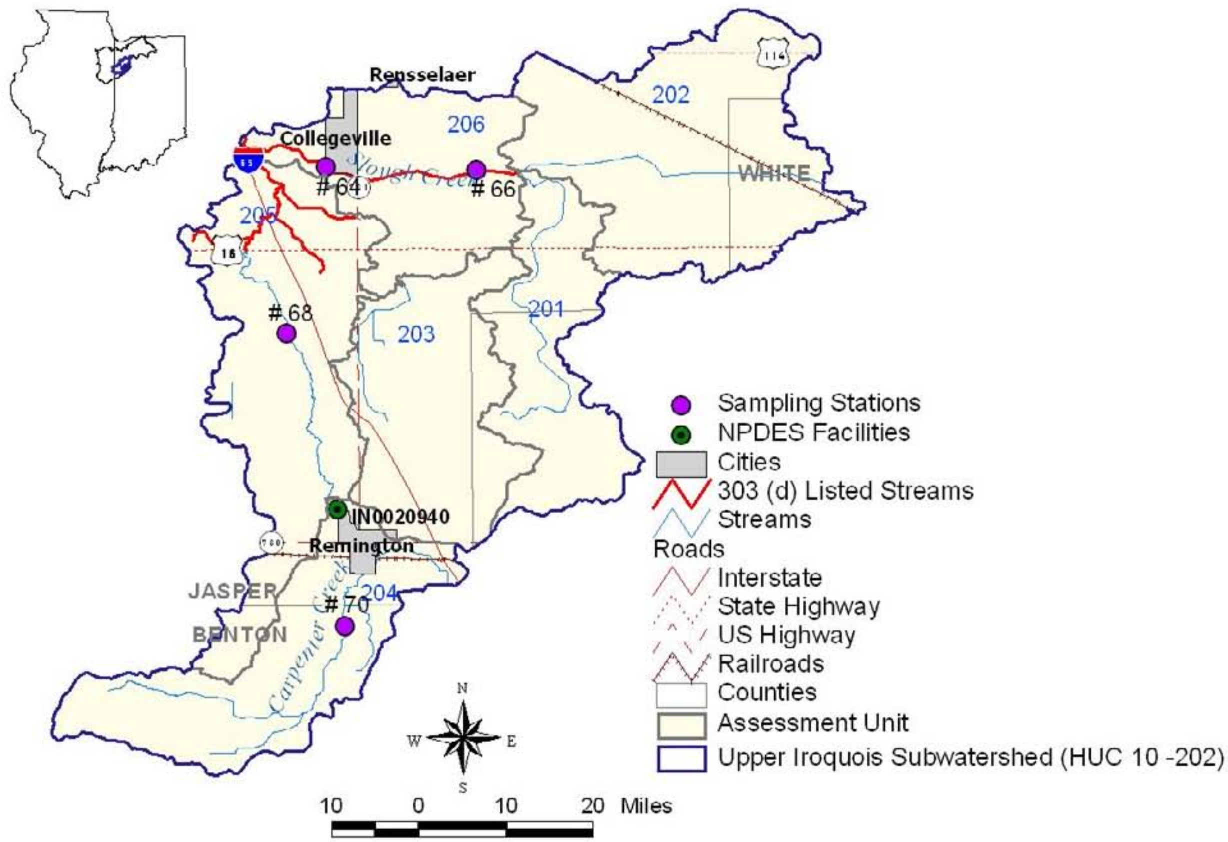


Figure 87. NPDES Facilities in the Slough Creek Subwatershed (HUC10-202)

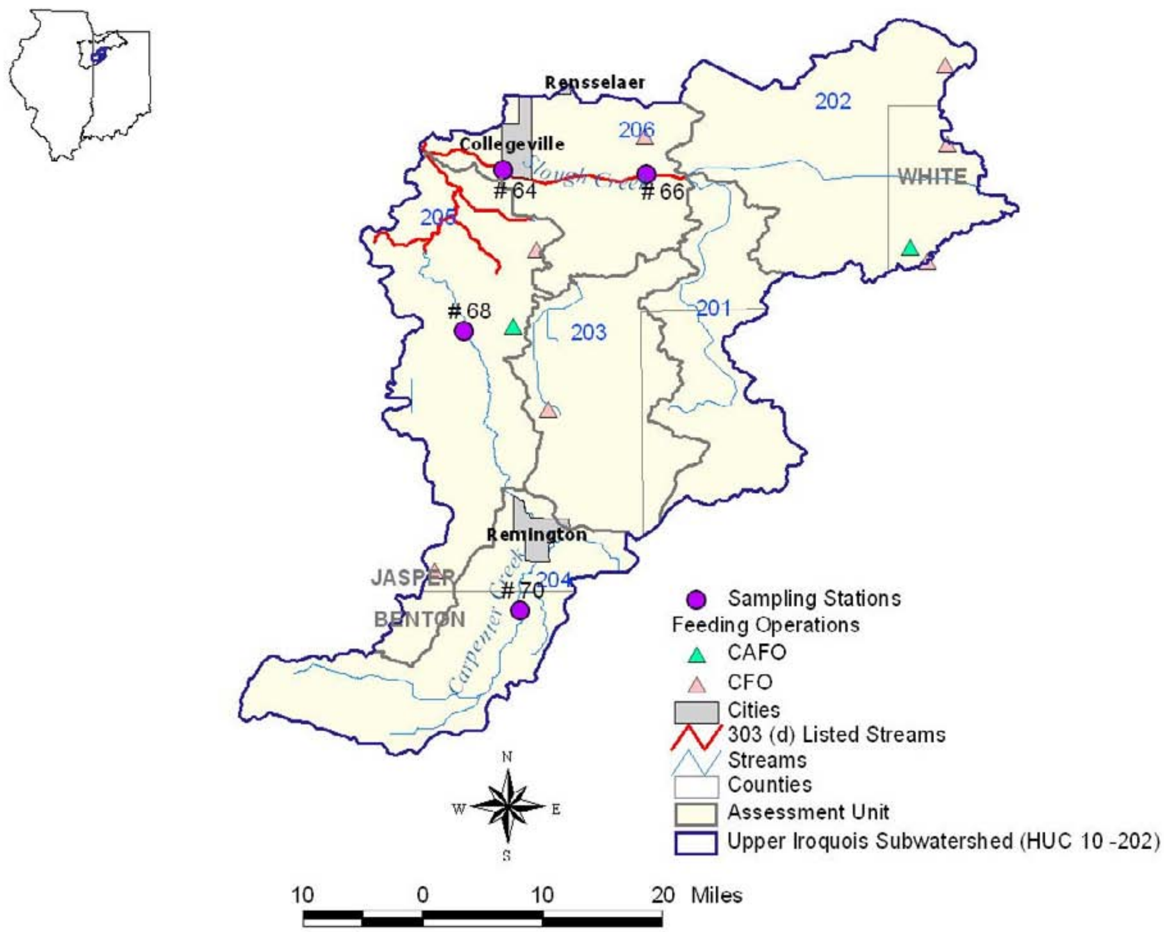


Figure 88. Feeding Operations in the Slough Creek Subwatershed (HUC10-202)

Table 182 through Table 184 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 204; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There is one NPDES facilities within the Slough Creek subwatershed and the WLAs for that facility were calculated based on design flows and *E. coli* permit limits. The individual WLAs are presented in Table 276. There are two CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 182. Headwaters Carpenter Creek Characteristics and TMDL Summary (HUC12-204)

Upstream Characteristics					
Drainage Area	23.46 square miles				
Sampling Station	70				
Listed Segments	None				
Land Use	Agriculture: 90.32%; Developed Land:7.19%; Forest:0.74%; Other: 1.74%				
Soils	A: 0.00%; B: 62.58%; C: 36.77%; D:0.65%; Unknown:0.00%				
NPDES Facilities	Remington WWTP (IN0020940)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	203.59	55.49	19.83	5.45	0.71
WLA	2.03	2.03	2.03	2.03	2.03
MOS (10%)	22.85	6.39	2.43	0.83	0.3
TMDL = LA+WLA+MOS	228.47	63.91	24.29	8.31	3.04

Table 183. Carpenter Creek Characteristics and TMDL Summary (HUC12-205)

Upstream Characteristics					
Drainage Area	54.09 square miles				
Sampling Station	68				
Listed Segments	INK0238_00				
Land Use	Agriculture: 87.97%; Developed Land:6.85%; Forest:2.96%; Other: 2.22%				
Soils	A: 20.33%; B: 43.18%; C: 32.03%; D:4.46%; Unknown:0.00%				
NPDES Facilities	Remington WWTP (IN0020940)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Tip Top Pigs Inc #1 (ING802689)				
CFOs	Jasper County Pullets (3506)				
	Ronald Hathaway (4390)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	472.15	130.61	48.37	15.21	4.27
WLA	2.03	2.03	2.03	2.03	2.03
MOS (10%)	52.69	14.74	5.60	1.92	0.70
TMDL = LA+WLA+MOS	526.87	147.38	56.00	19.16	7.00

Table 184. Bice Ditch-Slough Creek Characteristics and TMDL Summary (HUC12-206)

Upstream Characteristics					
Drainage Area	145.11 square miles				
Sampling Station	64,66				
Listed Segments	INK0235_T1019				
Land Use	Agriculture: 84.65%; Developed Land:6.04%; Forest:6.72%; Other: 2.59%				
Soils	A: 42.90%; B: 35.03%; C: 19.69%; D:2.28%; Unknown:0.10%				
NPDES Facilities	Remington WWTP (IN0020940)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	White County Egg Farm (ING803422)				
	Tip Top Pigs Inc #1 (ING802689)				
CFOs	Jack Rodibaugh & Sons Inc (516)				
	Frey Farm (745)				
	Mark And Rebecca Streitmatter (2891)				
	White County Pullets (3423)				
	Keith Streitmatter (4260)				
	Jasper County Pullets (3506)				
	Ronald Hathaway (4390)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1269.84	353.74	133.16	44.22	14.87
WLA	2.03	2.03	2.03	2.03	2.03
MOS (10%)	141.32	39.53	15.02	5.14	1.88
TMDL = LA+WLA+MOS	1413.19	395.30	150.21	51.39	18.78

7.1.4.3 Bruner Ditch-Iroquois River Subwatershed (HUC10-203)

The Bruner Ditch subwatershed has an area of approximately 136 square miles and lies in Jasper County (Figure 89). Agriculture is the dominant land use (Table 188). There is only one NPDES facility and two CAFOs within the subwatershed as documented in Figure 90 and Figure 91, respectively. The subwatershed has two listed segments (Table 185). Table 186 lists the sampling locations and Table 187 summarizes the 2008 data. The required reductions range from 64 to 80 percent in this subwatershed.

Table 185. 303 (d) Listed Streams in the Bruner Ditch-Iroquois River Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
303	Dexter Ditch-Iroquois River	INK0223_T1003	Iroquois River	3.51	*E. coli*
305	Moore Ditch _Iroquois River	INK0226_T1004	Iroquois River	10.9	*E. coli*

Table 186. Station Locations in the Bruner Ditch-Iroquois River Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
304	Ryan Ditch	ID# 58	Ryan D
305	Moore Ditch-Iroquois River	ID# 60	Iroquois R

Table 187. Summary of Pathogen Data in the Bruner Ditch-Iroquois River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
58	6/4/2008 - 7/2/2008	5	100	40	162	343	665	2,419	64%
60	6/4/2008 - 7/2/2008	5	100	100	365	631	672	1,120	80%

Table 188. Land Use/Land Cover in the Bruner Ditch-Iroquois River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	72,477.52	113.25	83.57
Forested Land	4,947.38	7.73	5.70
Developed Land	5,619.67	8.78	6.48
Pasture/Hay	2,570.65	4.02	2.96
Grassland and Shrubs	693.65	1.08	0.80
Open Water	320.69	0.50	0.37
Wetland	97.41	0.15	0.11
Total	**86,726.97**	**135.51**	**100.00**

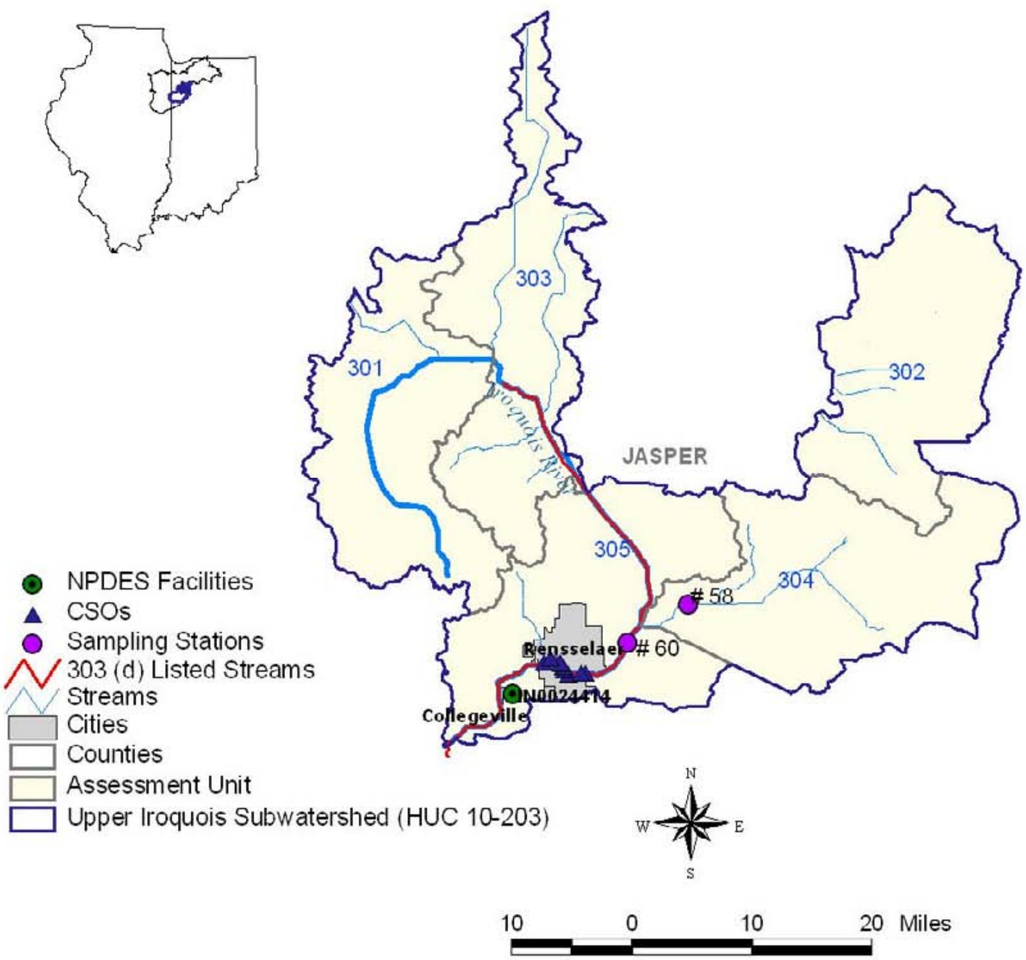


Figure 89. Location of Bruner Ditch-Iroquois River (HUC10-203)

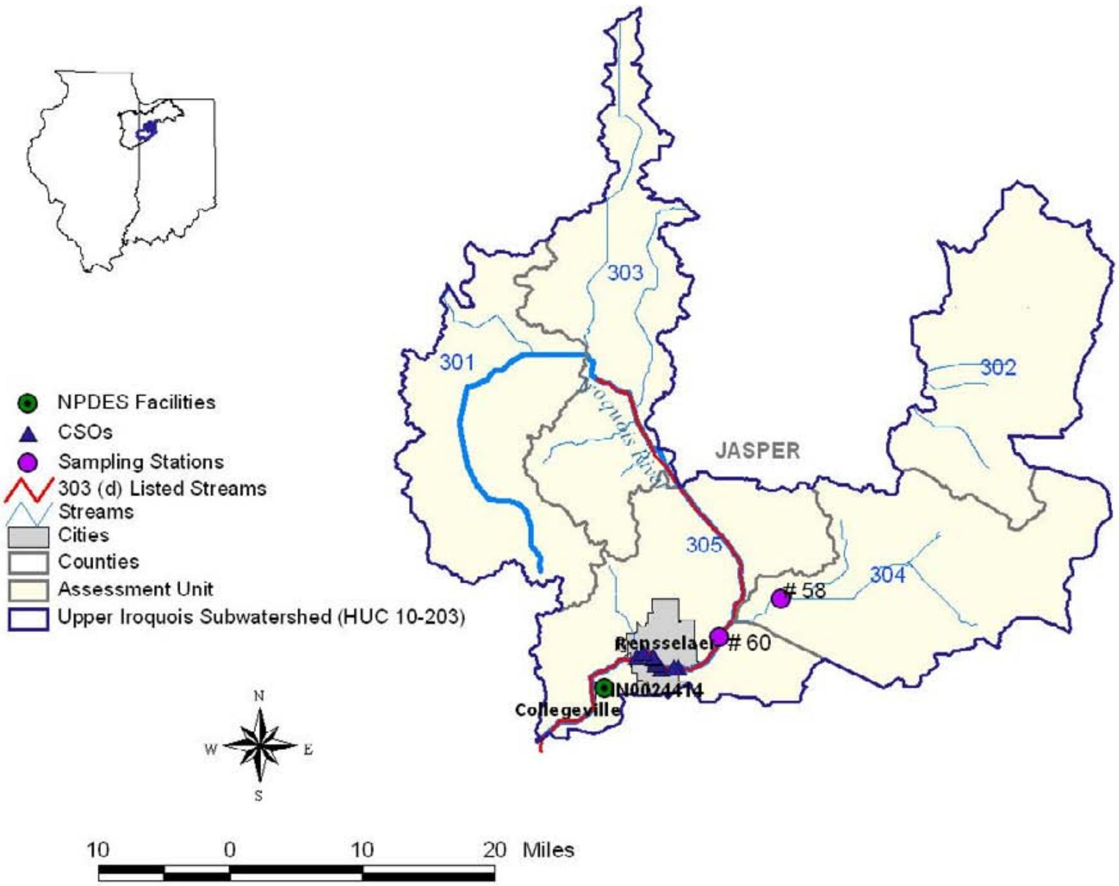


Figure 90. NPDES Facilities in the Bruner Ditch-Iroquois River (HUC10-203)

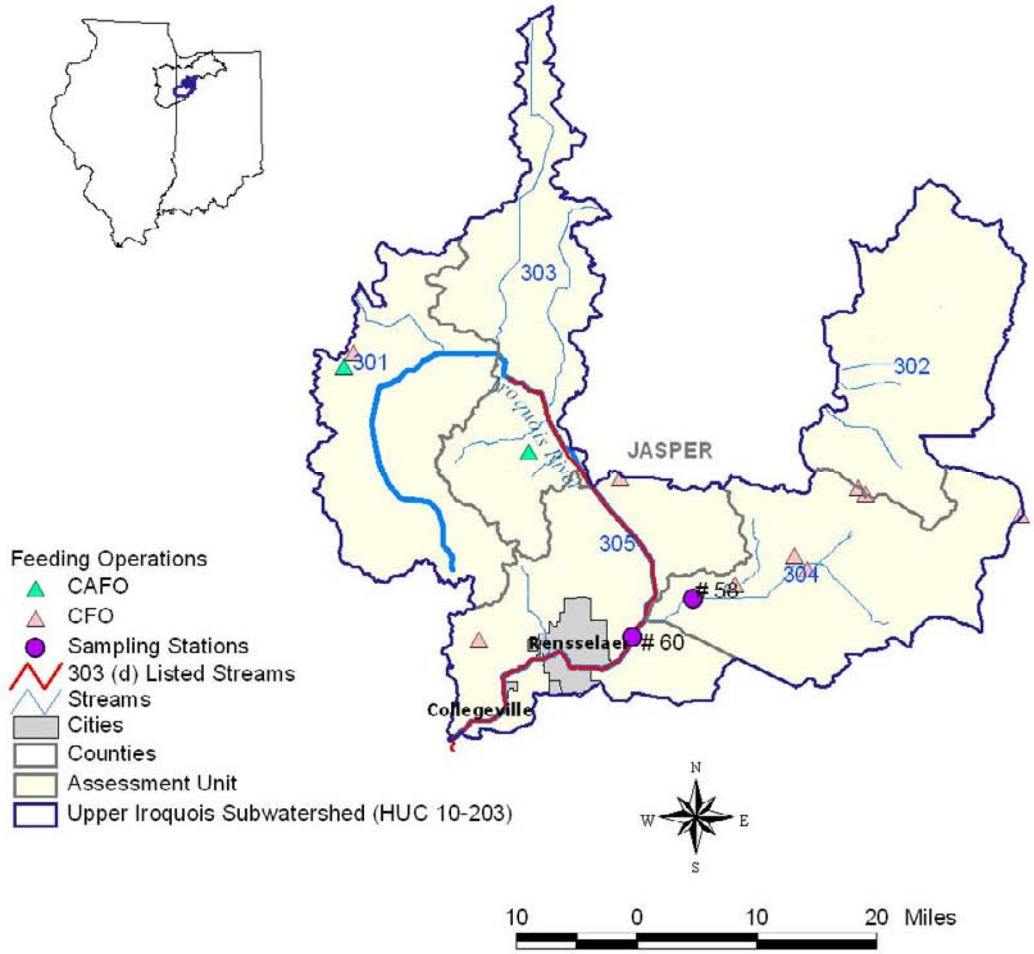


Figure 91. Feeding Operations in the Bruner Ditch-Iroquois River (HUC10-203)

Table 189 through Table 191 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 304; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There is one NPDES facility within the Bruner Ditch subwatershed and the WLAs for the facility were calculated based on the design flows and *E. coli* permit limits. There is one CSO community with 9 outfalls upstream of this subwatershed. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are two CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 189. Dexter Ditch-Iroquois River Characteristics and TMDL Summary (HUC12-303)

Upstream Characteristics					
Drainage Area	52.93 square miles				
Sampling Station	None				
Listed Segments	INK0223_T1003				
Land Use	Agriculture: 79.61%; Developed Land:6.00%; Forest:8.53%; Other: 5.86%				
Soils	A: 47.98%; B: 45.66%; C: 4.34%; D:1.45%; Unknown:0.58%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Grow Feedlots (ING800876)				
	Dairy (ING806045)				
CFOs	Iroquois Valley Swine (3700)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	466.42	124.86	51.67	20.09	7.89
WLA	0	0	0	0	0
MOS (10%)	51.82	13.87	5.74	2.23	0.88
TMDL = LA+WLA+MOS	518.24	138.73	57.41	22.32	8.77

Table 190. Ryan Ditch-Iroquois River Characteristics and TMDL Summary (HUC12-304)

Upstream Characteristics					
Drainage Area	53.87 square miles				
Sampling Station	58				
Listed Segments	None				
Land Use	Agriculture: 90.36%; Developed Land:3.66%; Forest:3.08%; Other: 2.90%				
Soils	A: 22.65%; B: 56.91%; C: 14.64%; D:5.52%; Unknown:0.28%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Bruce Wuethrich Farm (230)				
	Hurley Swine Enterprises #1 (4056)				
	Parkinson & Rodibaugh (4235)				
	G.O.P. Farms (4656)				
	Moore Farms (4337)				
	Northwind Pork LLC (4991)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	474.71	127.07	52.58	20.45	8.04
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	52.74	14.12	5.84	2.27	0.89
TMDL = LA+WLA+MOS	527.45	141.19	58.42	22.72	8.93

Table 191. Moore Ditch-Iroquois River Characteristics and TMDL Summary (HUC12-305)

Upstream Characteristics					
Drainage Area	217.93 square miles				
Sampling Station	60				
Listed Segments	INK0226_T1004				
Land Use	Agriculture: 78.59%; Developed Land:5.89%; Forest:10.35%; Other: 5.17%				
Soils	A: 42.66%; B: 42.17%; C: 10.80%; D:3.74%; Unknown:0.62%				
NPDES Facilities	Rensselaer Municipal STP (IN0024414)				
MS4 Communities	None				
CSO Communities	Rensselaer Municipal STP (IN0024414)-9 outfalls				
CAFOs	Grow Feedlots (ING800876)				
	Windy Ridge Dairy (ING806045)				
	Newberry Farms, LLC (ING806083)				
CFOs	Bruce Wuethrich Farm (230)				
	Hurley Swine Enterprises #1 (4056)				
	Parkinson & Rodibaugh (4235)				
	G.O.P. Farms (4656)				
	Moore Farms (4337)				
	Pullin Farms Inc. (652)				
	Greg & Mark Bailey (2284)				
	Iroquois Valley Swine (3700)				
	Whitaker Farms (6355)				
	Northwind Pork LLC (4991)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1056.13	508.42	207.05	77.05	26.82
WLA	864.35	5.68	5.68	5.68	5.68
MOS (10%)	213.39	57.12	23.64	9.19	3.61
TMDL = LA+WLA+MOS	2133.87	571.22	236.37	91.92	36.11

7.1.4.4 Curtis Creek-Iroquois River Subwatershed (HUC10-204)

The Curtis Creek subwatershed has an area of nearly 162 square miles and is located within Jasper, Newton and Benton counties (Figure 92). A significant portion of the land (86.34%) is used for agriculture. Developed land accounts for 9.83 percent. The remaining land categories comprise 7.58 percent of the total subwatershed area (Table 194). The NPDES facilities and feeding operations that are potential sources of pathogen in this subwatershed are shown in Figure 93 and Figure 94, respectively. Although no segments were listed in 2006, the 2008 data suggest impaired conditions (Table 192 and Table 193). The required reductions range from 75 to 89 percent in this subwatershed.

Table 192. Station Locations in the Curtis Creek-Iroquois River Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
401	Headwaters Curtis Creek	ID# 62	Curtis Cr
403	Hunter Ditch	ID# 76	Hunter D
404	Bower Ditch-Darroch Ditch	ID# 78	Darroch D
405	Hickory Branch-Iroquois River	ID# 72	Mosquito Cr
		ID# 74	Iroquois R

Table 193. Summary of Pathogen Data in Curtis Creek-Iroquois River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
62	6/4/2008 - 7/2/2008	5	100	100	326	649	882	2,419	81%
76	6/2/2008 - 6/30/2008	5	100	100	866	1,122	1,144	1,414	89%
78	6/2/2008 - 6/30/2008	5	100	100	276	755	866	1,300	83%
72	6/2/2008 - 6/30/2008	5	100	100	276	544	608	1,120	77%
74	6/2/2008 - 6/30/2008	5	100	80	131	495	805	2,419	75%

Table 194. Land Use/Land Cover in the Curtis Creek-Iroquois River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	89,350.55	139.61	86.34
Forested Land	4,048.90	6.33	3.91
Developed Land	6,291.75	9.83	6.08
Pasture/Hay	3,008.32	4.70	2.91
Grassland and Shrubs	217.06	0.34	0.21
Open Water	178.80	0.28	0.17
Wetland	394.30	0.62	0.38
Total	**103,489.69**	**161.70**	**100.00**

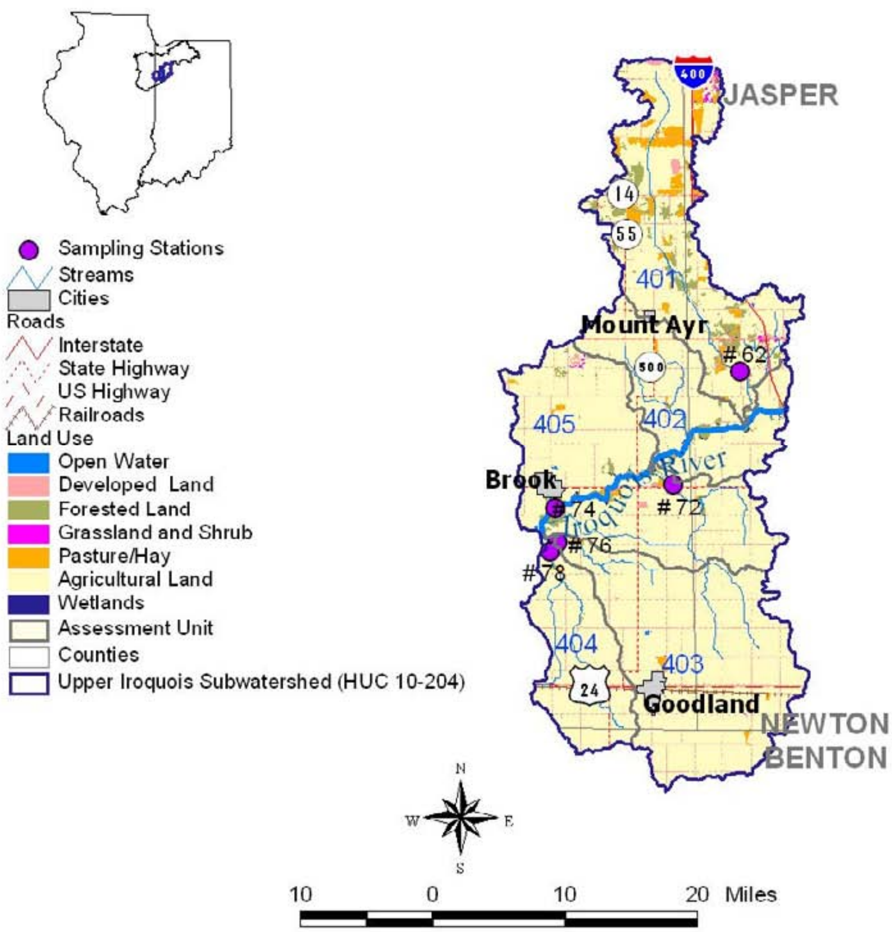


Figure 92. Location of Curtis Creek-Iroquois River Subwatershed (HUC10-204)

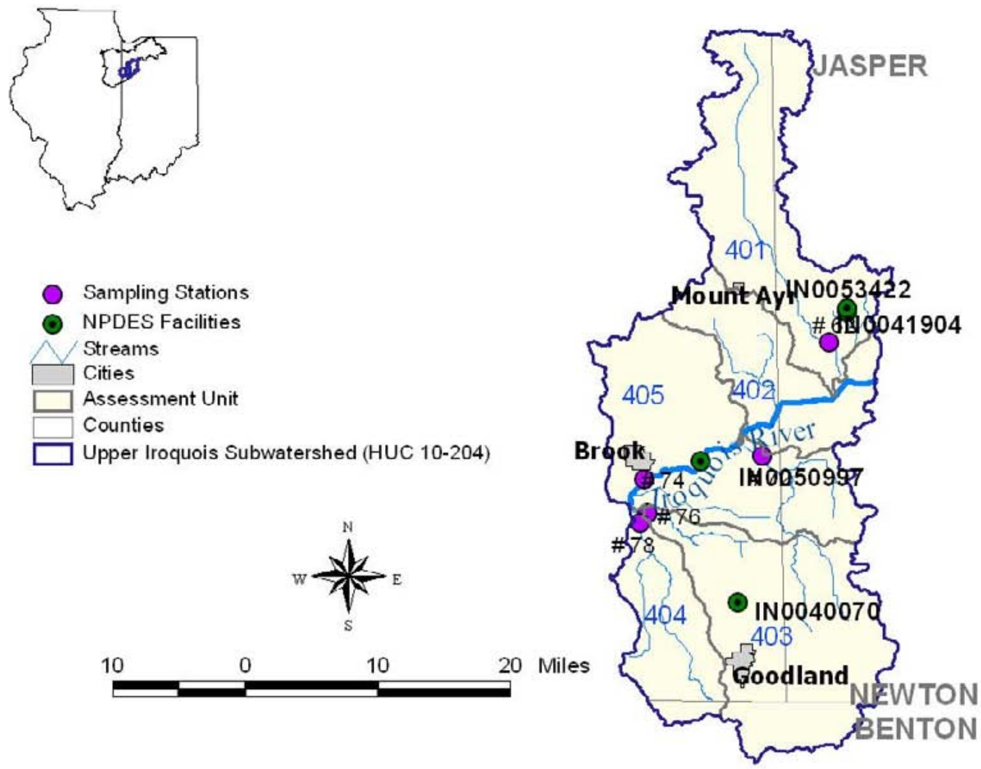


Figure 93. NPDES Facilities in the Curtis Creek-Iroquois River Subwatershed (HUC10-204)

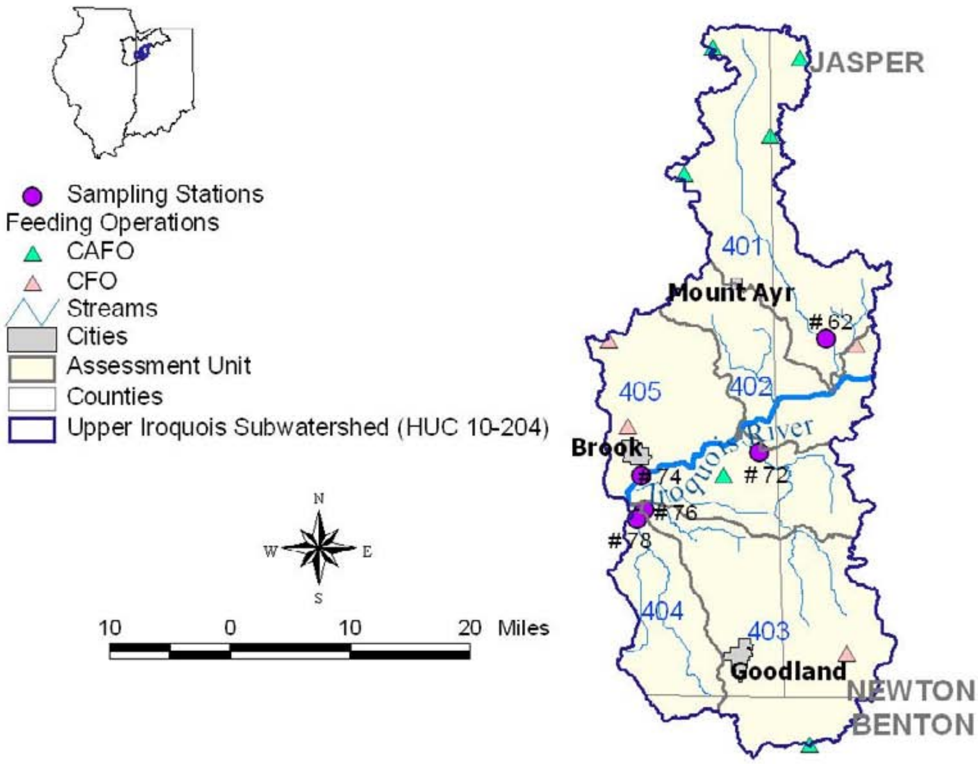


Figure 94. Feeding Operations in Curtis Creek-Iroquois River Subwatershed (HUC10-204)

Table 195 through Table 198 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in this subwatershed; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are three NPDES facilities within the Mill Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There is one CSO community with 9 outfalls upstream of this subwatershed. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are six CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 195. Headwaters Curtis Creek Characteristics and TMDL Summary (HUC12-401)

Upstream Characteristics					
Drainage Area	38.66 square miles				
Sampling Station	62				
Listed Segments	None				
Land Use	Agriculture: 72.70%; Developed Land:7.73%; Forest:9.50%; Other: 10.07%				
Soils	A: 48.65%; B: 40.93%; C: 8.11%; D:2.32%; Unknown:0.00%				
NPDES Facilities	Trail Tree Inn (IN0041904)				
	Grandmas Home Cooking (IN0053422)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Cambalot Swine Breeders *				
	Calf Land, LLC (ING803732)				
	Fair Oaks Dairy Farm South (ING806036)				
	Fair Oaks Dairy Farm West (ING806065)				
	Fair Oaks Dairy Farm, LLC. - North Central # 5 (ING806341)				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	337.50	93.43	34.67	10.97	3.15
WLA	1.35	1.35	1.35	1.35	1.35
MOS (10%)	37.65	10.53	4.00	1.37	0.50
TMDL = LA+WLA+MOS	376.50	105.31	40.02	13.69	5.00

* ID not available

Table 196. Hunter Ditch Characteristics and TMDL Summary (HUC12-403)

Upstream Characteristics					
Drainage Area	42.66 square miles				
Sampling Station	76				
Listed Segments	None				
Land Use	Agriculture: 92.65%; Developed Land:6.16%; Forest:0.27%; Other: 0.92%				
Soils	A: 6.69%; B: 47.54%; C: 44.01%; D:1.76%; Unknown:0.00%				
NPDES Facilities	Goodland Municipal WWTP (IN0040070)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Seven Hills Dairy, LLC (ING806207)				
CFOs	Oinker Acres (3279)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	373.46	104.14	39.29	13.15	4.52
WLA	0.45	0.45	0.45	0.45	0.45
MOS (10%)	41.55	11.62	4.42	1.51	0.55
TMDL = LA+WLA+MOS	415.46	116.21	44.16	15.11	5.52

Table 197. Bower Ditch –Darroch Ditch Characteristics and TMDL Summary (HUC12-404)

Upstream Characteristics					
Drainage Area	59.77 square miles				
Sampling Station	78				
Listed Segments	None				
Land Use	Agriculture: 92.86%; Developed Land:5.84%; Forest:0.53%; Other: 0.77%				
Soils	A: 5.30%; B: 49.75%; C: 43.18%; D:1.77%; Unknown:0.00%				
NPDES Facilities	Goodland Municipal WWTP (IN0040070)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Seven Hills Dairy, LLC (ING806207)				
CFOs	Oinker Acres (3279)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	523.43	146.09	55.24	18.6	6.51
WLA	0.45	0.45	0.45	0.45	0.45
MOS (10%)	58.21	16.28	6.18	2.12	0.77
TMDL = LA+WLA+MOS	582.09	162.82	61.87	21.17	7.73

Table 198. Hickory Branch –Iroquois River Characteristics and TMDL Summary (HUC12-405)

Upstream Characteristics					
Drainage Area	524.76 square miles				
Sampling Station	72,74				
Listed Segments	None				
Land Use	Agriculture: 82.65%; Developed Land:5.99%; Forest:7.36%; Other: 4.00%				
Soils	A: 35.58%; B: 39.75%; C: 19.64%; D:4.74%; Unknown:0.29%				
NPDES Facilities	Facilities Upstream of HUC12-206[a]				
	Trail Tree Inn (IN0041904)				
	Goodland Municipal WWTP (IN0040070)				
	Grandmas Home Cooking (IN0053422)				
	George Ade Mem Health Care Car (IN0050997)				
MS4 Communities	None				
CSO Communities	Rensselaer Municipal STP (IN0024414)-9 outfalls				
CAFOs	Facilities Upstream of HUC12-206[a] and HUC12-205[b]				
	Seven Hills Dairy, LLC (ING806207)				
CFOs	Facilities Upstream of HUC12-206[a] and HUC12-205[b]				
	Oinker Acres (3279)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	3731.22	1276.99	479.33	157.69	51.54
WLA	868.24	9.57	9.57	9.57	9.57
MOS (10%)	511.05	142.95	54.32	18.58	6.79
TMDL = LA+WLA+MOS	5110.51	1429.51	543.22	185.84	67.9

a: Refers to Upper Iroquois HUC12

7.1.4.5 Montgomery Ditch-Iroquois River Subwatershed (HUC10-205)

The Montgomery Ditch subwatershed has an area of nearly 160 square miles. Incorporated cities with this subwatershed include Sheldon and Kentland (Figure 95). As with the above watersheds, agriculture is the dominant land use covering 88.70 percent of the subwatershed area (Table 201). There are two NPDES facilities (Figure 96) and no CAFO (Figure 97) in this subwatershed. The subwatershed does not have any 303 (d) listed segments within it. The summary of the *E. coli* data at the four monitoring locations (Table 199) is listed in Table 200. The required reductions range from 41 to 85 percent.

Table 199. Station Locations in the Montgomery Ditch -Iroquois River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
502	Whaley Ditch	ID# 82	Thompson D
503	Strole Ditch-Iroquois River	ID# 80	Iroquois R
505	Kent Ditch-Montgomery Ditch	ID# 86	Montgomery
506	Montgomery Ditch	ID# 84	Montgomery

Table 200. Summary of Pathogen Data in Montgomery Ditch-Iroquois River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
82	6/2/2008 - 6/30/2008	5	100	80	214	361	414	866	65%
80	6/2/2008 - 6/30/2008	5	80	40	102	211	252	488	41%
86	6/2/2008 - 6/30/2008	5	100	100	345	581	632	1,046	78%
84	6/2/2008 - 6/30/2008	5	100	100	411	813	877	1,300	85%

Table 201. Land Use/Land cover in the Montgomery Ditch -Iroquois River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	91,053.20	142.27	88.70
Developed Land	6,550.84	10.24	6.38
Forested Land	2,462.12	3.85	2.40
Pasture/Hay	2,023.34	3.16	1.97
Open Water	247.97	0.39	0.24
Wetland	236.85	0.37	0.23
Grassland and Shrubs	78.28	0.12	0.08
Total	**102,652.60**	**160.39**	**100.00**

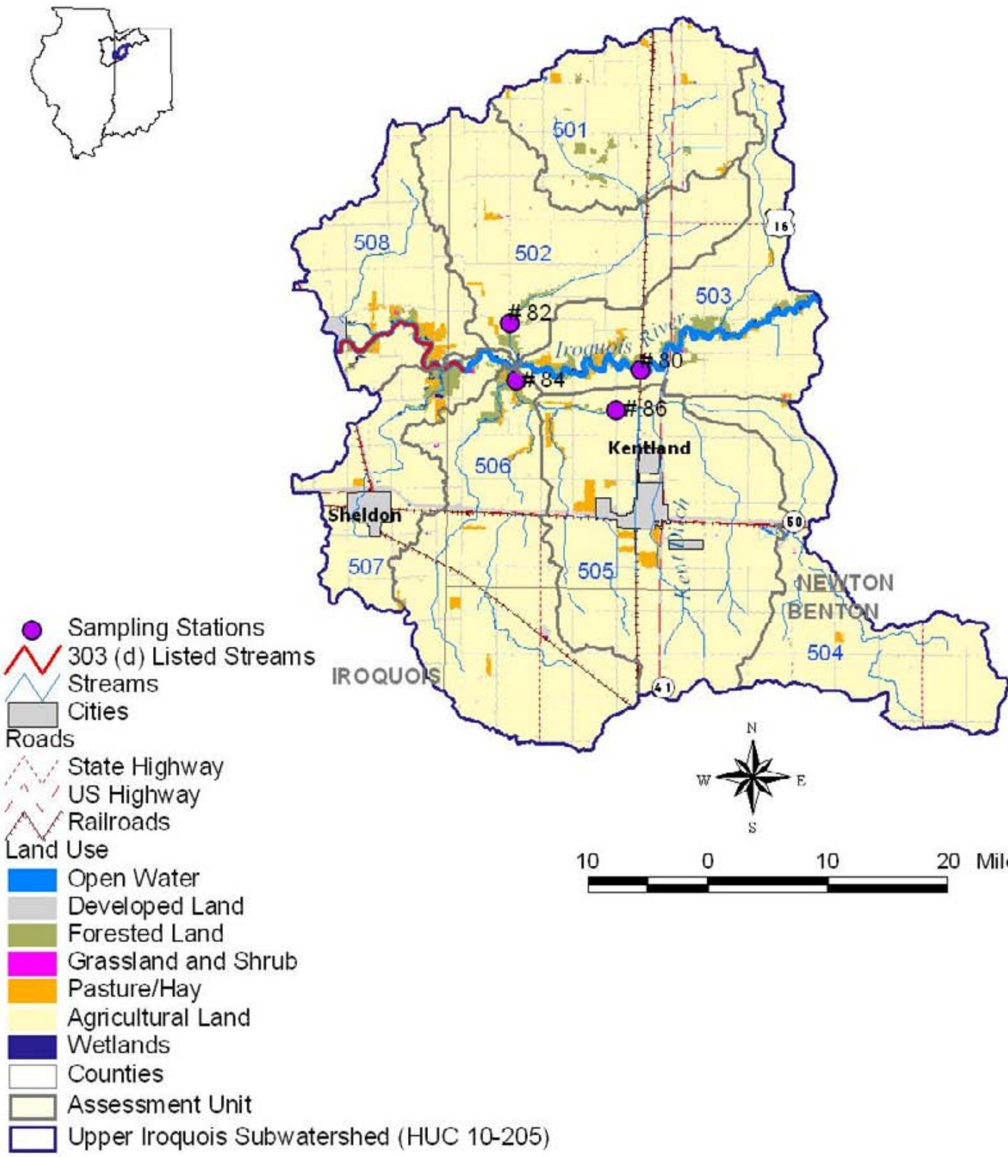


Figure 95. Location of Montgomery Ditch-Iroquois River Subwatershed (HUC10-205)

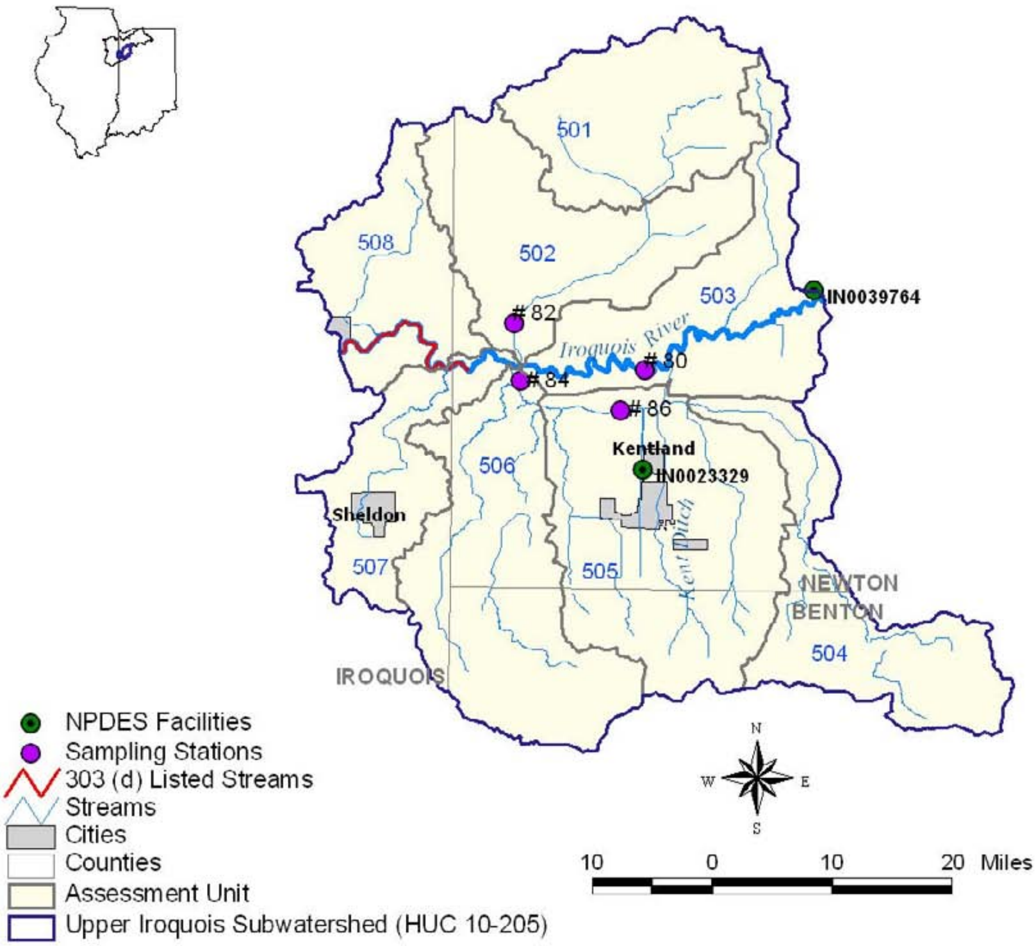


Figure 96. NPDES Facilities in the Montgomery Ditch-Iroquois River Subwatershed (HUC10-205)

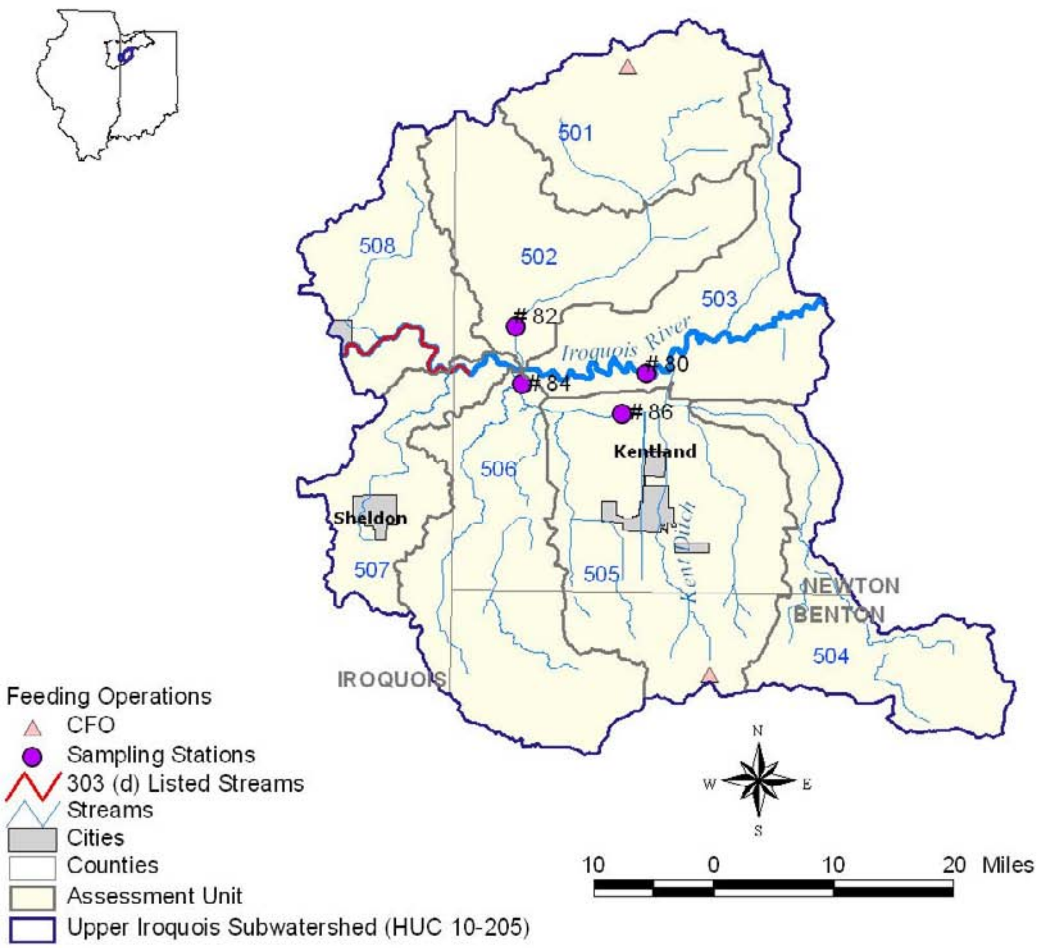


Figure 97. Feeding Operations in the Montgomery Ditch-Iroquois River Subwatershed (HUC10-205)

Table 202 through Table 205 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in the subwatershed; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are two NPDES facilities within the Montgomery Ditch subwatershed and the WLAs for the facilities were calculated based on their design flows and *E. coli* permit limits. There is one CSO community with 9 outfalls upstream of this subwatershed. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* standards. The individual WLAs are presented in Table 276. There are two CAFOs within this subwatershed and they receive a WLA of zero as described further in Section 7.3.

Table 202. Whaley Ditch Characteristics and TMDL Summary (HUC 12-502)

Upstream Characteristics					
Drainage Area	38.93 square miles				
Sampling Station	82				
Listed Segments	None				
Land Use	Agriculture: 91.54%; Developed Land:5.44%; Forest:1.95%; Other: 4.00%				
Soils	A: 7.66%; B: 54.60%; C: 32.57%; D:5.17%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Gary A Clark (669)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	365.13	78.80	25.70	5.28	1.63
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	40.57	8.75	2.86	0.59	0.18
TMDL = LA+WLA+MOS	405.70	87.55	28.56	5.87	1.81

Table 203. Strole Ditch-Iroquois River Characteristics and TMDL Summary (HUC 12-503)

Upstream Characteristics					
Drainage Area	545.01 Square miles				
Sampling Station	80				
Listed Segments	None				
Land Use	Agriculture: 82.69%; Developed Land:5.96%; Forest:7.35%; Other: 4.00%				
Soils	A: 34.47%; B: 40.17%; C: 20.44%; D:4.65%; Unknown:0.28%				
NPDES Facilities	All facilities upstream of HUC12-405[a]				
	Brook Municipal WWTP (IN0039764)				
MS4 Communities	None				
CSO Communities	Rensselaer Municipal STP (IN0024414)-9 outfalls				
	Brook Municipal WWTP (IN0039764)				
CAFOs	All facilities upstream of HUC12-405[a]				
CFOs	All facilities upstream of HUC12-405[a]				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	4243.04	1093.03	349.8	63.95	12.83
WLA	868.72	10.04	10.04	10.04	10.04
MOS (10%)	567.97	122.56	39.98	8.22	2.54
TMDL = LA+WLA+MOS	5679.73	1225.63	399.82	82.21	25.41

a: Refers to Upper Iroquois HUC 12

Table 204. Kent Ditch-Montgomery Ditch Characteristics and TMDL Summary (HUC 12-505)

Upstream Characteristics					
Drainage Area	49.15 square miles				
Sampling Station	86				
Listed Segments	None				
Land Use	Agriculture: 90.50%; Developed Land:7.01%; Forest:0.18%; Other: 2.31%				
Soils	A: 0.92%; B: 50.15%; C: 47.71%; D:1.22%; Unknown:0.00%				
NPDES Facilities	Kentland Municipal WWTP (IN0023329)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Carl E Funk Farms (1680)				
TMDL Allocations (billion/day)*					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	460.07	98.57	31.54	5.76	1.15
WLA	2.18	2.18	2.18	2.18	2.18
MOS (10%)	51.36	11.19	3.74	0.88	0.37
TMDL = LA+WLA+MOS	513.61	111.94	37.46	8.82	3.7

* Design flows from the Kentland Municipal WWTP facility were added to the originally estimated flows. Without these modifications the WLA would exceed the TMDL during low flows.

Table 205. Montgomery Ditch Characteristics and TMDL Summary (HUC 12-506)

Upstream Characteristics					
Drainage Area	75.39 square miles				
Sampling Station	84				
Listed Segments	None				
Land Use	Agriculture: 90.56%; Developed Land:6.48%; Forest:0.73%; Other: 2.23%				
Soils	A: 0.80%; B: 51.29%; C: 45.02%; D:2.89%; Unknown:0.00%				
NPDES Facilities	Kentland Municipal WWTP (IN0023329)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Carl E Funk Farms (1680)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	705.01	150.43	47.6	8.06	0.99
WLA	2.18	2.18	2.18	2.18	2.18
MOS (10%)	78.58	16.95	5.53	1.13	0.35
TMDL = LA+WLA+MOS	785.77	169.56	55.31	11.37	3.52

7.1.5 Lower Iroquois Subwatershed

The Lower Iroquois Subwatershed is comprised of nine HUC 10 and forty seven HUC 12 subwatersheds. Note that HUC 10 subwatersheds 206, 208, 209, 211, and 212 do not have impaired segments, but 2008 sampling of monitoring locations showed impairments. Therefore, TMDLs are calculated for these subwatersheds.

Table 206. Hydrologic Unit Code (HUC 10 and 12) in the Lower Iroquois Subwatershed

HUC 10	HU C10 Name	HUC 12	HU C12 Name	Area (sq. miles)
206	Mud Creek	601	071200020601	16.59125
		602	071200020602	18.7441
		603	Headwaters Pigeon Creek	30.8068
		604	Pigeon Creek	15.96917
		605	Whiskey Creek	21.2739
		606	Town of Hickman	19.16795
		607	Fountain Creek	45.60417
		608	Gay Creek	21.97431
		609	Town of Hallock	35.96924
		610	Little Mud Creek-Mud Creek	60.06453
207	Sugar Creek	701	Upper Sugar Creek-Sugar Creek	22.23759
		702	Coon Creek-Mud Creek	38.54219
		703	Kult Ditch-Mud Creek	16.00688
		704	Cole Creek-Mud Creek	15.40805
		705	Yeagers Curve-Sugar Creek	32.14466
		706	Town of Stockland	21.12238
		707	City of Milford-Sugar Creek	15.30333
		708	Jefferson Creek	20.80353
		709	Possum Trot Ditch	16.81788
		710	Coon Creek	30.81923
		711	Sugar Creek	48.07788
208	Spring Creek	801	801	17.07744
		802	Louis Creek	23.43562
		803	City of Roberts	18.92303
		804	Town of Dalrey	41.12784
		805	Headwaters Spring Creek	55.80779
		806	Sharetail Creek	31.4288
		807	Town of Leonard	20.31431
		808	Spring Creek	45.22072
209	Prairie Creek	901	City of Ashkum	10.4721
		902	Prairie Creek	78.95901
210	Gofield Creek-Iroquois River	001	Eastburo Hollow-Iroquois River	52.59964
		002	City of Watseka-Iroquois River	57.56998
211	Pike Creek	101	North Martinton Ditch	37.05092
		102	Pike Creek	34.02338
212	Langan Creek	201	Headwaters Langan Creek	24.28199
		202	Langan Creek	83.05827

Table 206. Hydrologic Unit Code (HUC 10 and 12) in the Lower Iroquois Subwatershed

HUC 10	HU C10 Name	HUC 12	HU C12 Name	Area (sq. miles)
213	Beaver Creek	301	Hanger Ditch-Beaver Creek	23.82794
		302	Deardruff Ditch-Beaver Creek	18.62002
		303	Carlson Ditch-Beaver Creek	17.33211
		304	Hooper Branch	22.00391
		305	North Hooper-Beaver Creek	13.93102
		306	Headwaters Little Beaver Creek	29.04992
		307	Little Beaver Creek	31.93209
		308	Beaver Creek	30.13464
214	Iroquois River	401	Minnie Creek	22.81042
		402	Iroquois River	46.59147

7.1.5.1 Mud Creek Subwatershed (HUC10-206)

The Mud creek subwatershed lies in Iroquois, Vermillion, and Ford counties (Figure 98). The two dominant land uses in this subwatershed are agriculture (90.85%) and developed land (5.67%). The remaining land categories all contribute less than 3 percent of the subwatershed area (Table 210). The NPDES facilities are shown in Figure 99. There are no listed segments on the current 303(d) list in this subwatershed, anticipated 2010 303 (d) listed streams are shown in Table 207. There are six monitoring station in the subwatershed (Table 208). Statistical summaries of the water quality data are presented in Table 209. The reductions needed to achieve a geomean of 200 #/100 mL range from 0 to 78 percent.

Table 207. Anticipated 2010 303 (d) Listed Streams in the Mud Creek Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
604	Pigeon Creek	FLIDDc	Pigeon Creek	4.93	Fecal Coliform
605	Whiskey Creek	FLIDAA	Whiskey Creek	16.00	Fecal Coliform
608	Gay Creek	FLIDB	Gay Creek	12.01	Fecal Coliform
609	Town of Hallock	FLIDE-01	Unnamed Trib Mud Creek West	15.08	Fecal Coliform
610	Little Mud Creek-Mud Creek	FLID-02	Mud Creek West	8.18	Fecal Coliform

Table 208. Station Locations in the Mud Creek Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
604	Pigeon Creek	FLIDD-CP-C3	Pigeon Creek
605	Whiskey Creek	FLIDAA-01	Whisky Creek
607	Fountain Creek	FLIDA-01	Fountain Creek
608	Gay Creek	FLIDB-01	Gay Creek
609	Town of Hallock	FLIDE-01	Unnamed Trib Mud Creek West
610	Little Mud Creek-Mud Creek	FLID-02	Mud Creek West

Table 209. Summary of Pathogen Data in Mud Creek Subwatershed (IL)

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FLIDD-CP-C3	10/3/2000 - 9/17/2008	6	60	60	10	514	1,081	2,500	61%
FLIDAA-01	8/19/2008 - 9/17/2008	5	40	20	96	309	924	3,900	35%
FLIDA-01	8/19/2008 - 9/17/2008	5	60	0	60	129	153	222	0%
FLIDB-01	8/19/2008 - 9/17/2008	5	100	60	270	700	1,134	3,600	71%
FLIDE-01	8/19/2008 - 9/17/2008	5	100	100	570	912	1,115	2,780	78%
FLID-02	8/19/2008 - 9/17/2008	5	80	60	108	502	796	2,100	60%

Table 210. Land Use/land Cover in the Mud Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	166132.29	259.58	90.85
Developed Land	10367.34	16.20	5.67
Pasture/Hay	3809.61	5.95	2.08
Forested Land	1715.32	2.68	0.94
Wetland	619.14	0.97	0.34
Open Water	103.64	0.16	0.06
Grassland and Shrubs	106.97	0.17	0.06
Total	**182,854.32**	**285.71**	**100.00**

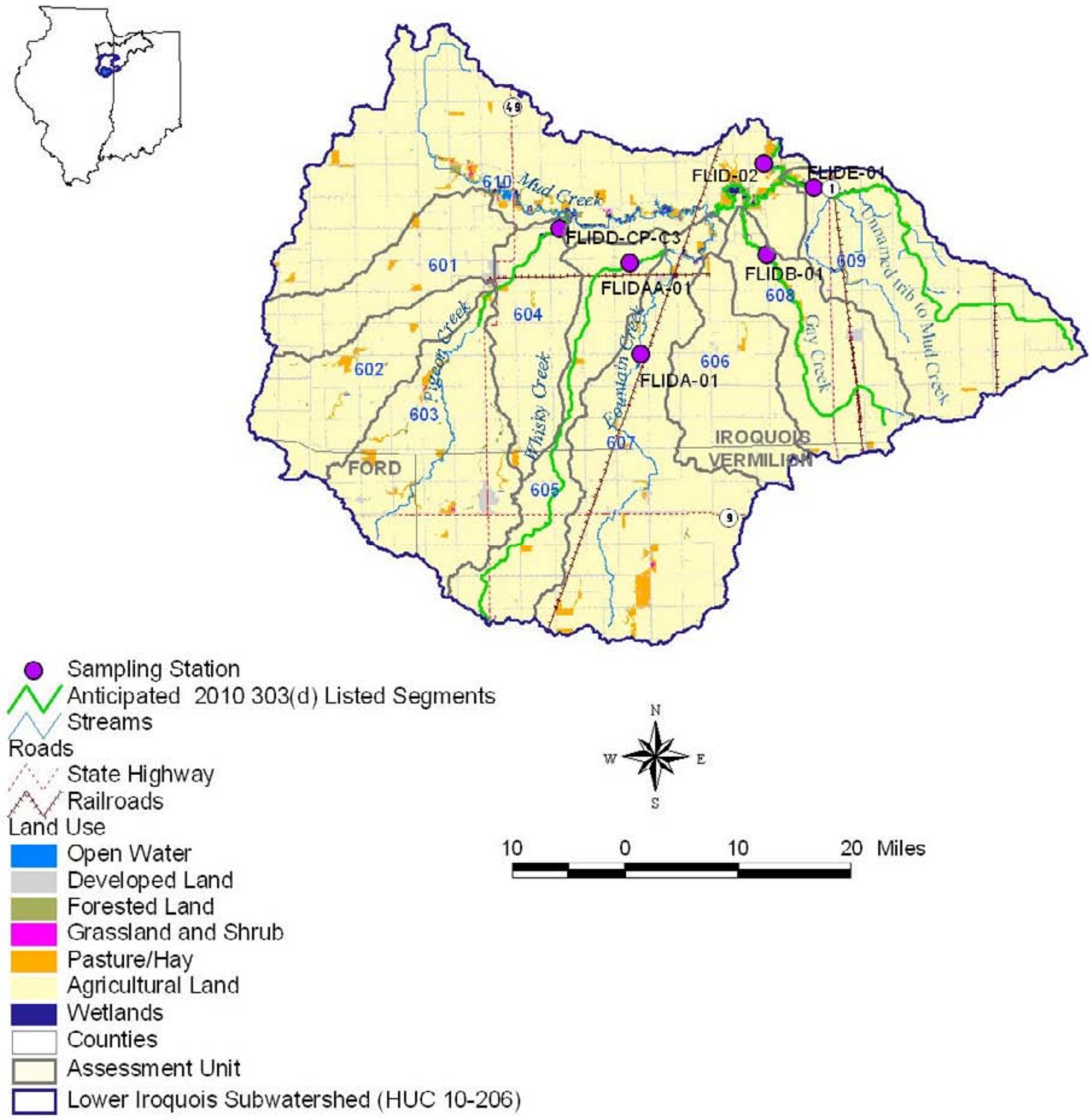


Figure 98. Location of Mud Creek Subwatershed (HUC10-206)

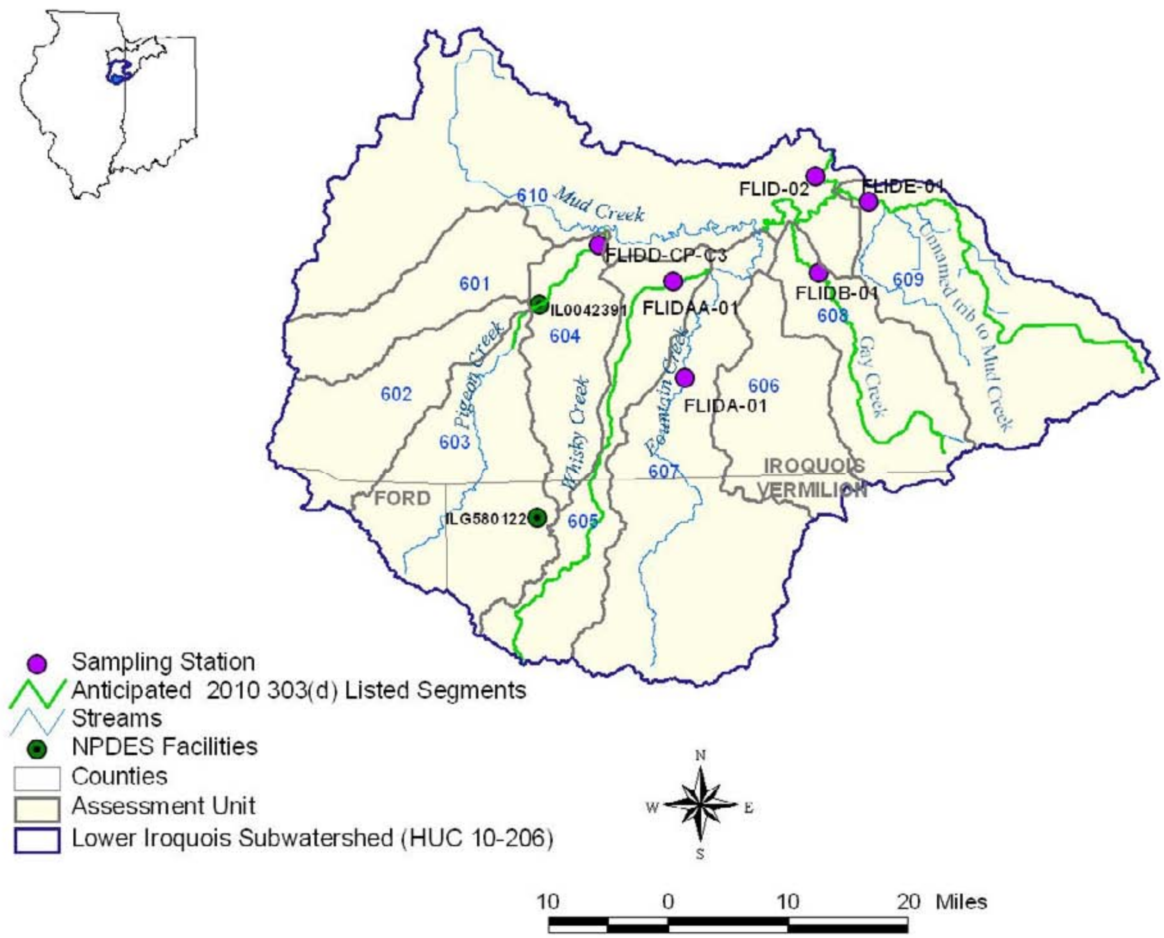


Figure 99. NPDES Facilities in the Mud Creek Subwatershed (HUC10-206)

Table 211 through Table 216 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in this subwatershed; however, the sampling performed in 2008 suggests that several streams are impaired. Those streams will appear on the next 303(d) list and TMDLs for those streams are presented here.

There are two NPDES facilities within the Mud Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and fecal coliform permit limits. The individual WLAs are presented in Table 276.

Table 211. Pigeon Creek Characteristics and TMDL Summary (HUC12-604)

Upstream Characteristics					
Drainage Area	65.49 square miles				
Sampling Station	FLIDD-CP-C3				
Listed Segments	FLIDDc				
Land Use	Agriculture: 97.52%; Developed Land:6.20%; Forest:0.65%; Other: 2.48%				
Soils	A:0.00%; B: 5.26%; C: 15.22%; D:79.29%; Unknown:0.23%				
NPDES Facilities	Cissna Park STP (IL0042391)				
	Rankin STP (ILG580122)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOS	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	849.29	154.54	47.78	10.28	2.78
WLA	4.19	4.19	1.36	1.36	1.36
MOS (10%)	94.83	17.64	5.46	1.29	0.46
TMDL = LA+WLA+MOS	948.31	176.37	54.6	12.93	4.6

Table 212. Whiskey Creek Characteristics and TMDL Summary (HUC12-605)

Upstream Characteristics					
Drainage Area	21.27 square miles				
Sampling Station	FLIDAA-01				
Listed Segments	FLIDAA				
Land Use	Agriculture: 93.69%; Developed Land:0.22%; Forest:0.22%; Other: 0.79%				
Soils	A:0.00%; B: 10.64%; C: 29.43%; D:59.93%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	277.19	51.55	15.96	3.78	1.34
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	30.80	5.73	1.77	0.42	0.15
TMDL = LA+WLA+MOS	307.99	57.28	17.73	4.20	1.49

Table 213. Fountain Creek Characteristics and TMDL Summary (HUC12-607)

Upstream Characteristics					
Drainage Area	86.02 square miles				
Sampling Station	FLIDA-01				
Listed Segments	FLIDA				
Land Use	Agriculture: 91.96%; Developed Land:5.28%; Forest:0.40%; Other: 2.36%				
Soils	A:0.00%; B:19.37%; C: 32.64%; D:47.99%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1121.02	208.49	64.55	15.29	5.44
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	124.56	23.17	7.17	1.70	0.60
TMDL = LA+WLA+MOS	1245.58	231.66	71.72	16.99	6.04

Table 214. Gay Creek Characteristics and TMDL Summary (HUC12-608)

Upstream Characteristics					
Drainage Area	21.97 square miles				
Sampling Station	FLIDB-01				
Listed Segments	FLIDB-01				
Land Use	Agriculture: 90.48%; Developed Land:6.43%; Forest:0.84%; Other: 2.25%				
Soils	A:0.00%; B:65.97%; C: 4.17%; D:29.86%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	286.32	53.25	16.49	3.91	1.39
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	31.81	5.92	1.83	0.43	0.15
TMDL = LA+WLA+MOS	318.13	59.17	18.32	4.34	1.54

Table 215. Town of Hallock Characteristics and TMDL Summary (HUC12-609)

Upstream Characteristics					
Drainage Area	35.96 square miles				
Sampling Station	FLIDE-01				
Listed Segments	FLIDE-01				
Land Use	Agriculture: 92.23%; Developed Land:5.72%; Forest:0.73%; Other: 1.32%				
Soils	A:0.00%; B:71.31%; C: 2.53%; D:26.16%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	468.64	87.16	26.98	6.39	2.27
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	52.07	9.68	3.00	0.71	0.25
TMDL = LA+WLA+MOS	520.71	96.84	29.98	7.10	2.52

Table 216. Little Mud Creek-Mud Creek Characteristics and TMDL Summary (HUC12-610)

Upstream Characteristics					
Drainage Area	286.02 square miles				
Sampling Station	FLID-02				
Listed Segments	FLIDE-02				
Land Use	Agriculture: 90.76%; Developed Land:5.66%; Forest:0.94%; Other: 2.64%				
Soils	A:0.00%; B:24.54%; C: 20.61%; D:54.74%; Unknown:0.11%				
NPDES Facilities	Cissna Park STP (IL0042391)				
	Rankin STP (ILG580122)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	3723.26	689.06	213.25	49.47	16.71
WLA	4.19	4.19	1.36	1.36	1.36
MOS (10%)	414.16	77.03	23.85	5.65	2.01
TMDL = LA+WLA+MOS	4141.61	770.28	238.46	56.48	20.08

7.1.5.2 Sugar Creek Subwatershed (HUC10-207)

The Sugar Creek subwatershed incorporates the towns of Watseka, Milford and Fowler as shown in Figure 100, and lies in both Indiana and Illinois. The two dominant land uses in this subwatershed are agriculture (89.73%) and developed land (5.96%). The remaining land categories contribute less than 2 percent of the subwatershed area (Table 222). The NPDES facilities and feeding operations are shown in Figure 101 and Figure 102, respectively.

The listed 303(d) segment lies in Illinois (Table 217). Among the nine monitoring locations, four of them are in Indiana and five in Illinois (Table 219). Furthermore, as Indiana and Illinois use *E. coli* and fecal coliform, respectively for the pathogen standards, separate statistical summaries of the data are presented in Table 220 and Table 221. The required reductions in Indiana range from 47 to 67 percent and the required reductions in Illinois range from 39 to 61 percent. Historical reductions based on the geomean of all samples in the Illinois portion of this watershed are 12 percent.

Table 217. 303 (d) Listed Streams in the Sugar Creek Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
711	Sugar Creek	IL_FLI-02	Sugar Creek	23.14	Fecal Coliform

Table 218. Anticipated 2010 303 (d) Listed Streams in the Sugar Creek Subwatershed *(IL)*

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
704	Cole Creek-Mud Creek	FLIC-04	Mud Creek-East	4.94	Fecal Coliform
706	Town of Stockland	FLIE-01	Unnamed Trib to Sugar Creek	19.28	Fecal Coliform
707	City of Milford-Sugar Creek	FLI-03	Sugar Creek	14.52	Fecal Coliform

Table 219. Station Locations in the Sugar Creek Subwatershed

<table>
<tr><th>HUC 12</th><th>HU C12 Name</th><th>Station # (State)</th><th>Stream Name</th></tr>
<tr><td>702</td><td>Coon Creek-Mud Creek</td><td>ID# 92 (IN)</td><td>Mud Cr</td></tr>
<tr><td>703</td><td>Kult Ditch-Mud Creek</td><td>ID# 91 (IN)</td><td>Finigan D</td></tr>
<tr><td rowspan="2">705</td><td rowspan="2">Yeagers Curve-Sugar Creek</td><td>ID# 88 (IN)</td><td>Sugar Cr</td></tr>
<tr><td>ID# 90 (IN)</td><td>Sugar Cr</td></tr>
<tr><td>711</td><td>Sugar Creek</td><td>FLI-02 (IL)</td><td>Sugar Cr</td></tr>
<tr><td>711</td><td>Sugar Creek</td><td>FLI-01 (IL)</td><td>Sugar Creek</td></tr>
<tr><td>704</td><td>Cole Creek-Mud Creek</td><td>FLIC-04 (IL)</td><td>Mud Creek East</td></tr>
<tr><td>706</td><td>Town of Stockland</td><td>FLIE-01 (IL)</td><td>Unnamed Trib Sugar Creek</td></tr>
<tr><td rowspan="2">707</td><td rowspan="2">City of Milford-Sugar Creek</td><td>FLI-M-C2 (IL)</td><td>Sugar Creek</td></tr>
<tr><td>FLI-M-D (IL)</td><td>Sugar Creek</td></tr>
</table>

Table 220. Summary of Pathogen Data in Sugar Subwatershed *(IN)*

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
92	6/2/2008 - 6/30/2008	5	100	40	144	272	316	579	54%
91	6/2/2008 - 6/30/2008	5	80	60	109	237	255	326	47%
88	6/2/2008 - 6/30/2008	5	100	80	214	381	415	727	67%
90	6/2/2008 - 6/30/2008	5	80	40	115	249	311	687	50%

Table 221. Summary of Pathogen Data in Sugar Creek Subwatershed *(IL)*

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FLIC-04	8/19/2008 - 9/17/2008	5	80	20	110	377	904	3,600	47%
FLIE-01	8/19/2008 - 9/17/2008	5	80	40	200	328	388	788	39%
FLI-M-D	8/19/2008 - 9/17/2008	8	88	38	176	376	436	1,100	47%
FLI-02	3/8/1999 - 6/10/2008	46	50	37	10	227	678	7,455	12%
FLI-01	8/19/2008 - 9/17/2008	5	100	80	292	514	550	860	61%

Table 222. Land Use/land Cover in the Sugar Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	159017.91	248.47	89.73
Developed Land	10569.50	16.51	5.96
Forested Land	3049.69	4.77	1.72
Pasture/Hay	2884.89	4.51	1.63
Wetland	1337.92	2.09	0.75
Grassland and Shrubs	246.63	0.39	0.14
Open Water	106.97	0.17	0.06
Total	**177,213.52**	**276.90**	**100.00**

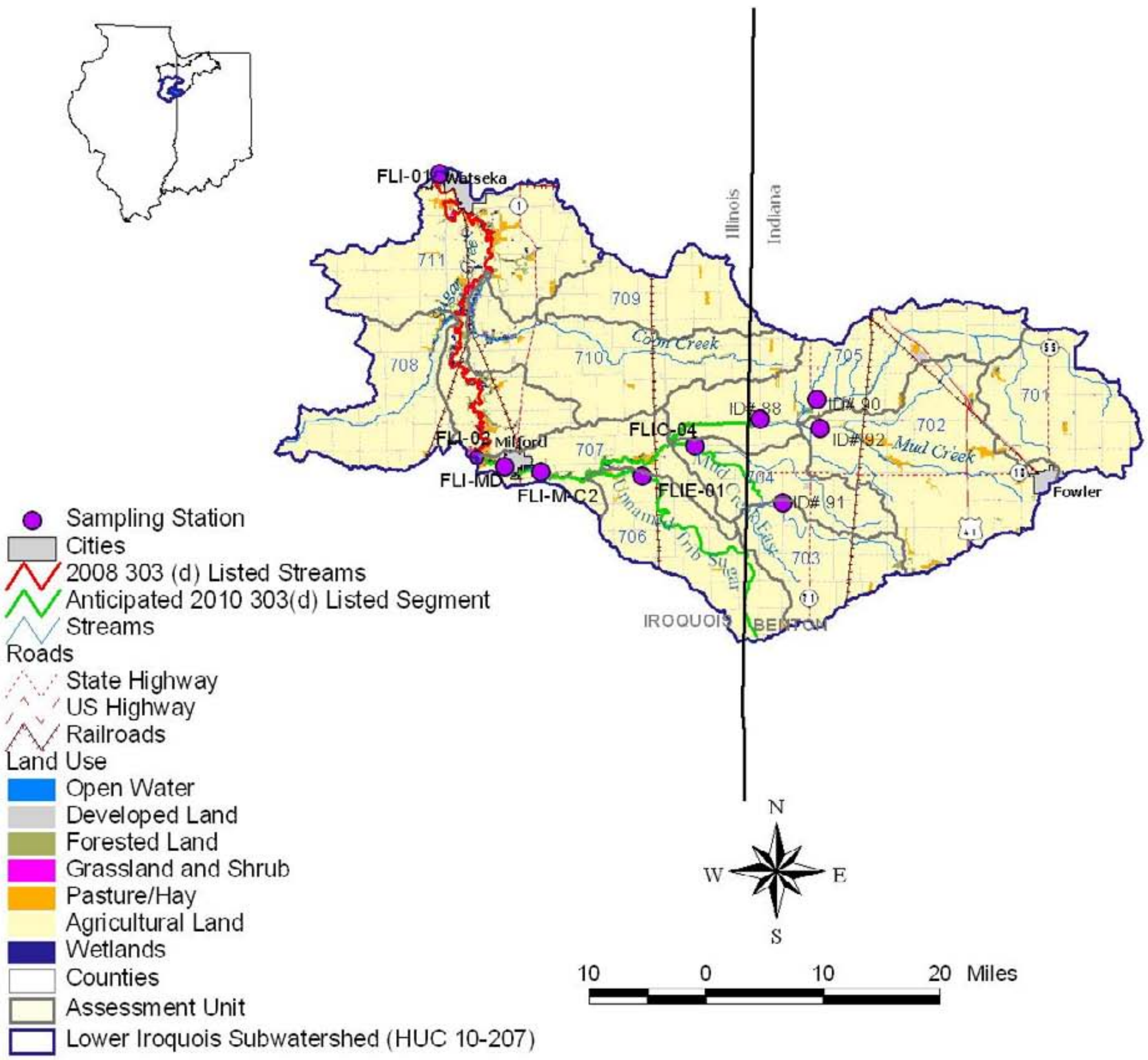


Figure 100. Location of Sugar Creek Watershed (HUC10-207)

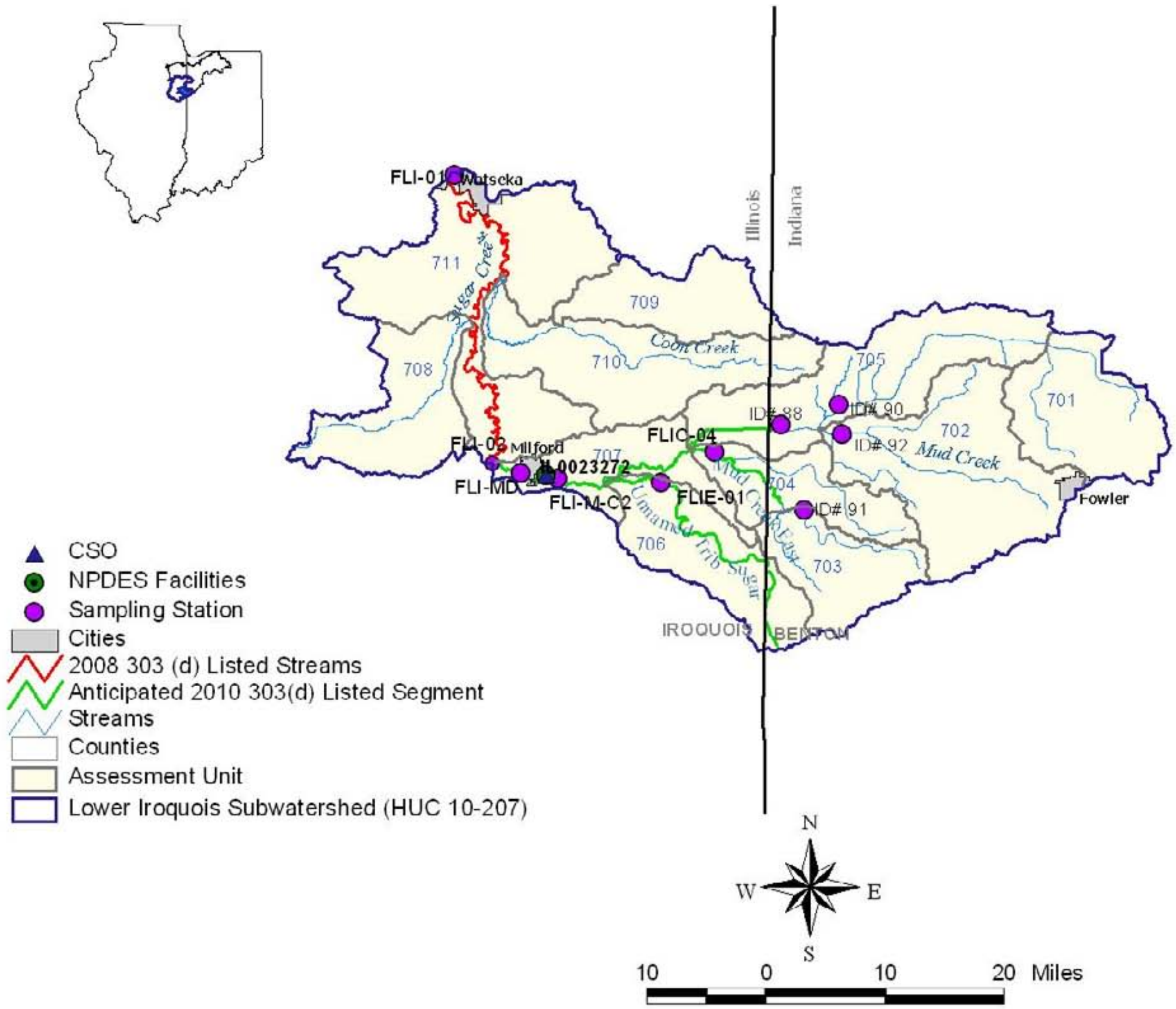


Figure 101. NPDES Facilities in the Sugar Creek Watershed (HUC10-207)

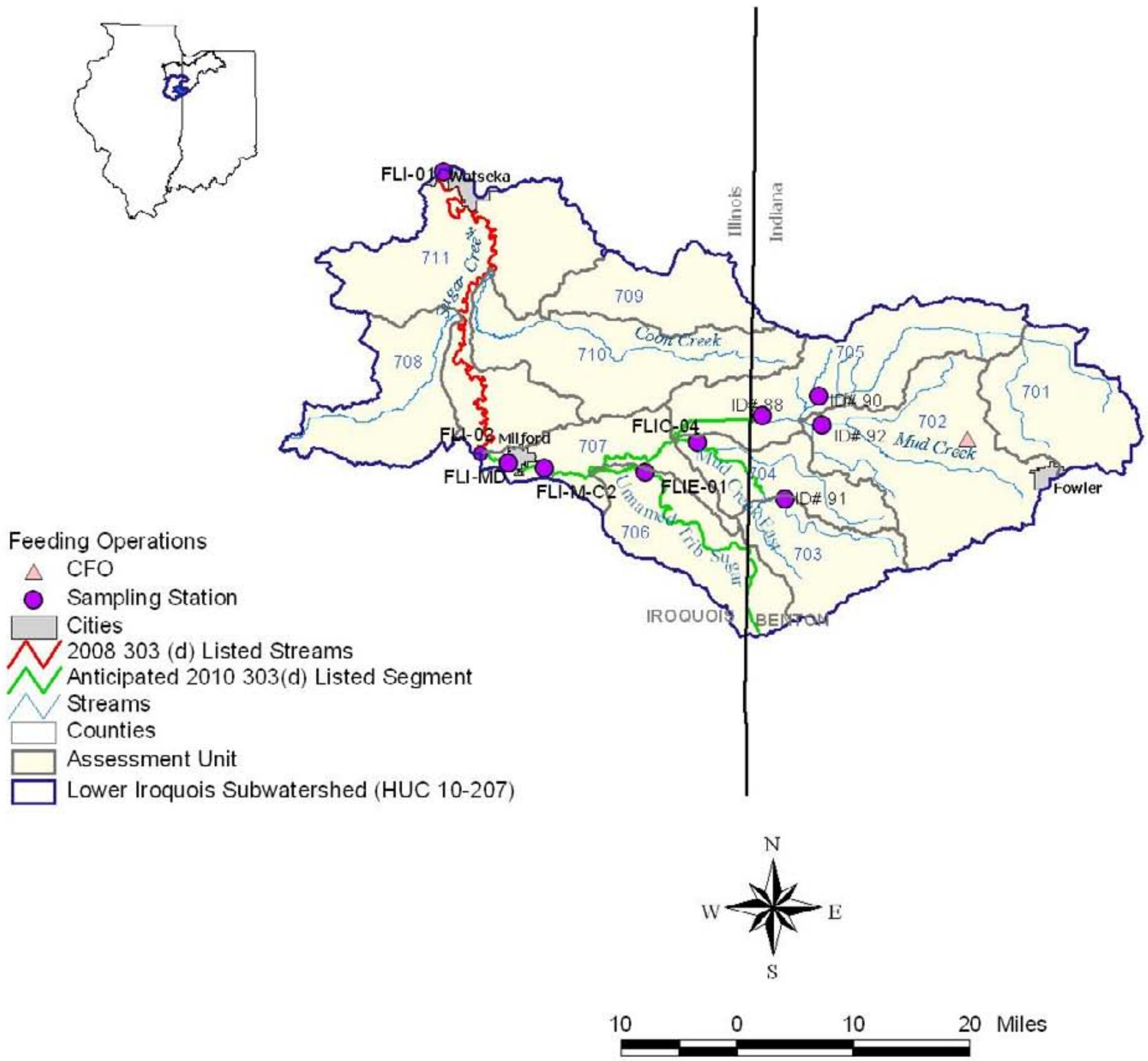


Figure 102. Feeding Operations in the Sugar Creek Watershed (HUC10-207)

Table 223 through Table 229 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in HUC 702, HUC 703, HUC 704, HUC 705, HUC 706, or HUC 707; however, the 2008 sampling data indicate that the *E. coli* and fecal coliform bacteria criteria are not met in these HUCs and so TMDL results are presented here.

There is one NPDES facility within the Sugar Creek subwatershed and the WLAs for the facility was calculated based on their design flows and *E. coli* and fecal coliform permit limits. There is one CSO community with 10 outfalls upstream of this subwatershed. WLAs for CSO communities were calculated based on the maximum observed CSO flow at each outfall and *E. coli* and fecal coliform standards. The individual WLAs are presented in Table 276.

Table 223. Coon Creek-Mud Creek Characteristics and TMDL Summary (HUC12-702)

Upstream Characteristics					
Drainage Area	38.53 square miles				
Sampling Station	92				
Listed Segments	None				
Land Use	Agriculture: 89.90%; Developed Land:6.11%; Forest:0.53%; Other: 3.46%				
Soils	A: 0.77%; B: 52.51%; C: 44.40%; D:2.32%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Ewen Gravel Hill Farm (1178)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	361.38	77.99	25.44	5.23	1.62
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	40.15	8.66	2.83	0.58	0.18
TMDL = LA+WLA+MOS	401.53	86.65	28.27	5.81	1.80

Table 224. Kult Ditch-Mud Creek Characteristics and TMDL Summary (HUC12-703)

Upstream Characteristics					
Drainage Area	16.00 square miles				
Sampling Station	91				
Listed Segments	None				
Land Use	Agriculture: 94.44%; Developed Land:4.48%; Forest:0.58%; Other: 0.50%				
Soils	A: 0.00%; B: 45.75%; C: 52.83%; D:1.42%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	150.07	32.38	10.57	2.17	0.68
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	16.67	3.60	1.17	0.24	0.07
TMDL = LA+WLA+MOS	166.74	35.98	11.74	2.41	0.75

Table 225. Cole Creek-Mud Creek Characteristics and TMDL Summary (HUC12-704)

Upstream Characteristics					
Drainage Area	31.39 square miles				
Sampling Station	FLIC-04				
Listed Segments	FLIC-04				
Land Use	Agriculture: 94.69%; Developed Land:4.42%; Forest:0.59%; Other: 0.30%				
Soils	A:0.00%; B:55.26%; C:39.23%; D:5.50%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	409.08	76.09	23.55	5.58	1.98
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	45.45	8.45	2.62	0.62	0.22
TMDL = LA+WLA+MOS	454.53	84.54	26.17	6.20	2.20

Table 226. Yeagers Curve-Sugar Creek Characteristics and TMDL Summary (HUC12-705)

Upstream Characteristics					
Drainage Area	92.87 square miles				
Sampling Station	88,90				
Listed Segments	None				
Land Use	Agriculture: 91.88%; Developed Land:5.25%; Forest:0.75%; Other: 2.12%				
Soils	A: 0.65%; B: 44.88%; C: 45.53%; D:8.94%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Ewen Gravel Hill Farm (1178)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	871.05	187.97	61.32	12.61	3.90
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	96.78	20.88	6.81	1.40	0.43
TMDL = LA+WLA+MOS	967.83	208.85	68.13	14.01	4.33

Table 227. Town of Stockland Characteristics and TMDL Summary (HUC12-706)

Upstream Characteristics					
Drainage Area	21.10 square miles				
Sampling Station	FLIE-01				
Listed Segments	FLIE-01				
Land Use	Agriculture: 92.75%; Developed Land:5.42%; Forest:0.43%; Other: 1.39%				
Soils	A:0.00%; B:71.43%; C:6.43%; D:22.14 %; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	274.98	51.14	15.83	3.75	1.33
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	30.55	5.68	1.76	0.42	0.15
TMDL = LA+WLA+MOS	305.53	56.82	17.59	4.17	1.48

Table 228. City of Milford-Sugar Creek Characteristics and TMDL Summary (HUC12-707)

Upstream Characteristics					
Drainage Area	160.65 square miles				
Sampling Station	FLIM-C2				
Listed Segments	FLE-03				
Land Use	Agriculture: 91.46%; Developed Land:5.50%; Forest:0.96%; Other: 2.08%				
Soils	A:0.37%; B:52.11%; C:35.90%; D:11.62 %; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	Ewen Grvel Hill Farm (1178)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	2093.62	389.38	120.54	28.55	10.15
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	232.62	43.26	13.39	3.17	1.13
TMDL = LA+WLA+MOS	2326.24	432.64	133.93	31.72	11.28

Table 229. Sugar Creek Characteristics and TMDL Summary (HUC12-711)

Upstream Characteristics					
Drainage Area	563.08 square miles				
Sampling Station	FLI-02				
Listed Segments	IL_FLI-02				
Land Use	Agriculture: 90.23%; Developed Land:5.81%; Forest:1.32%; Other: 2.64%				
Soils	A: 1.29%; B: 36.52%; C: 24.18%; D:37.97%; Unknown:0.05%				
NPDES Facilities	Milford STP (IL0023272				
	Cissna Park STP (IL0042391)				
	Rankin STP (ILG580122)				
MS4 Communities	None				
CSO Communities	Milford STP (IL0023272)-10 outfalls				
CAFOs	None				
CFOs	Ewen Gravel Hill Farm (1178)				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	7310.63	1348.43	419.62	97.19	32.70
WLA	27.51	16.35	2.88	2.88	2.88
MOS (10%)	815.35	151.64	46.94	11.11	3.95
TMDL = LA+WLA+MOS	8153.49	1516.42	469.44	111.18	39.53

7.1.5.3 Spring Creek Subwatershed (HUC10-208)

The Spring Creek subwatershed incorporates the cities of Gilman and Onarga as shown in Figure 103. The Spring Creek subwatershed lies in Iroquois and Ford counties in Illinois (Figure 103). The two dominant land uses in this subwatershed are agriculture (85.18%) and developed land (9.19%). The remaining land categories contribute less than 2 percent of the subwatershed area (Table 233). The NPDES facilities are shown in Figure 104.

There are no currently listed 303(d) segments in this subwatershed. 2008 sampling at one monitoring station in the subwatershed indicated an impairment that will lead to a listing on the 2010 303 (d) list (Table 230). The monitoring station is located on Spring Creek in HUC 20808 (Table 231). A statistical summary of the water quality is presented in Table 232. The reduction needed to achieve a geomean of 200 #/100 mL is 51 percent.

Table 230. Anticipated 2010 303 (d) Listed Streams in the Spring Creek Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
808	Spring Creek	IL-FLH-02	Spring Creek	62.00	Fecal Coliform

Table 231. Station Locations in the Spring Creek Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
808	Spring Creek	FLH-02	Spring Creek

Table 232. Summary of Pathogen Data in Spring Creek Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FLH-02	8/19/2008 - 9/17/2008	5	80	40	188	411	470	840	51%

Table 233. Land Use/land Cover in the Spring Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	137912.50	215.49	85.18
Developed Land	14872.82	23.24	9.19
Forested Land	3097.95	4.84	1.91
Pasture/Hay	3648.82	5.70	2.25
Wetland	1625.03	2.54	1.00
Grassland and Shrubs	289.11	0.45	0.18
Open Water	467.03	0.73	0.29
Total	**161,913.26**	**252.99**	**100.00**

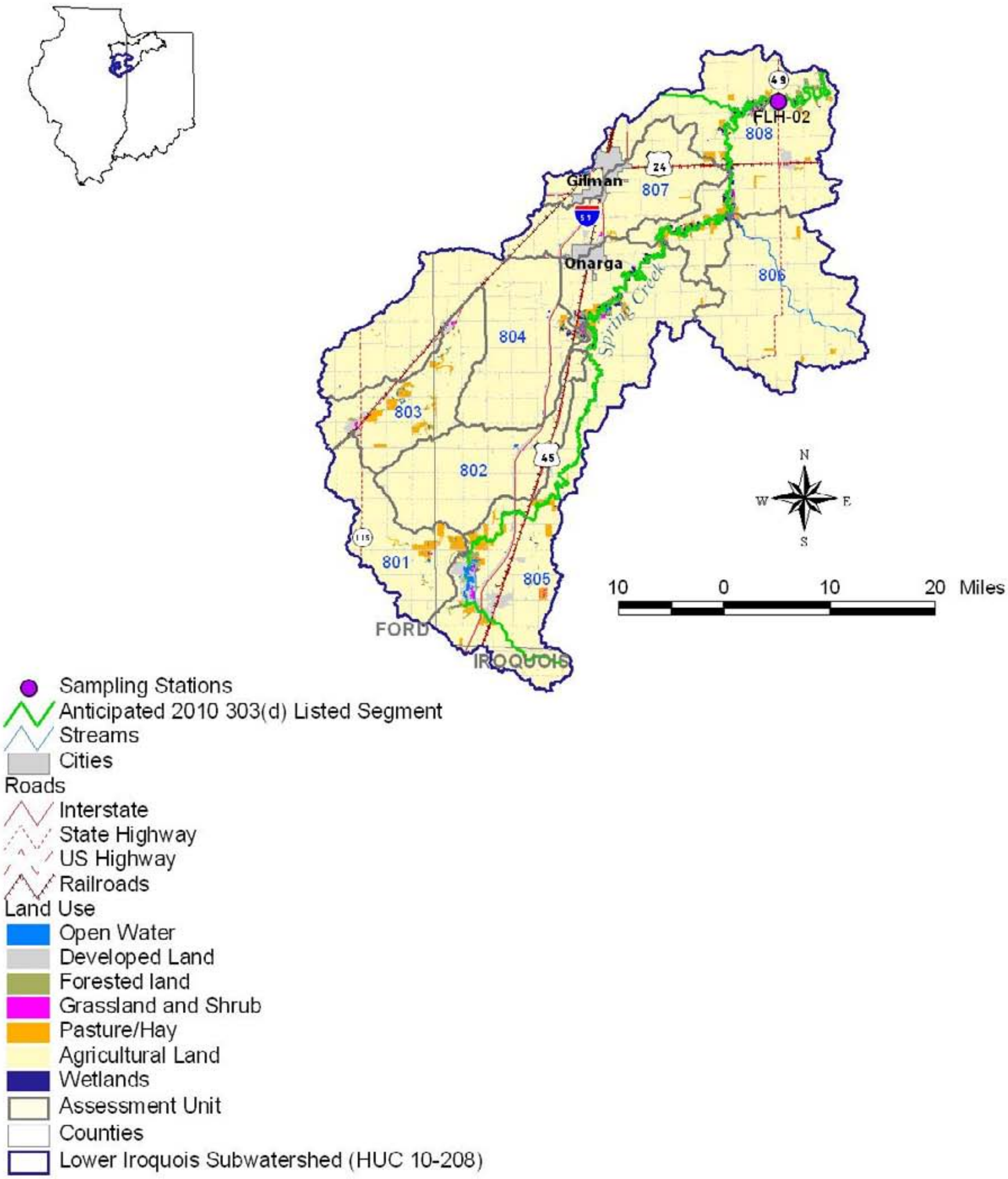


Figure 103. Location of Spring Creek Watershed (HUC10-208)

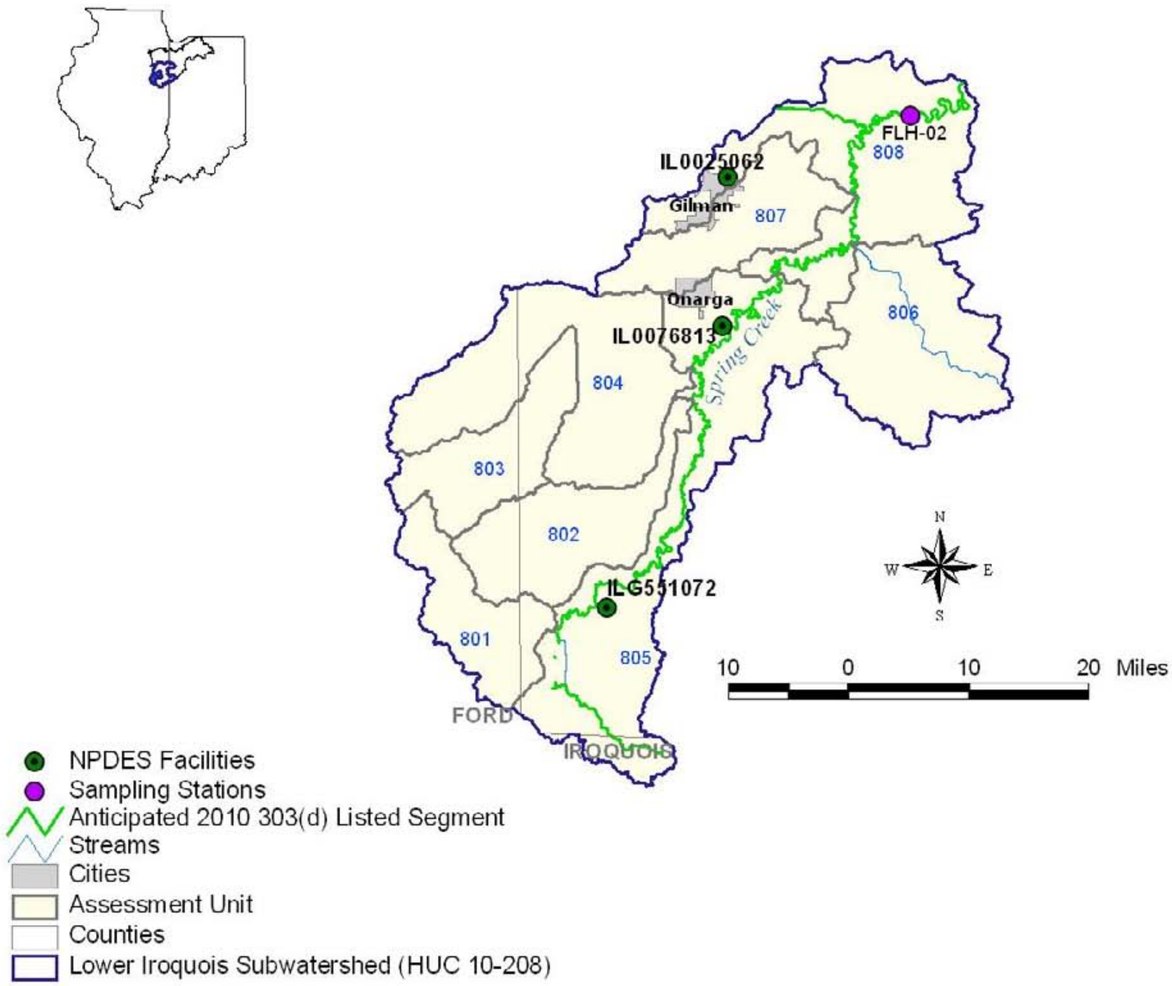


Figure 104. NPDES Facilities in the Spring Creek Watershed (HUC10-208)

Table 234 summarizes the subwatershed characteristics as well as the TMDL results for HUC 12-808. It should be noted that there are no current 303(d) listings in this HUC; however, the 2008 sampling data indicate that the fecal coliform bacteria criteria are not met in this HUC and so TMDL results are presented here.

There are three NPDES facilities within the Spring Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and fecal coliform permit limits. The individual WLAs are presented in Table 276.

Table 234. Spring Creek Characteristics and TMDL Summary (HUC12-808)

Upstream Characteristics					
Drainage Area	253.23 square miles				
Sampling Station	FLH-02				
Listed Segments	FLH-02				
Land Use	Agriculture: 85.10%; Developed Land:9.18%; Forest:1.91%; Other: 3.81%				
Soils	A:1.63%; B:18.29%; C:23.00%; D:56.91 %; Unknown:0.18%				
NPDES Facilities	Gilman-North STP (IL0025062)				
	Onarga STP (IL0076813)				
	Il Dot-I-57 Iroquois County (ILG551072)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	3121.42	725.53	255.89	77.10	26.71
WLA	15.66	15.66	5.80	5.80	5.80
MOS (10%)	348.56	82.36	29.08	9.21	3.61
TMDL = LA+WLA+MOS	3485.64	823.55	290.77	92.11	36.12

7.1.5.4 Prairie Creek Subwatershed (HUC10-209)

The Prairie Creek subwatershed incorporates the towns of Gilman and Clifton as shown in Figure 105. The Prairie Creek subwatershed lies almost entirely within Iroquois county in Illinois. The two dominant land uses in this subwatershed are agriculture (90.06%) and developed land (8.85%). The remaining land categories contribute less than 1 percent of the subwatershed area (Table 237). The NPDES facilities are shown in Figure 106.

There are no currently listed 303(d) segments in this subwatershed. 2008 sampling at one monitoring station in the subwatershed indicated an impairment that will lead to a listing on the 2010 303 (d) list (Table 235). The monitoring station is located on Spring Creek in HUC 20902 (Table 236). A statistical summary of the water quality is presented in Table 237. The reduction needed to achieve a geomean of 200 #/100 mL is 69 percent.

Table 235. Anticipated 2010 303 (d) Listed Streams in the Prairie Creek Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
902	Prairie Creek	FLG	Prairie Creek	34.35	Fecal Coliform

Table 236. Station Locations in the Prairie Creek Subwatershed

HUC 12	HU C12 Name	Station #	Stream Name
902	Prairie Creek	FLG-01	Prairie Creek

Table 237. Summary of Pathogen Data in Prairie Creek Subwatershed *(IL)*

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FLG-01	8/19/2008 - 9/17/2008	5	80	40	130	645	1,681	4,200	69%

Table 238. Land Use/land Cover in the Prairie Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	51532.02	80.52	90.06
Developed Land	5065.69	7.92	8.85
Forested Land	63.83	0.10	0.11
Pasture/Hay	463.25	0.72	0.81
Wetland	26.69	0.04	0.05
Grassland and Shrubs	3.56	0.01	0.01
Open Water	67.61	0.11	0.12
Total	**57,222.63**	**89.41**	**100.00**

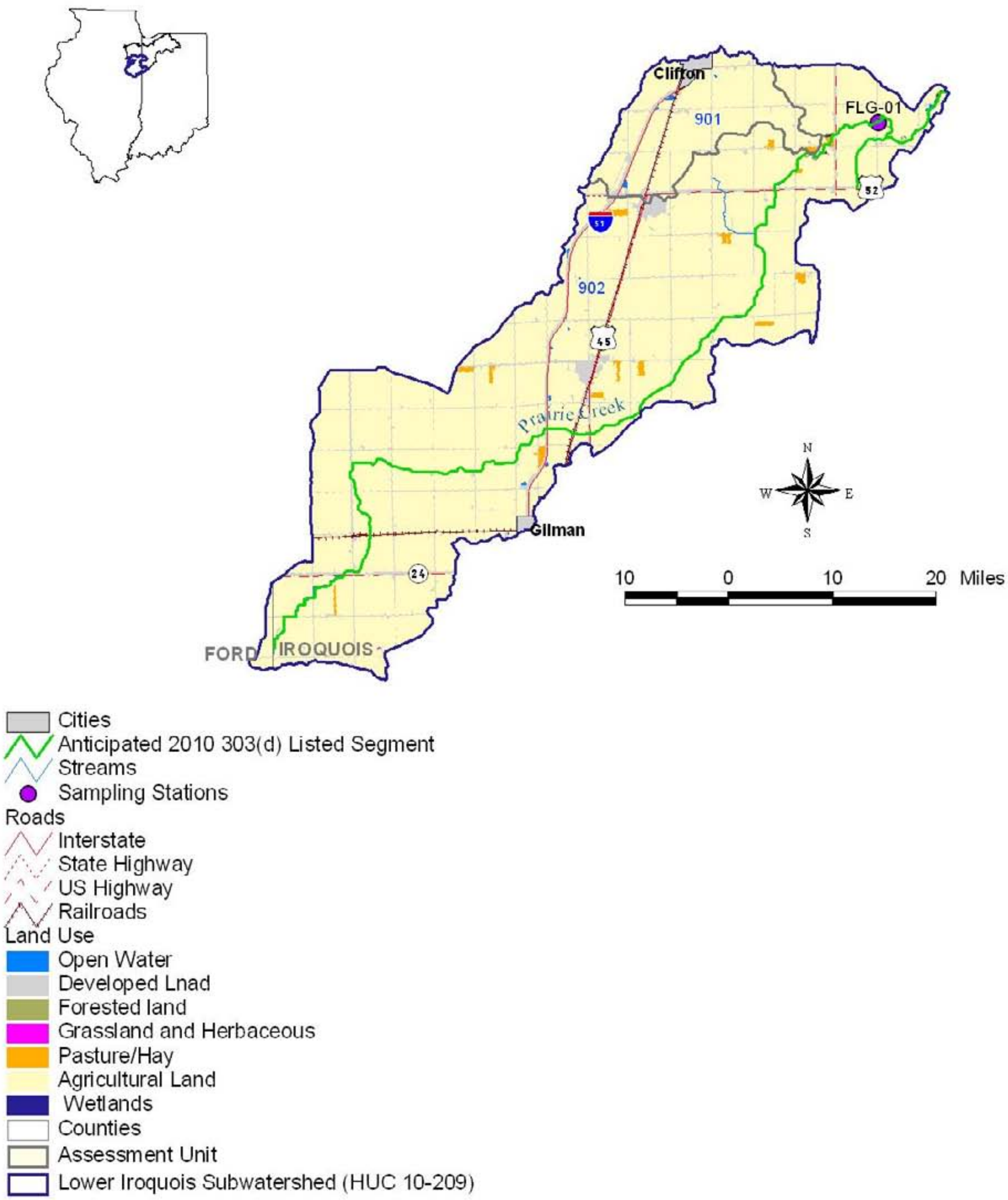


Figure 105. Location of Prairie Creek Watershed (HUC10-209)

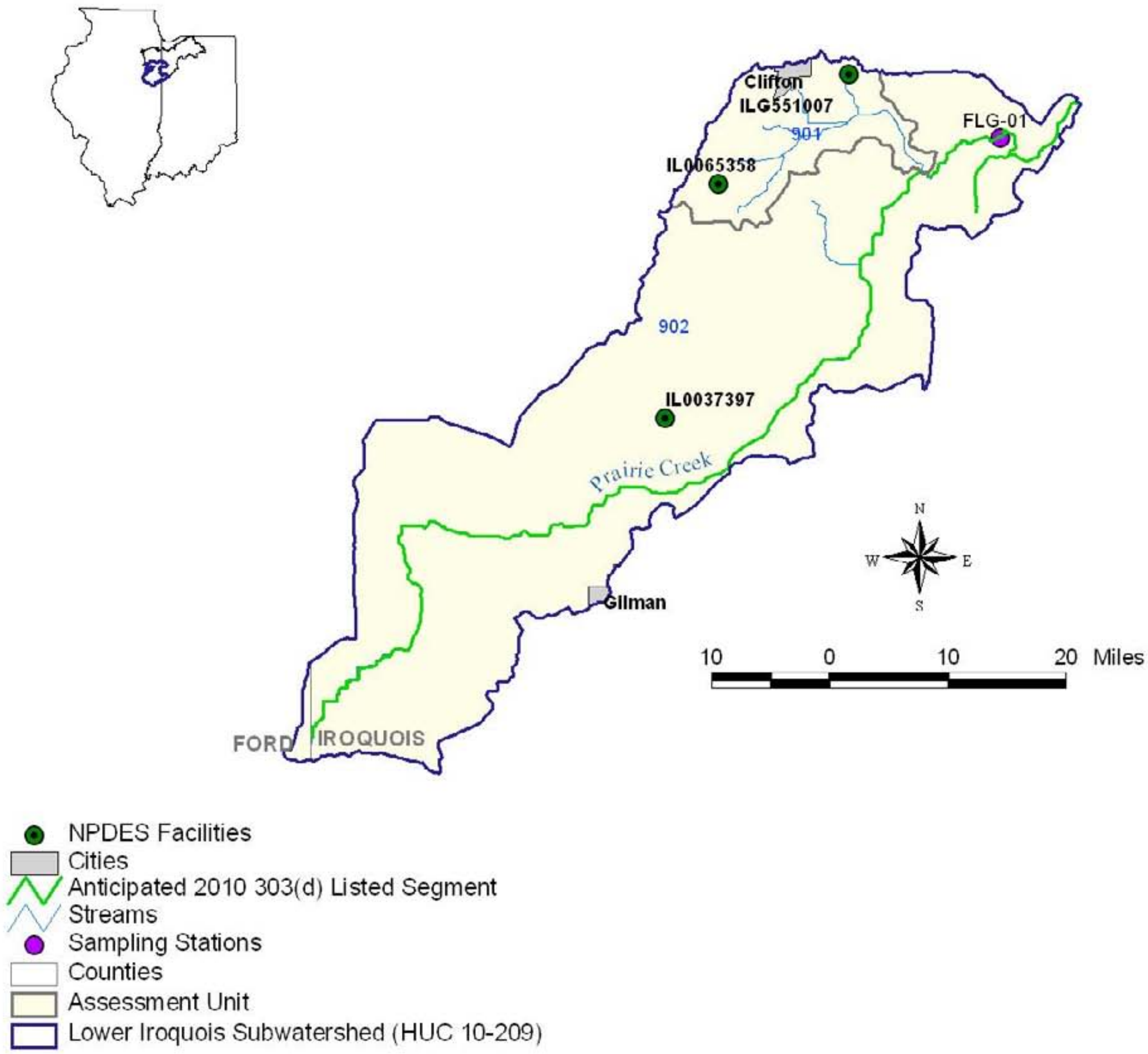


Figure 106. NPDES Facilities in the Prairie Creek Watershed (HUC10-209)

Table 239 summarizes the subwatershed characteristics as well as the TMDL results for HUC 12-809. It should be noted that there are no current 303(d) listings in this HUC; however, the 2008 sampling data indicate that the fecal coliform bacteria criteria are not met in this HUC and so TMDL results are presented here.

There are three NPDES facilities within the Prairie Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and fecal coliform permit limits. The individual WLAs are presented in Table 276.

Table 239. Prairie Creek Characteristics and TMDL Summary (HUC12-902)

Upstream Characteristics					
Drainage Area	89.42 square miles				
Sampling Station	FLG-01				
Listed Segments	FLG				
Land Use	Agriculture: 90.05%; Developed Land:8.85%; Forest:0.11%; Other: 0.991%				
Soils	A:0.33%; B:35.54%; C:13.29%; D:50.67 %; Unknown:0.17%				
NPDES Facilities	Prairieview Luthern Home (IL0037397)				
	Swissland Packing Company (IL0065358)				
	Merkle-Knipprath Nursing Home (ILG551007)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1107.04	261.01	91.99	28.85	11.06
WLA	0.72	0.72	0.42	0.42	0.42
MOS (10%)	123.08	29.08	10.27	3.25	1.27
TMDL = LA+WLA+MOS	1230.84	290.81	102.68	32.52	12.75

7.1.5.5 Gofield Creek-Iroquois River Subwatershed (HUC10-210)

The Gofield Creek subwatershed has an area of approximately 110 square miles and completely lies in Iroquois county (Figure 107). Agriculture is the dominant land use here as well (Table 244). There is only one NPDES facility as shown in Figure 108. No feeding operations exist within this subwatershed.

The listed segment and sampling locations are shown in Table 240 and Table 242. Table 243 summarizes the available water quality data. Forty five percent of all data available for FL-04 exceeds the geomean fecal coliform standard and twenty five percent of all data available for FL-04 exceed the not-to-exceed fecal coliform standard. The reductions needed to achieve a geomean of 200 #/100 mL at stations FL-07 and FL-03 is 74 percent.

Table 240. 303 (d) Listed Streams in the Gofield Creek-Iroquois River Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
001	Eastburo Hollow-Iroquois River	IL_FL-04	Iroquois River	22.24	Fecal Coliform

Table 241. Anticipated 2010 303 (d) Listed Streams in the Gofield Creek-Iroquois River Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
002	City of Watseka-Iroquois River	FL-05	Iroquois River	23.63	Fecal Coliform

Table 242. Station Locations in the Gofield Creek-Iroquois River Subwatershed

HUC 12	HUC12 Name	Station #	Stream Name
001	Eastburo Hollow-Iroquois River	FL-04	Iroquois River
001	Eastburo Hollow-Iroquois River	FL-07	Iroquois River
002	City of Watseka-Iroquois River	FL-03	Iroquois River

Table 243. Summary of Pathogen Data in Gofield Creek-Iroquois River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/100 mL)	Geomean (#/100 mL)	Average (#/100 mL)	Maximum (#/100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FL-04	3/31/1999 - 6/10/2008	40	45	25	10	171	551	7,636	0%
FL-07	8/19/2008 - 9/17/2008	5	60	60	164	759	1,229	3,200	74%
FL-03	8/19/2008 - 9/17/2008	5	80	60	68	780	1,563	3,500	74%

Table 244. Land Use/Land Cover in the Gofield Creek-Iroquois River Subwatershed

Land Use/Land Cover	Subwatershed Area: Acres	Subwatershed Area: Square Miles	Subwatershed Percent
Agricultural Land	59,132.33	92.39	83.95
Developed Land	5,530.94	8.64	7.85
Forested Land	2,634.03	4.12	3.74
Pasture/Hay	1,524.73	2.38	2.16
Wetland	867.78	1.36	1.23
Grassland and Shrubs	83.62	0.13	0.12
Open Water	666.51	1.04	0.95
Total	**70,439.95**	**110.06**	**100.00**

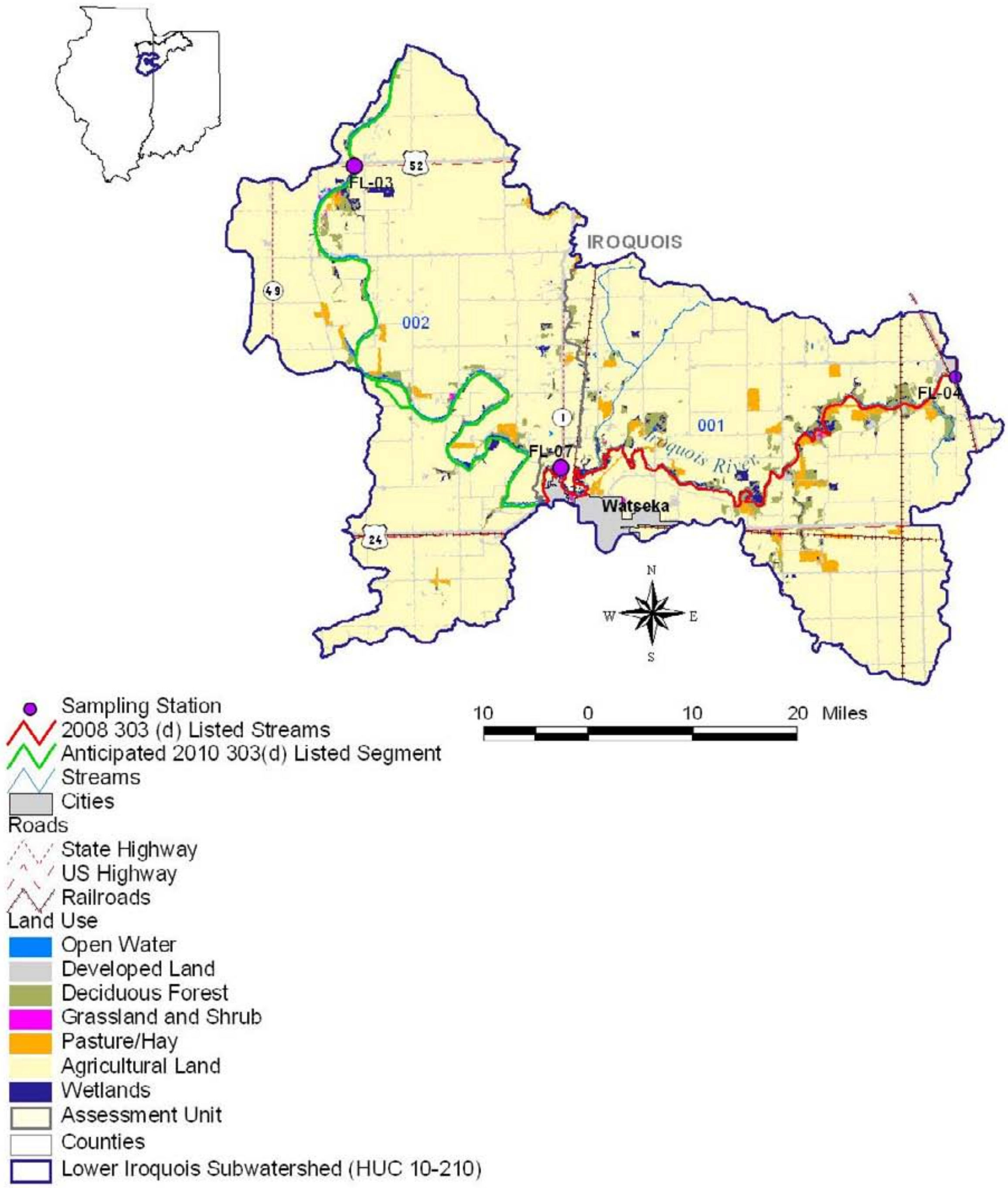


Figure 107. Location of Gofield Creek-Iroquois River (HUC10-210)

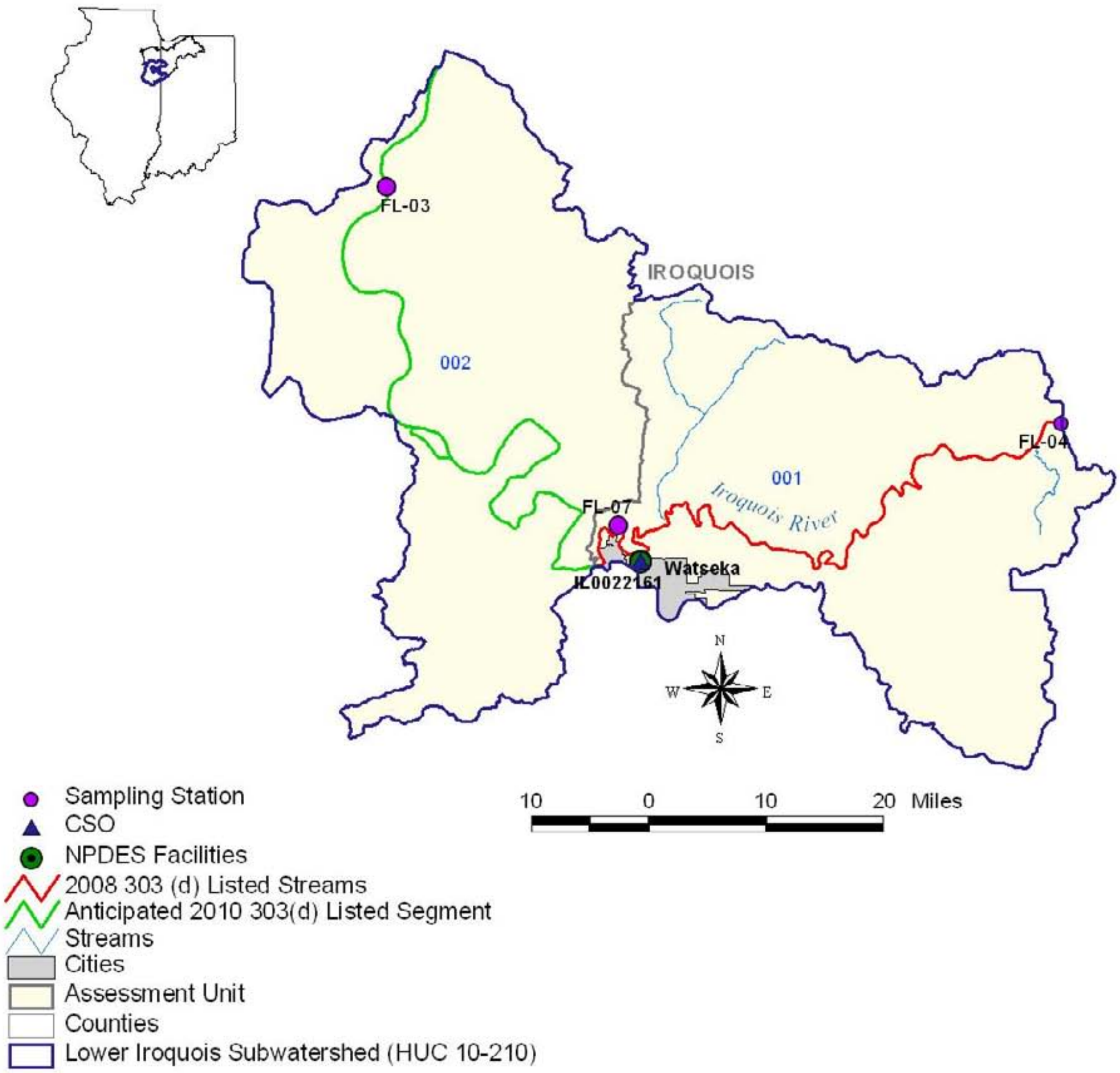


Figure 108. NPDES Facilities in Gofield Creek-Iroquois River (HUC10-210)

Table 245 and Table 246 summarize the subwatershed characteristics as well as the TMDL results for HUC 12-21001 and HUC 12-21002. There are ten NPDES facilities within the Gofield Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and fecal coliform permit limits. There are two CSO communities upstream of this subwatershed. WLAs for CSO communities were calculated based on the maximum observed CSO flow reported in the DMR and fecal coliform standards. The individual WLAs are presented in Table 277.

Table 245. Eastburo Hollow-Iroquois River Characteristics and TMDL Summary (HUC12-001)

Upstream Characteristics					
Drainage Area	737.77 square miles				
Sampling Station	FL-04, FL-07				
Listed Segments	IL_FL-04				
Land Use	Agriculture: 83.78%; Developed Land:6.31%; Forest:6.13%; Other: 3.78%				
Soils	A: 27.01%; B: 44.70%; C: 22.08%; D:5.96%; Unknown:0.24%				
NPDES Facilities	All the facilities upstream of HUC12-503[a], HUC 12-506[a]				
	Watseka STP (IL0022161)				
MS4 Communities	None				
CSO Communities	Watseka STP (IL0022161)-6 outfalls				
CAFOs	All the facilities upstream of HUC12-503[a], HUC 12-506[b]				
CFOs	All the facilities upstream of HUC12-503[a], HUC 12-506[b]				
TMDL Allocations (billion/day)					
	High Flows	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	9051.99	2071.74	730.76	209.85	63.05
WLA	87.69	87.69	31.67	31.67	31.67
MOS (10%)	1015.52	239.93	84.71	26.83	10.52
TMDL = LA+WLA+MOS	10155.20	2399.36	847.14	268.35	105.24

a: Refers to Upper Iroquois HUC12

Table 246. City of Watseka-Iroquois River Characteristics and TMDL Summary (HUC12-002)

Upstream Characteristics					
Drainage Area	1358.36 square miles				
Sampling Station	FL-03				
Listed Segments	FL-05				
Land Use	Agriculture: 86.61%; Developed Land:6.11%; Forest:3.98%; Other: 3.30%				
Soils	A: 15.70%; B: 41.40%; C: 2239%; D:20.30%; Unknown:0.21%				
NPDES Facilities	All the facilities upstream of HUC12-503[a], HUC 12-506[a]				
	Watseka STP (IL0022161)				
	Cissna Park STP (IL0042391)				
	Rankin STP (ILG580122)				
	Milford STP (IL0023272				
	Gilman-North STP (IL0025062)				
	Onarga STP (IL0076813)				
	Il Dot-I-57 Iroquois County (ILG551072)				
	Prairieview Luthern Home (IL0037397)				
	Swissland Packing Company (IL0065358)				
	Merkle-Knipprath Nursing Home (ILG551007)				
MS4 Communities	None				
CSO Communities	Watseka STP (IL0022161)				
	Milford STP (IL0023272)				
CAFOs	All the facilities upstream of HUC12-503 [a], HUC 12-506 [a]				
CFOs	All the facilities upstream of HUC12-503 [a], HUC 12-506 [a]				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	9008.09	2027.84	721.67	200.76	53.96
WLA	131.59	131.59	40.76	40.76	40.76
MOS (10%)	1015.52	239.93	84.71	26.83	10.52
TMDL = LA+WLA+MOS	10155.20	2399.36	847.14	268.35	105.24

a: Refers to Upper Iroquois HUC12

7.1.5.6 Pike Creek Subwatershed (HUC10-211)

The Pike Creek subwatershed lies entirely within Iroquois county in Illinois (Figure 109). The two dominant land uses in this subwatershed are agriculture (89.71%) and developed land (7.06%). The remaining land categories contribute less than 2 percent of the subwatershed area (Table 237). There are not any NPDES Facilities or CFOs within the subwatershed.

There are no currently listed 303(d) segments in this subwatershed. 2008 sampling at one monitoring station in the subwatershed indicated an impairment that will lead to a listing on the 2010 303 (d) list (Table 247). The monitoring station is located on Pike Creek in HUC 21102 (Table 236). A statistical summary of the water quality is presented in Table 249. The reduction needed to achieve a geomean of 200 #/100 mL is 44 percent.

Table 247. Anticipated 2010 303 (d) Listed Streams in the Pike Creek Subwatershed

HUC 12	HU C12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
102	Pike Creek	FLF-01	Pike Creek	17.95	Fecal Coliform

Table 248. Station Locations in the Pike Creek Subwatershed

HUC 12	HUC12 Name	Station #	Stream Name
102	Pike Creek	FLF-01	Pike Creek

Table 249. Summary of Pathogen Data in Pike Creek Subwatershed *(IL)*

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FLF-01	8/19/2008 - 9/17/2008	5	80	40	84	358	583	1,800	44%

Table 250. Land Use/land Cover in the Pike Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	40765.92	63.70	89.71
Developed Land	3205.81	5.01	7.06
Forested Land	519.29	0.81	1.14
Pasture/Hay	782.38	1.22	1.72
Wetland	134.99	0.21	0.30
Grassland and Shrubs	23.13	0.04	0.05
Open Water	6.67	0.01	0.01
Total	**45,438.20**	**71.00**	**100.00**

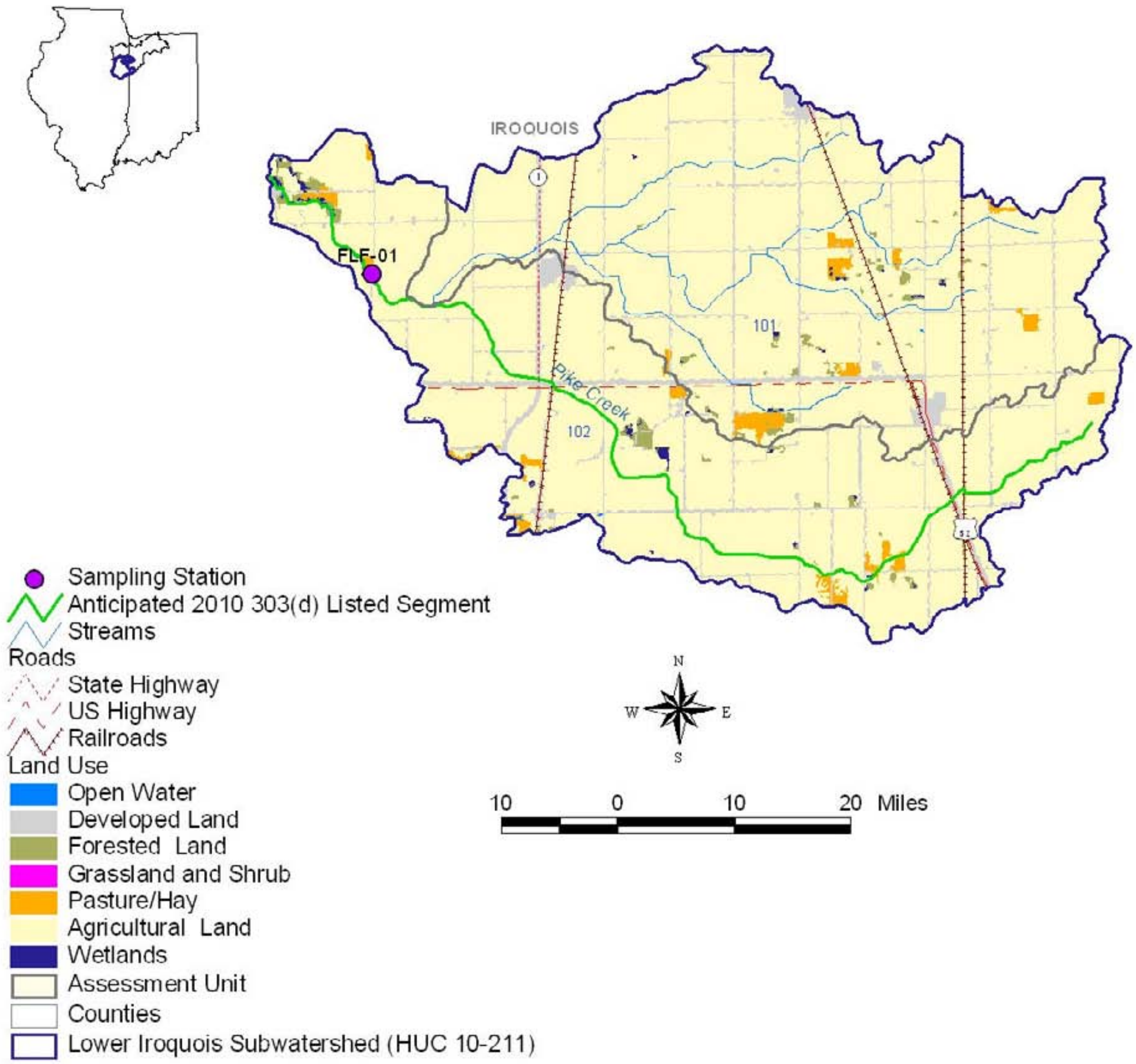


Figure 109. Location of Pike Creek Subwatershed (HUC10-211)

Table 251 summarizes the subwatershed characteristics as well as the TMDL results for HUC 12-102. It should be noted that there are no current 303(d) listings in this HUC; however, the 2008 sampling data indicate that the fecal coliform bacteria criteria are not met in this HUC and so TMDL results are presented here. There are no point sources in this subwatershed.

Table 251. Pike Creek Characteristics and TMDL Summary (HUC12-102)

Upstream Characteristics					
Drainage Area	71.00 square miles				
Sampling Station	FLF-01				
Listed Segments	FLF-01				
Land Use	Agriculture: 89.71%; Developed Land:7.05%; Forest:1.14%; Other: 2.09%				
Soils	A:13.40%; B:49.68%; C:5.91%; D:31.01 %; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	879.57	207.81	73.38	23.24	9.12
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	97.73	23.09	8.15	2.58	1.01
TMDL = LA+WLA+MOS	977.30	230.90	81.53	25.82	10.13

7.1.5.7 Langan Creek Subwatershed (HUC10-212)

The Langan Creek subwatershed incorporates the cities of Clifton and Chebanse as shown in Figure 110. The Langan Creek subwatershed lies within Iroquois and Kankakee counties in Illinois (Figure 110). The two dominant land uses in this subwatershed are agriculture (90.59%) and developed land (7.16%). The remaining land categories contribute less than 2 percent of the subwatershed area (Table 255). There are no NPDES Facilities or CFOs within the subwatershed (Figure 110).

There are no currently listed 303(d) segments in this subwatershed. 2008 sampling at one monitoring station in the subwatershed indicated an impairment that will lead to a listing on the 2010 303 (d) list (Table 252). The monitoring station is located on Langan Creek in HUC 21202 (Table 253). A statistical summary of the water quality is presented in Table 254. The reductions needed to achieve a geomean of 200 #/100 mL 56 percent.

Table 252. Anticipated 2010 303 (d) Listed Streams in the Langan Creek Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
202	Langan Creek	FLE-01	Langan Creek	9.45	Fecal Coliform

Table 253. Station Locations in the Langan Creek Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
202	Langan Creek	FLE-01	Langan Creek

Table 254. Summary of Pathogen Data in Langan Creek Subwatershed *(IL)*

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FLE-01	8/19/2008 - 9/17/2008	5	80	60	48	451	886	2,800	56%

Table 255. Land Use/land Cover in the Langan Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	62190.47	97.17	90.59
Developed Land	4914.68	7.68	7.16
Forested Land	360.72	0.56	0.53
Pasture/Hay	806.85	1.26	1.18
Wetland	282.00	0.44	0.41
Grassland and Shrubs	82.51	0.13	0.12
Open Water	16.68	0.03	0.02
Total	**68,653.91**	**107.27**	**100.00**

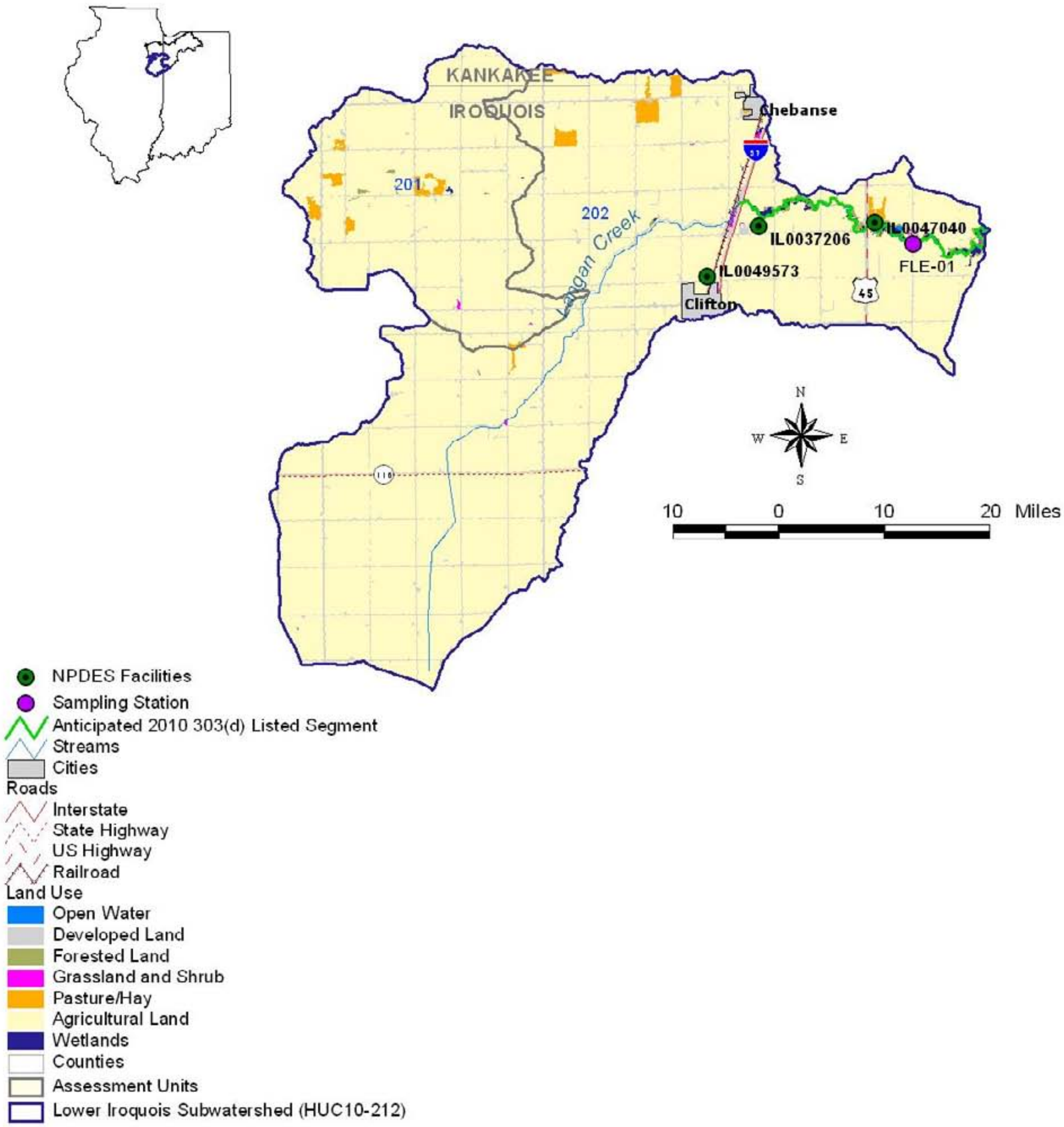


Figure 110. Location and NPDES Facilities in the Langan Creek Subwatershed (HUC10-212)

Table 256 summarizes the subwatershed characteristics as well as the TMDL results for HUC 12-202. It should be noted that there are no current 303(d) listings in this HUC; however, the 2008 sampling data indicate that the fecal coliform bacteria criteria are not met in this HUC and so TMDL results are presented here.

There are three NPDES facilities within the Langan Creek subwatershed and the WLAs for the facilities were calculated based on their design flows and fecal coliform permit limits. The individual WLAs are presented in Table 276.

Table 256. Langan Creek Characteristics and TMDL Summary (HUC12-202)

Upstream Characteristics					
Drainage Area	107.33 square miles				
Sampling Station	FLE-01				
Listed Segments	FLE-01				
Land Use	Agriculture: 90.53%; Developed Land:0.02%; Forest:7.15%; Other: 2.29%				
Soils	A:0.77%; B:39.66%; C:22.01%; D:37.551 %; Unknown:0.00%				
NPDES Facilities	Central Hs&Nash Middle School (IL0037206)				
	Iroquois Mobile Estates (IL0047040)				
	Clifton STP (IL0049573)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	1325.46	309.98	109.25	33.47	12.11
WLA	4.17	4.17	1.67	1.67	1.67
MOS (10%)	147.74	34.91	12.32	3.90	1.53
TMDL = LA+WLA+MOS	1477.37	349.06	123.24	39.04	15.31

7.1.5.8 Beaver Creek Subwatershed (HUC 10-213)

The Beaver Creek subwatershed has an area of 187 square miles (Figure 111). Agriculture constitutes the primary land use in this area (Table 261). There are no listed segments within this subwatershed and there is only one NPDES facility (Figure 112). Feeding operations are shown in Figure 113.

There are four monitoring locations in this subwatershed (Table 258) and the summary of the 2008 data in is shown in Table 259 and Table 260. The reductions needed to achieve a fecal coliform geomean of 200 #/100 mL for the Illinois station is 48 percent. The reductions needed to achieve an *E. coli* geomean of 125 #/100 mL ranges from 20 to 72 percent.

Table 257. Anticipated 2010 303 (d) Listed Streams in the Beaver Creek Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
305	North-Hooper Beaver Creek	FLD-03*	Beaver Creek	4.2	Fecal Coliform
308	Beaver Creek			17.87	

*Segment FLD-03 lies in two subwatersheds.

Table 258. Station Locations in the Beaver Creek Subwatershed

HUC 12	HUC 12 Name	Station # *(State)*	Stream Name
302	Deardruff Ditch-Beaver Creek	ID# 48 *(IN)*	Beaver Cr
303	Carlson Ditch-Beaver Creek	ID# 44 *(IN)*	Salisbury D
		ID# 46 *(IN)*	Beaver Cr
308	Beaver Creek	FLD-03 *(IL)*	Beaver Creek

Table 259. Summary of Pathogen Data in Beaver Creek (HUC10-213) Subwatershed *(IN)*

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding *E. coli* WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (125/ 100mL)
			125	235					
48	6/2/2008 - 6/30/2008	5	80	60	120	330	578	1,986	62%
44	6/2/2008 - 6/30/2008	5	80	0	93	156	161	196	20%
46	6/2/2008 - 6/30/2008	5	100	100	326	439	457	727	72%

Table 260. Summary of Pathogen Data in the Beaver Creek Subwatershed *(IL)*

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FLD-03	8/19/2008 - 9/17/2008	5	100	40	220	388	510	1,380	48%

Table 261. Land Use/Land Cover in the Beaver Creek Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	91,283.82	142.63	76.45
Forested Land	15,463.72	24.16	12.95
Developed Land	7,206.45	11.26	6.04
Pasture/Hay	1,683.30	2.63	1.41
Grassland and Shrubs	1,,602.79	2.50	1.34
Open Water	1,208.71	1.89	1.01
Wetland	957.18	1.50	0.80
Total	**119,405.99**	**186.57**	**100.00**

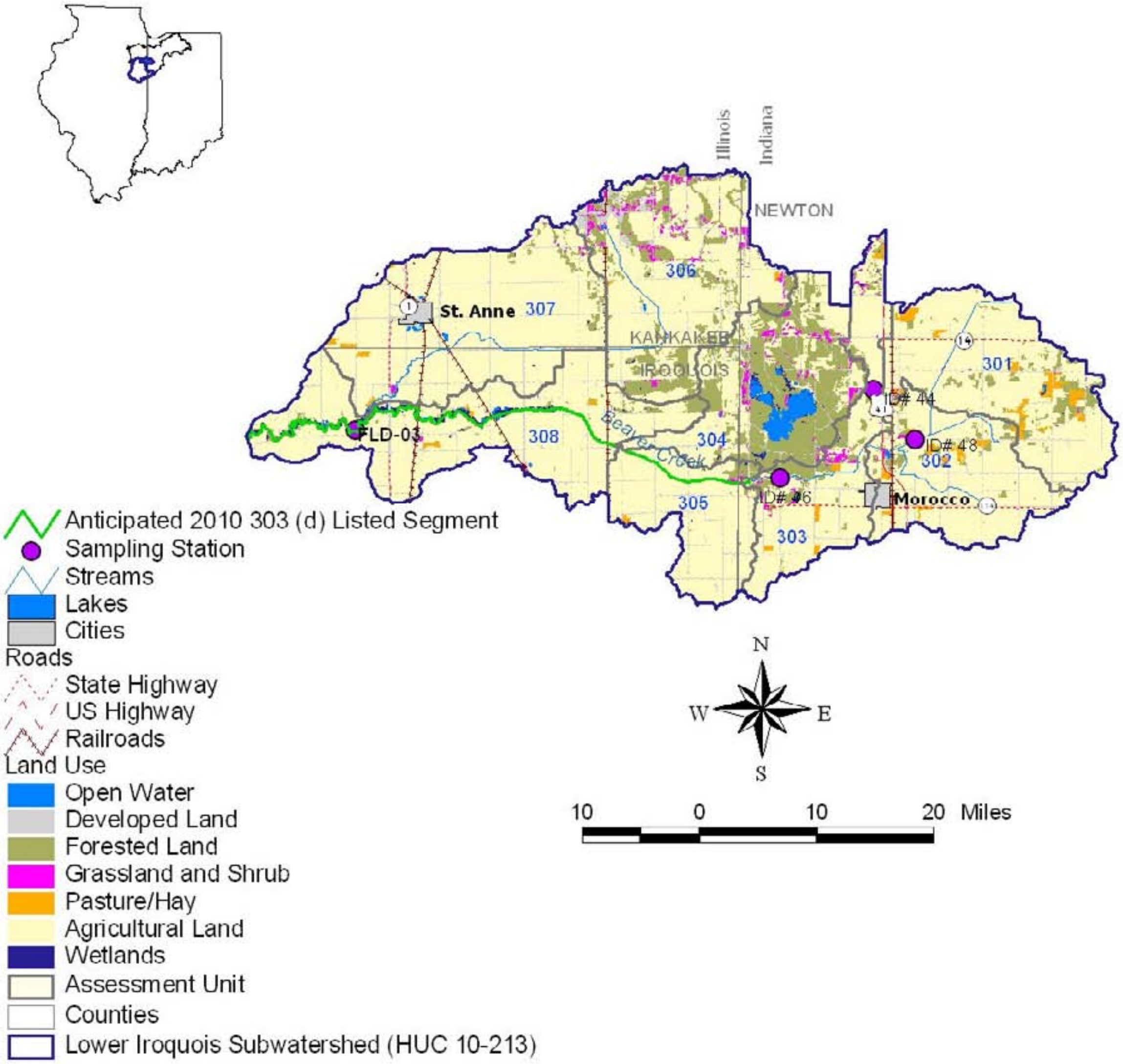


Figure 111. Location of Beaver Lake Ditch-Kankakee River Subwatershed (HUC10-112)

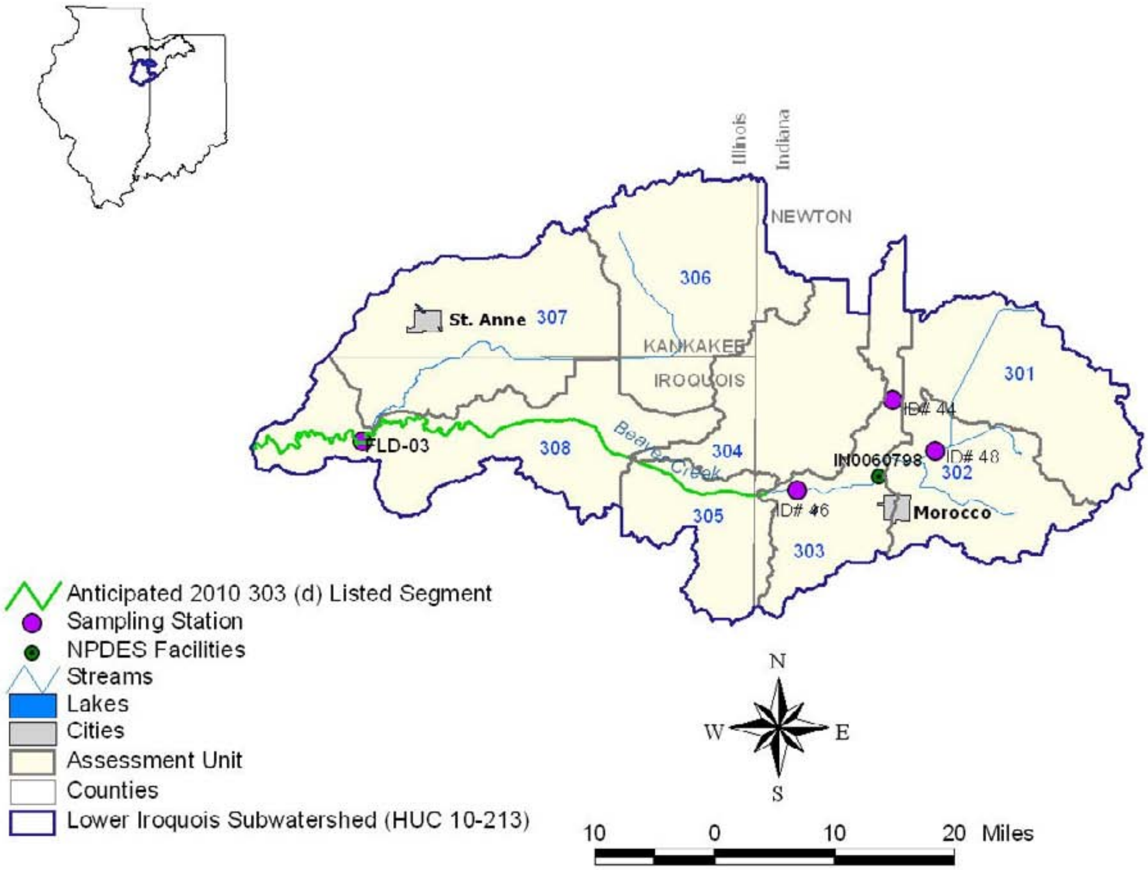


Figure 112. NPDES Facilities in the Beaver Lake Ditch-Kankakee River Subwatershed (HUC10-112)

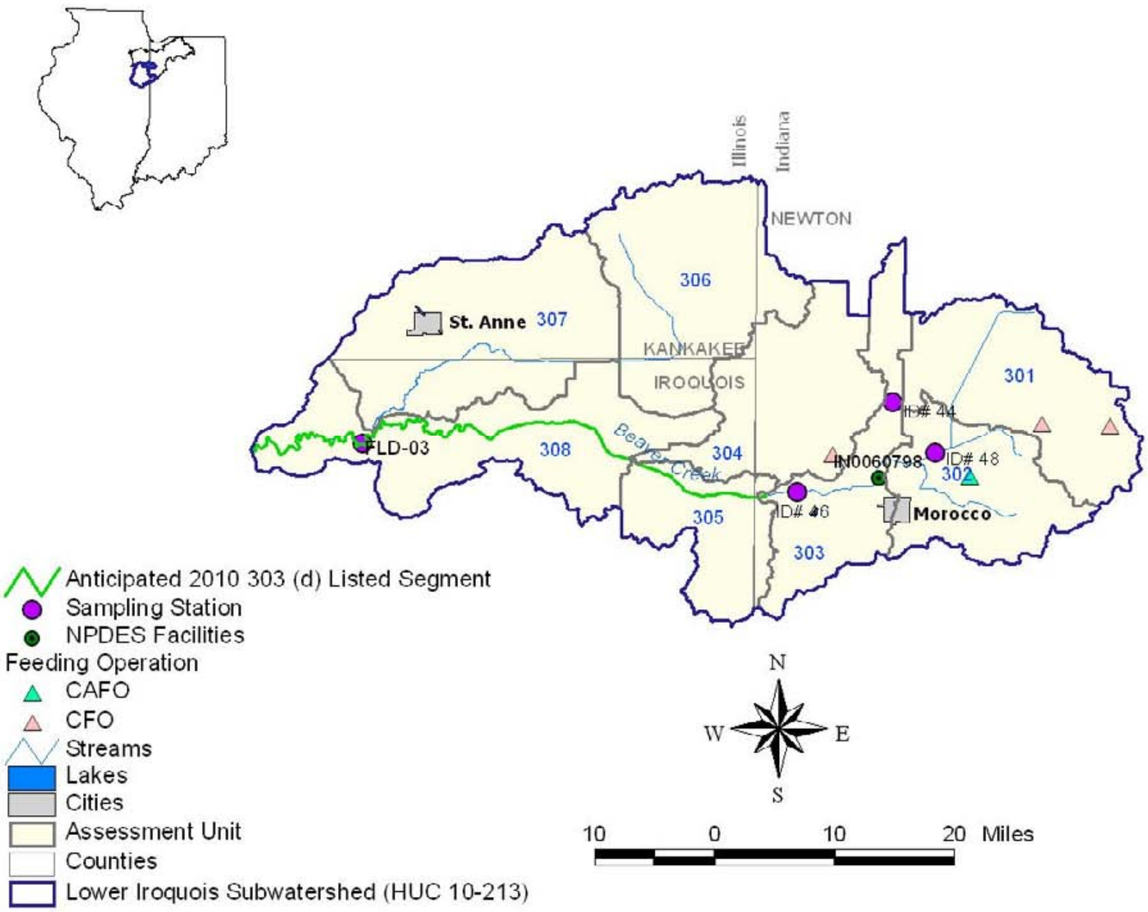


Figure 113. Feeding Operations in the Beaver Lake Ditch-Kankakee River Subwatershed (HUC10-112)

Table 262 through Table 264 summarize the subwatershed characteristics as well as the TMDL results for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in this subwatershed; however, the 2008 sampling data indicate that the *E. coli* and fecal coliform bacteria criteria are not met in this subwatershed and so TMDL results are presented here.

There is one NPDES facility within the Beaver Creek subwatershed and the WLAs for the facility was calculated based on their design flows and *E. coli* and fecal coliform bacteria permit limits. The individual WLAs are presented in Table 276. There is one CAFO within this subwatershed and it receives a WLA of zero as described further in Section 7.3.

Table 262. Deardruff ditch-Beaver Creek Characteristics and TMDL Summary (HUC12-302)

Upstream Characteristics					
Drainage Area	42.40 square miles				
Sampling Station	44, 48				
Listed Segments	None				
Land Use	Agriculture: 83.07%; Developed Land:5.59%; Forest:6.58%; Other: 4.76%				
Soils	A: 67.84%; B: 22.97%; C: 8.48%; D:0.71%; Unknown:0.00%				
NPDES Facilities	None				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Storey Pork Farm (ING803684)				
	Gibson Fine Swine, Inc. (3855)				
CFOs	Sow Production Site (2484)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	367.41	104.44	36.06	9.87	3.40
WLA	0.00	0.00	0.00	0.00	0.00
MOS (10%)	40.82	11.60	4.01	1.09	0.38
TMDL = LA+WLA+MOS	408.23	116.04	40.07	10.96	3.78

Table 263. Carlson Ditch-Beaver Creek Subwatershed Characteristics and TMDL Summary (HUC12-303)

Upstream Characteristics					
Drainage Area	59.71 square miles				
Sampling Station	46				
Listed Segments	None				
Land Use	Agriculture: 80.59%; Developed Land:6.03%; Forest:8.58%; Other: 4.81%				
Soils	A: 65.22%; B: 22.51%; C: 10.74%; D:1.53%; Unknown:0.00%				
NPDES Facilities	Morocco WWTP (IN0060798)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	Storey Pork Farm (INg803684)				
	Gibson Fine Swine, Inc. (3855)				
CFOs	Sow Production Site (2484)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	516.7	146.37	50.08	13.19	4.08
WLA	0.71	0.71	0.71	0.71	0.71
MOS (10%)	57.49	16.34	5.64	1.54	0.53
TMDL = LA+WLA+MOS	574.9	163.42	56.43	15.44	5.32

Table 264. Beaver Creek Subwatershed Characteristics and TMDL Summary (HUC12-308)

Upstream Characteristics					
Drainage Area	186.63 square miles				
Sampling Station	FLD-03				
Listed Segments	FLD-03				
Land Use	Agriculture: 76.42%; Developed Land:6.03%; Forest:12.95%; Other: 4.60%				
Soils	A:47.24%; B:24.57%; C:10.28%; D:16.94 %; Unknown:0.97%				
NPDES Facilities	Morocco WWTP (IN0060798)				
MS4 Communities	None				
CSO Communities	None				
CAFOs	None				
CFOs	None				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	2310.88	545.12	191.73	59.96	22.82
WLA	1.14	1.14	1.14	1.14	1.14
MOS (10%)	256.89	60.69	21.43	6.78	2.66
TMDL = LA+WLA+MOS	2568.91	606.95	214.30	67.88	26.62

7.1.5.9 Iroquois River Subwatershed (HUC10-214)

The Iroquois River subwatershed has an area of nearly 69 square miles and lies entirely in Illinois. The land in this subwatershed is primarily used for agricultural purposes (Table 268). The subwatershed does not have NPDES facilities or feeding operations within its borders (Figure 114).

There is one listed segment in the subwatershed (Table 265). The sampling station (Table 266) located on Iroquois River shows pathogen violations (Table 267). Twenty six percent of all data observed at station FL-02 exceeds the geomean standard while 12 percent of all samples exceed the not-to-exceed standard.

Table 265. 303 (d) Listed Streams in the Iroquois River Subwatershed

HUC 12	HUC 12 Name	Segment ID	Waterbody	Stream Length (miles)	Parameter
402	Iroquois River	IL_FL_02	Iroquois River	11.37	Fecal Coliform

Table 266. Station Locations in the Iroquois River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
402	Iroquois River	FL-02	Iroquois River

Table 267. Summary of Pathogen Data in the Iroquois River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
FL-02	3/8/1999 - 6/18/2008	42	26	12	10	84	198	2,500	0%

Table 268. Land Use/Land Cover in the Iroquois River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	38306.91	59.85	86.32
Developed Land	3019.89	4.72	6.80
Forested Land	1040.14	1.63	2.34
Pasture/Hay	996.10	1.56	2.24
Wetland	371.84	0.58	0.84
Grassland and Shrubs	106.97	0.17	0.24
Open Water	534.41	0.84	1.20
Total	**44,376.27**	**69.34**	**100.00**

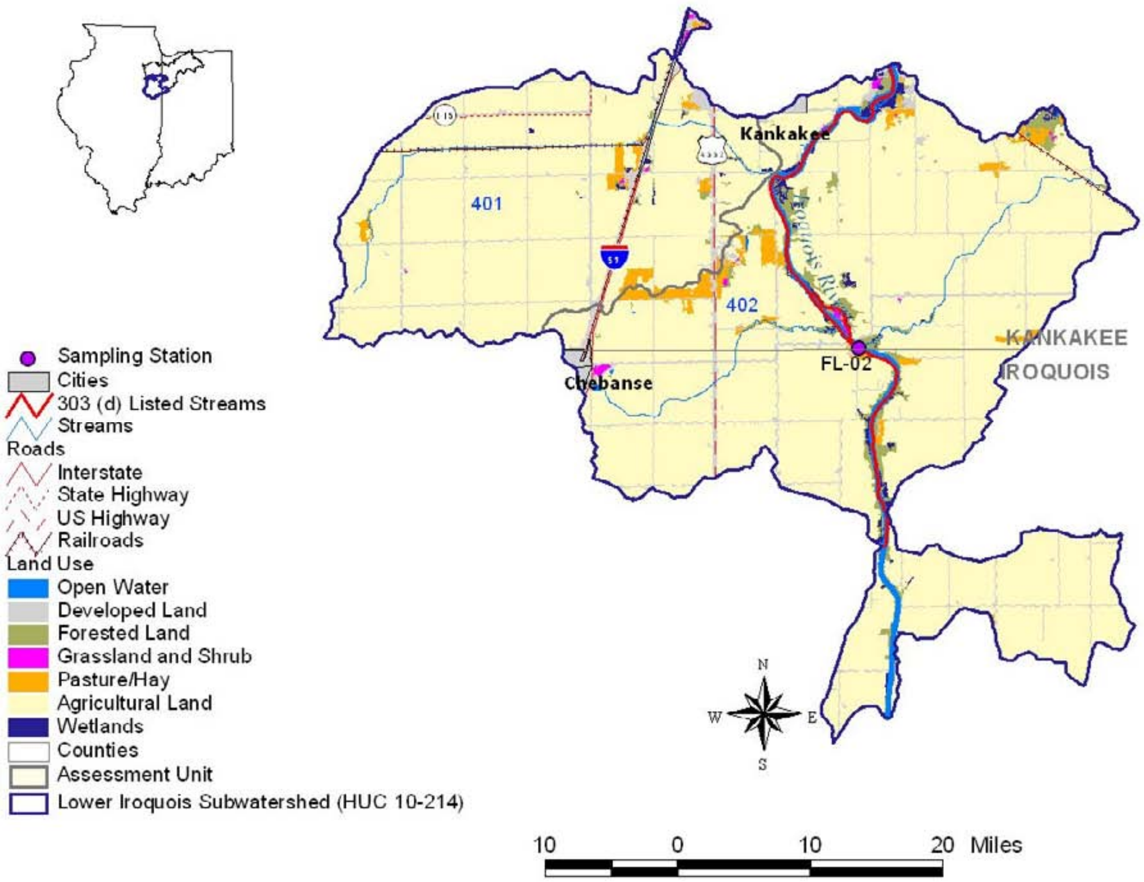


Figure 114. Location of Iroquois River Subwatershed (HUC10-214)

Table 269 summarizes the subwatershed characteristics as well as the TMDL results for HUC 12-402. There are two MS4 communities within the Iroquois River subwatershed and the WLAs for the communities were calculated based on their area within the subwatershed and fecal coliform standards. The individual WLAs are presented in Table 276. WLAs for CSO communities were calculated based on the maximum observed CSO flow reported in the DMR and fecal coliform standards.

Table 269. Iroquois River Characteristics and TMDL Summary (HUC12-402)

Upstream Characteristics					
Drainage Area	2135.30 square miles				
Sampling Station	FL_02				
Listed Segments	IL_FL_02				
Land Use	Agriculture: 85.97%; Developed Land:6.69%; Forest:4.03%; Other: 3.30%				
Soils	A: 15.10%; B: 36.68%; C: 20.92%; D:27.03%; Unknown:0.27%				
NPDES Facilities	All facilities upstream HUC12-001[a]				
	Cissna Park STP (IL0042391)				
	Rankin STP (ILG580122)				
	Milford STP (IL0023272)				
	Gilman-North STP (IL0025062)				
	Onarga STP (IL0076813)				
	Il Dot-I-57 Iroquois County (ILG551072)				
	Prairieview Luthern Home (IL0037397)				
	Swissland Packing Company (IL0065358)				
	Merkle-Knipprath Nursing Home (ILG551007)				
	Central Hs&Nash Middle School (IL0037206)				
	Clifton STP (IL0049573)				
	Morocco WWTP (IL0060798)				
	Iroquois Mobile Estates (IL0047040)				
MS4 Communities	City of Kankakee (ILR400363): 0.069 square miles				
	Kankakee County (ILR400260): 0.068 square miles				
CSO Communities	Watseka STP (IL0022161)-6 outfalls				
	Milford STP (IL0023272)-10 outfalls				
	Rensselaer Municipal STP (IN0024414)-9 outfalls				
CAFOs	All facilities upstream HUC12-001[a]				
	Storey Pork Farm (3684)				
CFOs	All facilities upstream HUC12-001[a]				
	Ewen Gravel Hill Farm (1178)				
	Sow Production Site (2484)				
	Gibson Fine Swine, Inc.(3855)				
	C Bar C Farms (3277)				
TMDL Allocations (billion/day)					
Allocation Category	*High Flows*	*Moist Conditions*	*Mid-Range Flows*	*Dry Conditions*	*Low Flows*
LA	24612.76	4468.02	1791.04	487.03	154.28
WLA	1512.45	1512.45	43.57	43.57	43.57
MOS (10%)	2902.80	664.50	203.85	58.95	21.98
TMDL = LA+WLA+MOS	29028.01	6644.97	2038.46	589.55	219.83

a: Refers to Lower Iroquois HUC12

7.1.6 Lower Kankakee Subwatershed

The Lower Kankakee subwatershed has five HUC 10 and 26 HUC 12 units (Table 270). The only sampling stations are located in HUC 10-118. Therefore information is only presented for this subwatershed. There are no listed segments in this subwatershed.

Table 270. Hydrologic Unit Code (HUC 10 and 12) in the Lower Kankakee Subwatershed

HUC 10	HUC 10 Name	HUC 12	Subwatershed Name	Area (sq. miles)
114	Spring Creek-Kankakee River	401	Pike Creek	26.01
		402	Trim Creek	37.82
		403	Mirror Lake-Kankakee River	37.64
		404	Tower Creek	17.81
		405	Spring Creek	27.59
		406	Farr Creek-Kankakee River	39.95
115	Rock Creek	501	Black Walnut Creek	20.59
		502	South Branch Rock Creek	39.53
		503	Headwaters Rock Creek	36.60
		504	Rock Creek	24.52
116	Horse Creek	601	Lehigh Raymond Run	16.09
		602	East Branch Horse Creek	56.32
		603	West Branch Horse Creek	31.45
		604	Horse Creek	24.48
117	Forked Creek	701	South Branch Forked Creek	35.62
		702	Headwaters Forked Creek	60.08
		703	Forked Creek	40.04
118	Kankakee River	801	Exline Slough	43.93
		802	Bur Creek Ditch	26.24
		803	Baker Creek	27.21
		804	Terry Creek	12.44
		805	Rayns Creek-Kankakee River	63.31
		806	City of Wilmington-Kankakee River	21.50
		807	Headwaters Prairie Creek	33.36
		808	Prairie Creek	18.22
		809	Kankakee River	17.75

7.1.6.1 Kankakee River Subwatershed (HUC 10-118)

The Kankakee River subwatershed has an area of approximately 263 square miles and includes the sampling stations listed in Table 271 and shown in Figure 115. Table 272 summarizes fecal coliform data for this subwatershed. Agriculture is the dominant land use followed by developed land (Table 273). There are no feeding operations within this subwatershed and the NPDES facilities are shown in Figure 116. It should be noted that the impairment status for segment F-01 previously relied on data from station F-01; impairment status is now based on data collected at station F-16.

Table 271. Station Locations in the Kankakee River Subwatershed

HUC 12	HUC 12 Name	Station #	Stream Name
806	City of Wilmington-Kankakee River	F-16	Kankakee River
809	Kankakee River	F-01	Kankakee River

Table 272. Summary of Pathogen Data in the Kankakee River Subwatershed

Station #	Period of Record	Total Number of Samples	Percent of Samples Exceeding Fecal Coliform WQS (#/100 mL)		Minimum (#/ 100 mL)	Geomean (#/ 100 mL)	Average (#/ 100 mL)	Maximum (#/ 100 mL)	Percent Reduction Based on Geomean (200/ 100mL)
			200	400					
F-16	1/14/2003 - 6/18/2008	16	25	0	20	61	104	240	0%
F-01	3/30/1999 - 9/19/2002	21	38	19	7	110	652	8,900	0%

Table 273. Land Use/Land Cover in the Kankakee River Subwatershed

Land Use/Land Cover	Subwatershed		
	Area		Percent
	Acres	Square Miles	
Agricultural Land	105,089.60	164.20	62.52
Developed Land	26,906.33	42.04	16.01
Forested Land	13,080.10	20.44	7.78
Pasture/Hay	8,126.72	12.70	4.83
Wetland	555.54	0.87	0.33
Grassland and Shrubs	9,524.02	14.88	5.67
Open Water	4815.27	7.52	2.86
Total	**168,097.59**	**262.65**	**100.00**

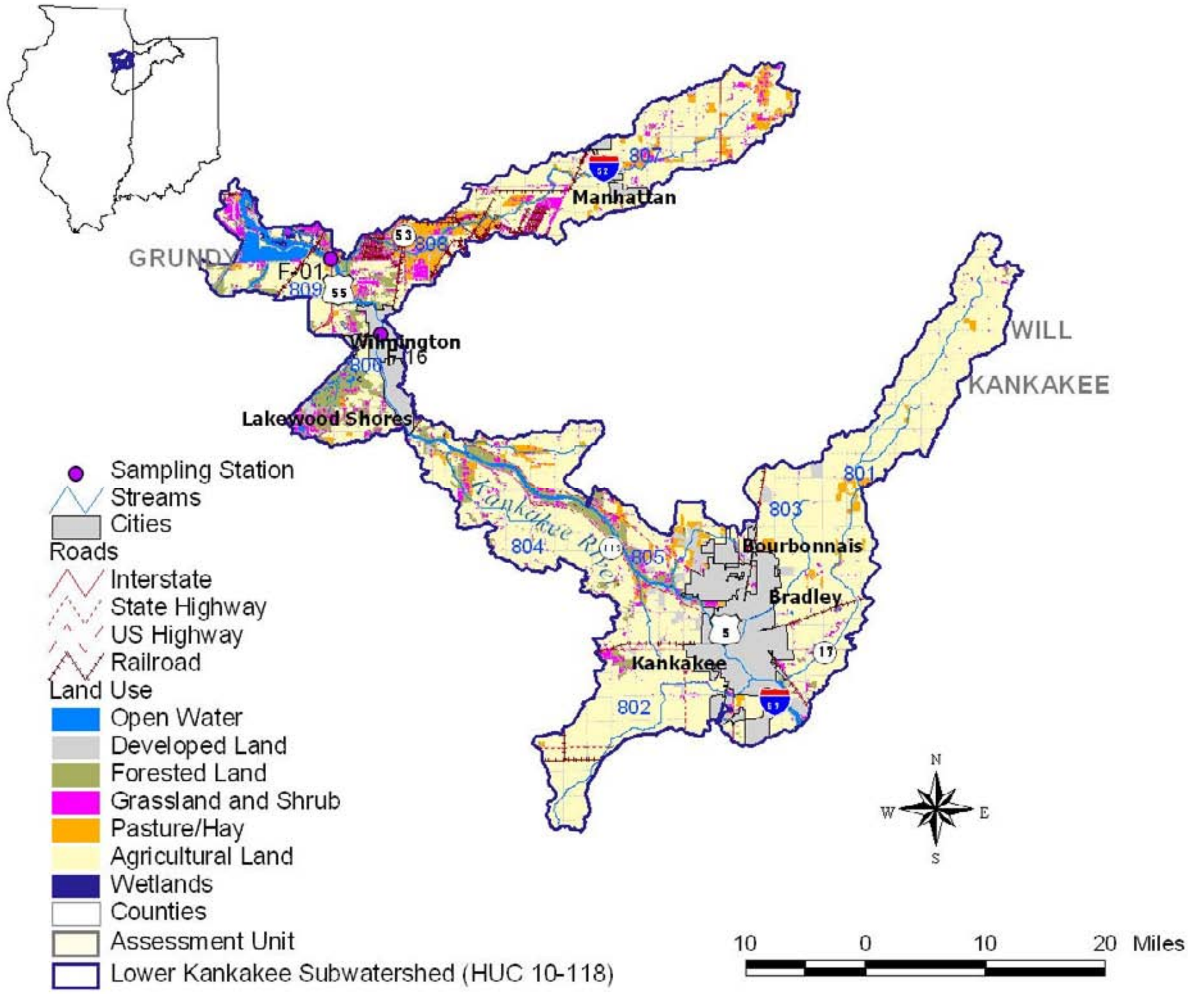


Figure 115. Location of Kankakee River Subwatershed (HUC 10-118)

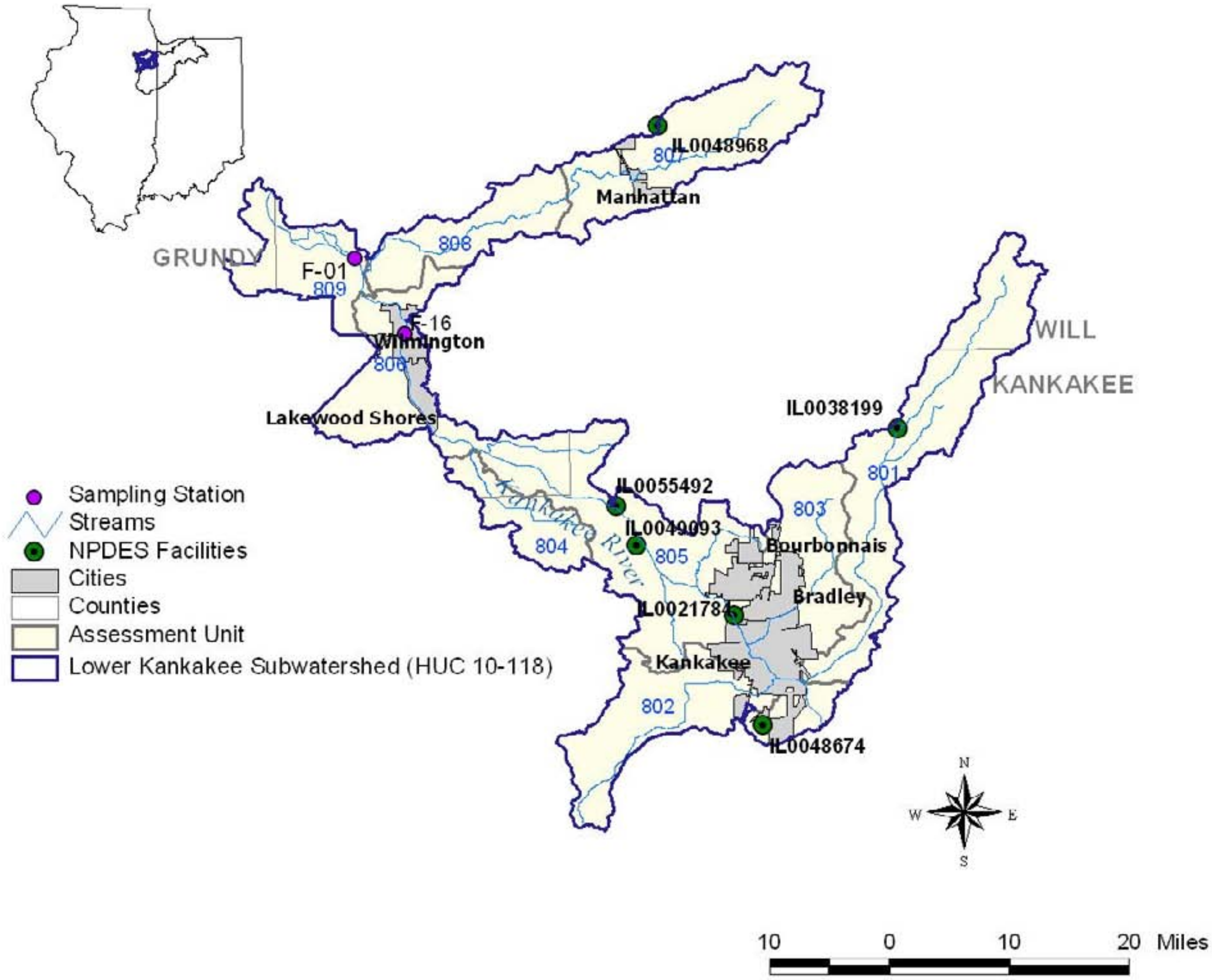


Figure 116. NPDES Facilities in the Kankakee River Subwatershed (HUC10-118)

Table 274 through Table 275 summarize the subwatershed characteristics for each of the HUC 12 subwatersheds. It should be noted that there are no current 303(d) listings in this subwatershed and the sampling performed in 2008 does not suggest any new impairment; therefore no TMDLs were developed.

Table 274. City of Wilmington-Kankakee River Characteristics (HUC12-806)

Upstream Characteristics	
Drainage Area	5025.01 square miles
Sampling Station	F-16
Listed Segments	None
Land Use	Agriculture: 77.09%; Developed Land:8.24%; Forest:8.09%; Other: 6.57%
Soils	A: 27.57%; B: 34.73%; C: 22.47%; D:14.59%; Unknown:0.65%
NPDES Facilities	All facilities in the entire Kankakee/Iroquois watershed excluding IL0048968*
MS4 Communities	All MS4s in the entire Kankakee/Iroquois watershed*
CSO Communities	Watseka STP (IL0022161)-6 outfalls
	Milford STP (IL0023272)-10 outfalls
	Grant Park STP (IL0050717)-2 outfalls
	North Judson Municipal (IN0020877)-1 outfall
	Plymouth Municipal STP (IN0020991)-10 outfalls
	Nappanee Municipal STP (IN0021466)-Discharges Outside of The Kankakee/Iroquois Watershed
	Lowell Municipal STP (IN0023621)-1 outfall
	Rensselaer Municipal STP (IN0024414)-9 outfalls
CAFOs	All facilities in the entire Kankakee/Iroquois watershed*
CFOs	All facilities in the entire Kankakee/Iroquois watershed *

*HUC12-806 is near the mouth of the Kankakee River; all sources listed previously in the document are upstream of this HUC.

Table 275. Kankakee River Characteristics (HUC12-809)

Upstream Characteristics	
Drainage Area	4955.62 square miles
Sampling Station	F-01
Listed Segments	None
Land Use	Agriculture: 76.79%; Developed Land:8.26%; Forest:8.09%; Other: 6.85%
Soils	A: 27.26%; B:34.55%; C: 22.88%; D:14.62%; Unknown:0.70%
NPDES Facilities	All facilities in the entire Kankakee/Iroquois watershed excluding IL0048968*
MS4 Communities	All MS4s in the entire Kankakee/Iroquois watershed*
CSO Communities	All CSOs in the entire Kankakee/Iroquois watershed*
CAFOs	All facilities in the entire Kankakee/Iroquois watershed*
CFOs	All facilities in the entire Kankakee/Iroquois watershed*

*HUC12-806 is at the mouth of the Kankakee River; all sources listed previously in the document are upstream of this HUC

7.2 Load Allocations

Load Allocations represent the portion of the allowable load that is reserved for nonpoint sources and natural background. Load allocations for the Kankakee/Iroquois watershed TMDLs are based on subtracting the WLAs and the MOS from the allowable load for each pollutant. The Load Allocations are presented by individual location in Section 7.1. CFOs receive a zero discharge permit from the state of Indiana and therefore receive a load allocation (LA) of zero for all pollutants.

7.3 Wasteload Allocations

There are 87 known NPDES facilities within the Kankakee/Iroquois watershed with the potential to discharge fecal coliform or *E. coli*. Seventy of these facilities discharge to streams with TMDLs. As required by the Clean Water Act, individual WLAs were developed for these permittees as part of the TMDL development process. For Indiana, WLAs were calculated based on each facility's average design flow multiplied by *E. coli* permit limits and appropriate conversion factors. For Illinois, each facility's maximum design flow was used to calculate the WLA for the high flow and moist flow zones and the average design flow was used for all other flow zones. Illinois assumes that facilities will have to discharge at their maximum flow during both high and moist flows based on the following:

> *For municipal NPDES permits in Illinois, page 2 of the NPDES permit lists 2 design flows: a design average flow (DAF) and a design maximum flow (DMF). These are defined in 35 Ill. Adm. Code 370.211(a) and (b) (see http://www.ipcb.state.il.us/documents/dsweb/Get/Document-12042/). Since rain (and to a certain extent, high ground water) causes influent flows to wastewater treatment facilities to increase and precipitation also leads to higher river levels, a correlation between precipitation and treatment flows exists. The load limits in these permits gives a tiered load limit, one based on DAF for flows of DAF and below, and another load limit in the permit for flows above DAF through DMF.*

Indiana *E. coli* WLAs are based on the already established permit limits. The *E. coli* WLA is based on the 125 #/100 mL standard. Illinois fecal coliform WLAs are based on the already established permit limits. The fecal coliform WLA is based on the 200 #/100 mL standard.

There are four CSOs in the Indiana portion of the watershed and three in the Illinois portion of the watershed (Table 277). One CSO in Illinois does not discharge to any 303 (d) listed segments and therefore did not receive a WLA. The WLAs for all the CSOs were calculated to be equal to the maximum observed daily flow (as reported on the 2006 discharge monitoring reports) multiplied by 125#/100 mL for *E. coli* and 200#/100 mL for fecal coliform. During the development of Long-Term Control Plans for the CSO communities each state may decide to modify the WLA if deemed appropriate.

There are seven permitted MS4 communities in the Indiana portion of the watershed and 11 in the Illinois portion of the watershed (Table 278). Seven of the Illinois MS4 communities do not discharge to impaired stream segments; these communities therefore did not receive a WLA. Different WLAs were established for each MS4 depending on the area of the MS4 upstream of the each assessment location. The jurisdictional areas of townships, municipalities, and urbanized areas were used as surrogates for the regulated area of each MS4. These areas were then used to calculate WLAs based on the proportion of the upstream drainage area located within the MS4 boundaries by multiplying that proportional area by the loading capacity of the assessment location. The MS4 WLAs therefore are equal to the estimated flows from the MS4 multiplied by either 125#/100 mL for *E. coli* or 200#/100 mL for fecal coliform.

Indiana has identified 28 CAFOs in the Kankakee/Iroquois watershed and the WLAs for each is set to zero. The zero allocation is based on the Effluent Limitations Guidelines and New Source Performance Standards requiring, in general, zero discharge from these areas. This limit on load is reasonable due to the requirement for the proper design, construction, operation, and maintenance of the structures to contain all manure, litter, and process wastewater including the runoff and direct precipitation from a 25 year, 24-hour rainfall event. Further, the allocation is based on the conditions of the NPDES general permit providing that water quality standards shall not be exceeded in the event of an overflow from production areas. No CAFOs were identified by IEPA in the Illinois portion of the watershed; therefore the WLA for Illinois CAFOs is also zero (Table 279).

WLAs from illicitly connected onsite systems (i.e., straight pipe dischargers) in the watershed are set equal to zero.

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
Lower Iroquois	Central Hs&Nash Middle School	IL0037206	IL_FL_02	0.01	0.08		0.026	0.20
	Cissna Park STP	IL0042391	IL_FLI-02, IL_FL_02, FL-05	0.10	0.76		0.25	1.89
	Clifton STP	IL0049573	IL_FL_02	0.20	1.51		0.5	3.79
	Gilman-North STP	IL0025062	IL_FL_02, FL-05	0.50	3.79		1.15	8.71
	Il Dot-I-57 Iroquois County	ILG551072	IL_FL_02, FL-05	0.02	0.12		0.0405	0.31
	Iroquois Mobile Estates	IL0047040	IL_FL_02	0.01	0.08		0.025	0.19
	Merkle-Knipprath Nursing Home	ILG551007	IL_FL_02, FL-05	0.02	0.11		0.0375	0.28
	Milford STP	IL0023272	IL_FLI-02, IL_FL_02, FL-05	0.20	1.51		1.3	9.84
	Morocco WWTP	IN0060798	HUC21303, IL_FL_02	0.15	1.14	0.71	0.15	1.14
	Onarga STP	IL0076813	IL_FL_02, FL-05	0.25	1.89		0.878	6.65
	Prairieview Luthern Home	IL0037397	IL_FL_02, FL-05	0.01	0.09		0.03	0.23
	Rankin STP	ILG580122	IL_FLI-02, IL_FL_02, FL-05	0.08	0.61		0.304	2.30
	Swissland Packing Company	IL0065358	IL_FL_02, FL-05	0.03	0.21		0.03	0.23
	Watseka STP	IL0022161	IL_FL-04, IL_FL_02, FL-05	1.60	12.11		4	30.28
Middle Kankakee	Boone Grove Elem & Middle Sch	IN0045888	HUC11009, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.02	0.17	0.11	0.02	0.17
	Boone Grove High School WWTP	IN0057029	HUC11007, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.02	0.14	0.09	0.02	0.14
	Buckhill Estates WWTP	IN0058548	HUC11306, HUC11312	0.02	0.15	0.09	0.02	0.15
	Dalecarlia Utilities Lake Dale	IN0033081	HUC11306, HUC11312	0.04	0.33	0.21	0.04	0.33
	Demotte Municipal WWTP	IN0039926	HUC11101, HUC11103, HUC11205	0.50	3.76	2.35	0.50	3.76

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
	Hebron Municipal WWTP	IN0020061	INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.03	0.19	0.12	0.03	0.19
Middle Kankakee	Hebron WWTP	IN0061450	INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.03	0.19	0.12	0.03	0.19
	Kankakee Rest Area	IN0031275	HUC11101, HUC11103, HUC11205	0.05	0.37	0.23	0.05	0.37
	Kouts Municipal WWTP	IN0023400	INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.33	2.50	1.56	0.33	2.50
	La Crosse Municipal WWTP	IN0040193	HUC10805, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.07	0.51	0.32	0.07	0.51
	Lake Eliza Conservancy Dist	IN0051446	HUC11007, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.09	0.66	0.41	0.09	0.66
	Lincoln Elementary School	IN0030503	HUC11101, HUC11103, HUC11205	0.03	0.26	0.16	0.03	0.26
	Little Co Of Mary Health Fac	IN0053104	INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.04	0.30	0.19	0.04	0.30
	Lowell WWTP	IN0023621	HUC11306, HUC11312	4.00	30.28	18.93	4.00	30.28
	Martis Place Bomars River Ldg	IN0058823	HUC10904, HUC11103, HUC11205	0.01	0.06	0.04	0.01	0.06
	Morgan Township School	IN0052248	INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.01	0.10	0.06	0.01	0.10
	North Newton Jr Sr High School	IN0031143	HUC11203, HUC11205	0.03	0.23	0.14	0.03	0.23
	Schneider WWTP	IN0040592	HUC11307, HUC11312	0.07	0.49	0.31	0.07	0.49
	Town Of Monterey WWTP	IN0060852	HUC10904, HUC11103, HUC11205	0.03	0.23	0.15	0.03	0.23
	Twin Lakes Utilities	IN0037176	HUC11302, INK01D3_00, HUC11312	1.10	8.33	5.20	1.10	8.33

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
Middle Kankakee	Wanatah Wastewater Trmt Plant	IN0056669	HUC11001, HUC11005, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.08	0.59	0.37	0.08	0.59
	Washington Twp School WWTP	IN0057703	HUC11006, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.04	0.30	0.19	0.04	0.30
	Water Services Co Of Indiana	IN0039101	HUC11101, HUC11103, HUC11205	0.16	1.17	0.73	0.16	1.17
	Westville Correctional Center	IN0042978	HUC11006, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.75	5.68	3.55	0.75	5.68
	Westville WWTP	IN0024848	HUC11006, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.35	2.65	1.66	0.35	2.65
	Wheatfield Municipal WWTP	IN0040754	HUC10902, HUC10904, HUC11103, HUC11205	0.08	0.58	0.36	0.08	0.58
	Winfield Elementary School	IN0031127	HUC11302, INK01D3_00, HUC11312	0.01	0.08	0.05	0.01	0.08
Upper Iroquois	Brook Municipal WWTP	IN0039764	HUC20503, IL_FL-04, IL_FL_02	0.10	0.76	0.47	0.10	0.76
	George Ade Mem Health Care Ctr	IN0050997	HUC20405, IL_FL-04, HUC20503, IL_FL_02	0.01	0.11	0.07	0.01	0.11
	Goodland Municipal WWTP	IN0040070	HUC20403, HUC20404, HUC20405, IL_FL-04, HUC20503, IL_FL_02	0.10	0.72	0.45	0.10	0.72
	Grandmas Home Cooking	IN0053422	HUC20401, HUC20405, IL_FL-04, HUC20503, IL_FL_02	0.03	0.22	0.14	0.03	0.22
	Kentland Municipal WWTP	IN0023329	HUC20505, IL_FL-04, HUC20506, IL_FL_02	0.46	3.48	2.18	0.46	3.48

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
Upper Iroquois	Remington WWTP	IN0020940	HUC20204, INK0235_T1019, INK0238_00, HUC20405, IL_FL-04, HUC20503	0.43	3.25	2.03	0.43	3.25
	Rensselaer Municipal STP	IN0024414	INK0226_T1004, HUC20405, IL_FL-04, HUC20503, IL_FL_02	1.20	9.08	5.68	1.20	9.08
	Trail Tree Inn	IN0041904	HUC20401, HUC20405, IL_FL-04, HUC20503, IL_FL_02	0.26	1.94	1.21	0.26	1.94
Upper Kankakee	Hamlet Municipal STP	IN0040100	INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10703	0.10	0.76	0.47	0.10	0.76
	Kingsbury Utility Corp	IN0045471	INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004, INK013C_T1007, INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	2.50	18.93	11.83	2.50	18.93
	Kingsford Heights Municipal WWTP	IN0023337	INK013C_T1007, INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.42	3.19	2.00	0.42	3.19

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
Upper Kankakee	La Porte Municipal STP	IN0025577	INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004, INK013C_T1007, INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	7.00	53.00	33.12	7.00	53.00
	North Liberty WWTP	IN0025801	INK0126_00, INK0125_00, INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004, INK013C_T1007, INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.18	1.36	0.85	0.18	1.36

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
Upper Kankakee	Potato Creek State Park	IN0052272	INK0126_00, INK0125_00, INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004, INK013C_T1007, INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.09	0.70	0.44	0.09	0.70
	Swan Lake Golf Resort	IN0061085	INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10702, HUC10703	0.04	0.27	0.17	0.04	0.27
	Walkerton Municipal WWTP	IN0040690	HUC10103, INK0126_00, INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004, INK013C_T1007, INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205	0.36	2.76	1.72	0.36	2.76

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
Upper Kankakee	Yogi Bears Jellystone Park	IN0041882	INK0147_T1009, INK0146_T1008, INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC10701, HUC11103, HUC11205, HUC10703	0.11	0.79	0.50	0.11	0.79
Yellow River	Argos Municipal WWTP	IN0022284	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10501, INK0165_00, INK0166A_00, INK0166_00	0.21	1.61	1.00	0.21	1.61
	Bass Lake Conservancy District	IN0058289	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10601, HUC10604, HUC10603	0.28	2.15	1.34	0.28	2.15
	Bremen Municipal WWTP	IN0020427	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, INK0158_00, INK015F_00, INK0165_00, INK0166A_00, INK0166_00	1.30	9.84	6.15	1.30	9.84
Yellow River	Convent Ancilla Domini	IN0025160	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10504	0.05	0.35	0.22	0.05	0.35

Table 276. Individual WLAs for NPDES Facilities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility Name	Permit ID	Applicable to the Loading Capacities at the Following Segments	Design Flow (MGD)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Max Design Flow (MGD)	Fecal coliform WLA (Billion/day)
	Knox Municipal WWTP	IN0021385	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, INK0166A_00	0.70	5.30	3.31	0.70	5.30
	Lake Of The Woods Reg Sew Dist	IN0057002	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, INK0157_00, INK0158_00, INK015F_00, INK0165_00, INK0166A_00, INK0166_00	0.14	1.02	0.64	0.14	1.02
	Lapaz Municipal WWTP	IN0040223	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10311, INK0165_00, INK0166A_00, INK0166_00	0.13	0.95	0.60	0.13	0.95
Yellow River	North Judson Municipal WWTP	IN0020877	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10604	0.47	3.56	2.22	0.47	3.56
	Plymouth WWTP	IN0020991	INK0183_M1011, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, INK0165_00, INK0166A_00, INK0166_00	3.50	26.50	16.56	3.50	26.50

*Fecal Coliform WLA values for Indiana Permits are represented here for the purpose of calculating the total WLA for the TMDL only. This fecal coliform WLA will not be incorporated into Indiana facility permits. It is assumed that by meeting their *E. coli* WLA Indiana permits will also be meeting the Fecal coliform WLA. The two standards are considered equal.

Table 277. Individual WLAs for CSO Communities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Permit #	Facility	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)	Applicable to the Loading Capacities at the Following Segments
Lower Iroquois	IL0023272	Milford STP	13.48		IL_FLI-02, IL_FL_02, FLI-01, FL-05
Lower Iroquois	IL0022161	Watseka STP	37.85		IL_FL-04, IL_FL_02, FL-05
Upper Iroquois	IN0024414	Rensselaer Municipal STP		858.67	INK0226_T1004, HUC20405, IL_FL-04, HUC20503, IL_FL_02, FL-05
Middle Kankakee	IN0023621	Lowell Municipal STP		203.64	HUC11306, HUC11311
Yellow	IN0020991	Plymouth Municipal STP		2.84	HUC10807,INK0183_M1011, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, INK0165_00, INK0166A_00, INK0166_00
Yellow	IN0020877	North Judson Municipal		23.66	INK0183_M1011, HUC10807, INK019F_M1113, INK019F_M1104, HUC11103, HUC11205, HUC10604

Table 278. Individual WLAs for MS4 Communities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility	Permit ID	Applicable to the Loading Capacities at the Following Segments	Area in Drainage (sq miles)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)
Lower Kankakee	City of Kankakee	ILR400363	IL_FL_02	0.069	0.84	
	Kankakee County	ILR400260	IL_FL_02	0.068	0.83	
	City of Crown Point	INR040054	HUC11311	0.35		2.83
	City of Crown Point	INR040054	HUC11306	0.35		5.07
	Hillsborough County-Valparaiso	INR04073 Co-Permit	HUC11006	0.27		2.18
	Hillsborough County-Valparaiso	INR04073 Co-Permit	HUC11103,HUC11205	1.9		12.48
	Hillsborough County-Valparaiso	INR04073 Co-Permit	INK019F_M1113, INK019F_M1104	1.9		15.36
	Lake County	INR040124	HUC11311	9.38		75.85
	Lake County	INR040124	HUC11306	9.38		135.97
	Lakes of the Four Seasons POA	INR040007	HUC11311,HUC11302,INK01D3_0 0	1.09		8.81
	Porter County	INR040140	HUC11006	0.58		4.69
	Porter County	INR040140	HUC11103,HUC11205	2.96		19.45
	Porter County	INR040140	INK019F_M1113, INK019F_M1104	2.96		23.93
	Town of Cedar Lake	INR040075	HUC11308	0.96		7.76
	Town of Cedar Lake	INR040075	HUC11310	1.35		10.92
	Town of Cedar Lake	INR040075	HUC11306	6.35		92.05
	Town of Cedar Lake	INR040075	HUC11311	7.7		62.26
	Town of Lowell	INR040046	HUC11304	0.91		7.36
Middle Kankakee	Town of Lowell	INR040046	HUC11306	2.82		40.88
	Town of Lowell	INR040046	HUC11311	4.16		33.64
	Town of St. John	INR040047	HUC11311,HUC11308,HUC11310	4.29		34.69
Upper Kankakee	La Porte County	INR040107	INK011C_00,INK011A_T1001,INK 011D_T1002	0.01		0.05
	La Porte County	INR040107	INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004,INK013C_T1007,I NK0147_T1009, INK0146_T1008	14.93		78.04
	La Porte County	INR040107	HUC11103,HUC11205,INK0183_ M1011,HUC10807	14.93		98.10
	La Porte County	INR040107	INK019F_M1113, INK019F_M1104	14.93		120.73
	South Bend	INR040114	HUC10203	0.22		1.15

Table 278. Individual WLAs for MS4 Communities in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	Facility	Permit ID	Applicable to the Loading Capacities at the Following Segments	Area in Drainage (sq miles)	Fecal coliform WLA (Billion/day)	*E. Coli* WLA (Billion/day)
Upper Kankakee	South Bend	INR040114	INK0112_00,INK013C_T1007,INK0147_T1009, INK0146_T1008,INK011A_T1001,INK011D_T1002,INK0138_T1006, INK0131_T1003, INK0134_T1005, INK0133_T1004	3.42		17.88
	South Bend	INR040114	INK0183_M1011,HUC11103,HUC11205,HUC10807	3.42		22.47
	South Bend	INR040114	INK019F_M1113, INK019F_M1104	3.42		27.65
Yellow	Plymouth	INR040064	INK015F_00	0.55		4.63
	Plymouth	INR040064	HUC10311	2.36		19.88
	Plymouth	INR040064	INK0183_M1011,HUC10807,HUC11205,HUC11103	6.97		45.80
	Plymouth	INR040064	INK019F_M1113, INK019F_M1104	6.97		56.36
	Plymouth	INR040064	INK0166A_00,INK0165_00,INK0166_00	6.97		58.72

Table 279. Individual WLAs for CAFOs in the Kankakee/Iroquois watershed TMDLs.

Major Subwatershed	HUC 10	HUC 10 Name	NPDES ID	Operation Name	*E. Coli* WLA (Billion/day)
Upper Kankakee	712000101	Pine Creek	ING802239	Walkerton Farm	0
	712000102	Little Kankakee River-Kankakee River	ING806085	Scher-Way Dairy Farm	0
	712000107	Robbins Ditch-Kankakee River	ING800149	N&L Pork, Inc. - Lee Nagai - Home Site	0
Middle Kankakee	712000108	Pitner Ditch-Kankakee River	ING806292	David And Brenda Wolfe	0
			ING801092	Smoker Farms	0
	712000111	Knight Ditch-Kankakee River	ING804410	Dekock Feedlot, Inc.	0
			ING801782	Dekock Feedlot Inc.	0
			ING802170	Bos Farms-Dry Cow Facility	0
			ING806155	Bos Dairy Site # 4	0
	712000112	Beaver Lake Ditch-Kankakee River	ING806015	Fair Oaks Dairy Farm North	0
			ING806154	Herrema Dairy	0
Yellow River	712000103	Headwaters Yellow River	ING8040910	Fred Beer Farms, Inc.	0
			INA006440	Walnut Grove Dairy, LLC	0
			ING800005	J & T Laidig Farms	0
	712000105	Yellow River	ING804918	Homestead Dairy	0
Upper Iroquois	712000201	Oliver Ditch	ING806083	Newberry Farms, LLC	0
	712000202	Slough Creek	ING802689	Tip Top Pigs Inc #1	0
			ING803422	White County Egg Farm	0
	712000203	Bruner Ditch-Iroquois River	ING800876	Grow Feedlots	0
			ING806045	Windy Ridge Dairy	0
	712000204	Curtis Creek-Iroquois River	ING806207	Seven Hills Dairy, LLC	0
			ING803372	Newton County Egg Farm	0
			N/A	Cambalot Swine Breeders	0
			ING806036	Fair Oaks Dairy Farm South	0
			ING803732	Calf Land, LLC	0
			ING806341	Fair Oaks Dairy Farm, LLC. - North Central # 5	0
			ING806065	Fair Oaks Dairy Farm West	0
Lower Iroquois	712000213	Beaver Creek	ING803684	Storey Pork Farm	0

7.4 Margin of Safety

Section 303(d) of the Clean Water Act and U.S. EPA regulations at 40 CFR 130.7 require that "TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numeric water quality standards with seasonal variations and a margin of safety which takes into account any lack of knowledge concerning the relationship between limitations and water quality." U.S. EPA guidance explains that the MOS may be implicit (i.e., incorporated into the TMDL through conservative assumptions in the analysis) or explicit (i.e., expressed in the TMDL as loadings set aside for the MOS).

A moderate explicit MOS has been applied as part of all the Kankakee/Iroquois watershed TMDLs by reserving ten percent of the allowable load (see allocation tables in Section 7.1). Ten percent was considered an appropriate MOS based on the following considerations:

- The use of the load duration curve approach minimizes a great deal of uncertainty associated with the development of TMDLs because the calculation of the loading capacity is simply a function of flow multiplied by the target value. Most of the uncertainty is therefore associated with the estimated flows in each assessed segment which were based on extrapolating flows from the nearest downstream USGS gage.
- The fecal coliform and *E. coli* TMDLs include an implicit MOS in that they were based on the geometric mean component of the standard rather than the not-to-exceed standard. Using the not-to-exceed standard would have resulted in larger loading capacities. The ten percent MOS helps to ensure that allocations will not exceed the load associated with the minimum flow in each zone.
- An additional implicit MOS for fecal coliform and *E. coli* is included because the load duration analysis does not address die-off of pathogens

7.5 Seasonal Variation

A TMDL must consider seasonal variation in the derivation of the allocation. The load duration approach accounts for seasonality by evaluating allowable loads on a daily basis over the entire range of observed flows and presenting daily allowable loads that vary by flow. Seasonal variations for fecal coliform and *E. coli* are also addressed in this TMDL by only assessing conditions during the season when the water quality standard applies (April through October).

8.0 PUBLIC PARTICIPATION

Public participation is an important and required component of the TMDL development process. The following public meetings were held in the watershed to discuss this project:

- Kickoff public meetings were held in Rensaleer, IN on May 19, 2008 and Kankakee, IL on May 20, 2008. IDEM, IEPA, and Tetra Tech explained the TMDL process during these meetings, presented initial information regarding the Kankakee/Iroquois watershed, and answered questions from the public.
- Draft TMDL public meetings will be held in the watershed in the Spring of 2009. The draft findings of the TMDL will be presented at these meetings and the public will have the opportunity ask questions and provide information to be included in the final TMDL report.

IDEM and IEPA will also accept and address written comments on the draft TMDL report for a period of 30 days following its release.

9.0 IMPLEMENTATION AND REASONABLE ASSURANCE

Rural and, to a lesser extent, urban runoff are considered to be the primary sources of the bacteria impairments in the Kankakee/Iroquois watershed. Although several NPDES facilities have been found to be in violation of their permit limits for bacteria, the majority of facilities discharge effluent that meets water quality standards. Meeting bacteria water quality standards in the watershed will therefore rely primarily on encouraging activities to address runoff from urban and agricultural areas. This section provides a brief description of the types of appropriate practices and the programs that are in place to promote them.

Rural and urban runoff is reduced through the implementation of Best Management Practices (BMPs). A BMP may be structural, something that is built or involves changes in landforms or equipment. BMPs may also be managerial, that is, changing a specific way of using or handling infrastructure or resources. BMPs should be selected based on the goals of a watershed management plan, a TMDL implementation plan, or an equivalent process. Livestock owners, farmers, and urban planners can implement BMPs outside of a watershed management plan. However, the success of BMPs is typically enhanced if they are coordinated as part of a larger planning effort. The following is a partial list of BMPs that may be used to reduce pathogen loads:

- Riparian Area Management - Management of riparian areas protects stream banks and river banks with a buffer zone of vegetation, either grasses, legumes, or trees.
- Manure Collection and Storage - Collecting, storing, and handling manure in such a way that nutrients or bacteria do not run off into surface waters or leach down into ground water.
- Conservation Tillage – Use of tillage practices and residue management to control erosion and surface transport of pollutants from fields used for crop production.
- Contour Row Crops - Farming with row patterns and field operations aligned at or nearly perpendicular to the slope of the land.
- Manure Nutrient Testing - If manure application is desired, sampling and chemical analysis of manure should be performed to determine nutrient content for establishing the proper manure application rate in order to avoid overapplication and run-off.
- Drift Fences - Drift fences (short fences or barriers) can be installed to direct livestock movement. A drift fence parallel to a stream keep animals out and prevents direct input of *E. coli* to the stream.
- Pet Clean-up / Education - Education programs for pet owners can improve water quality of runoff from urban areas.

- Septic Management/Public Education - Programs for management of septic systems can provide a systematic approach to reducing septic system pollution. Education on proper maintenance of septic systems as well as the need to remove illicit discharges could alleviate some anthropogenic sources of pathogens.

Participation of landowners will be essential to reducing nonpoint sources of pollution and improving water quality, but resistance to change and upfront costs may deter participation. However, educational efforts and cost share programs can increase participation to levels needed to protect water quality. The following provides a brief summary of a few of the federal cost share programs that are available; other federal programs and programs that are unique to each state are also available.

9.1 Nonpoint Source Management Program

Illinois EPA and Indiana DEM receive federal funds through Section 319(h) of the Clean Water Act to help implement the Nonpoint Source Management Program. The purpose of the Program is to work cooperatively with local units of government and other organizations toward the mutual goal of protecting the quality of water by controlling NPS pollution. The program emphasizes funding for implementing cost-effective corrective and preventative BMPs on a watershed scale; funding is also available for BMPs on a non-watershed scale and the development of information/education NPS pollution control programs. The maximum federal funding available is 60 percent, with the remaining 40 percent coming from local match. The program period is two years unless otherwise approved. Applications are accepted June 1 through August 1.

9.2 Environmental Quality Incentives Program (EQIP)

Several cost share programs are available to landowners who voluntarily implement resource conservation practices in the Kankakee/Iroquois watershed. The most comprehensive is the NRCS Environmental Quality Incentives Program (EQIP) which offers cost sharing and incentives to farmers who utilize approved conservation practices to reduce pollutant loading from agricultural lands.

9.3 Conservation Reserve Program (CRP)

The Farm Service Agency of the USDA supports the Conservation Reserve Program (CRP) which rents land converted from crop production to grass or forestland for the purposes of reducing erosion and protecting sensitive waters. This program is available to farmers who establish vegetated filter strips or grassed waterways. The program typically provides 50 percent of the upfront cost to establish vegetative cover and $185/ac/yr for up to 15 years.

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