Figure 41 Undercut banks along the Ely Run. (J. Loomis 2006)

Part 5: Critical Areas in the Watershed

The following areas are critical to improved water quality and relate to the problems identified in the previous chapter.

5.1 Main stem of the St. Joseph River and the river corridor

- Contaminants
  - Bacteria
  - Sediment
  - Pesticide (spikes)
  - Phosphorus
- Problems
  - Loss of contiguous corridor along the river and tributaries
  - Loss of diversity in wildlife, plants and aquatic populations
  - Loss of woodlands and wetlands
  - Failing septic systems in residential communities along the river
  - Cropping within the flood plain and river corridor
  - Lack of/diminished public access to the river
  - Nuisance geese
  - Logjams and obstacles to recreational use of the river

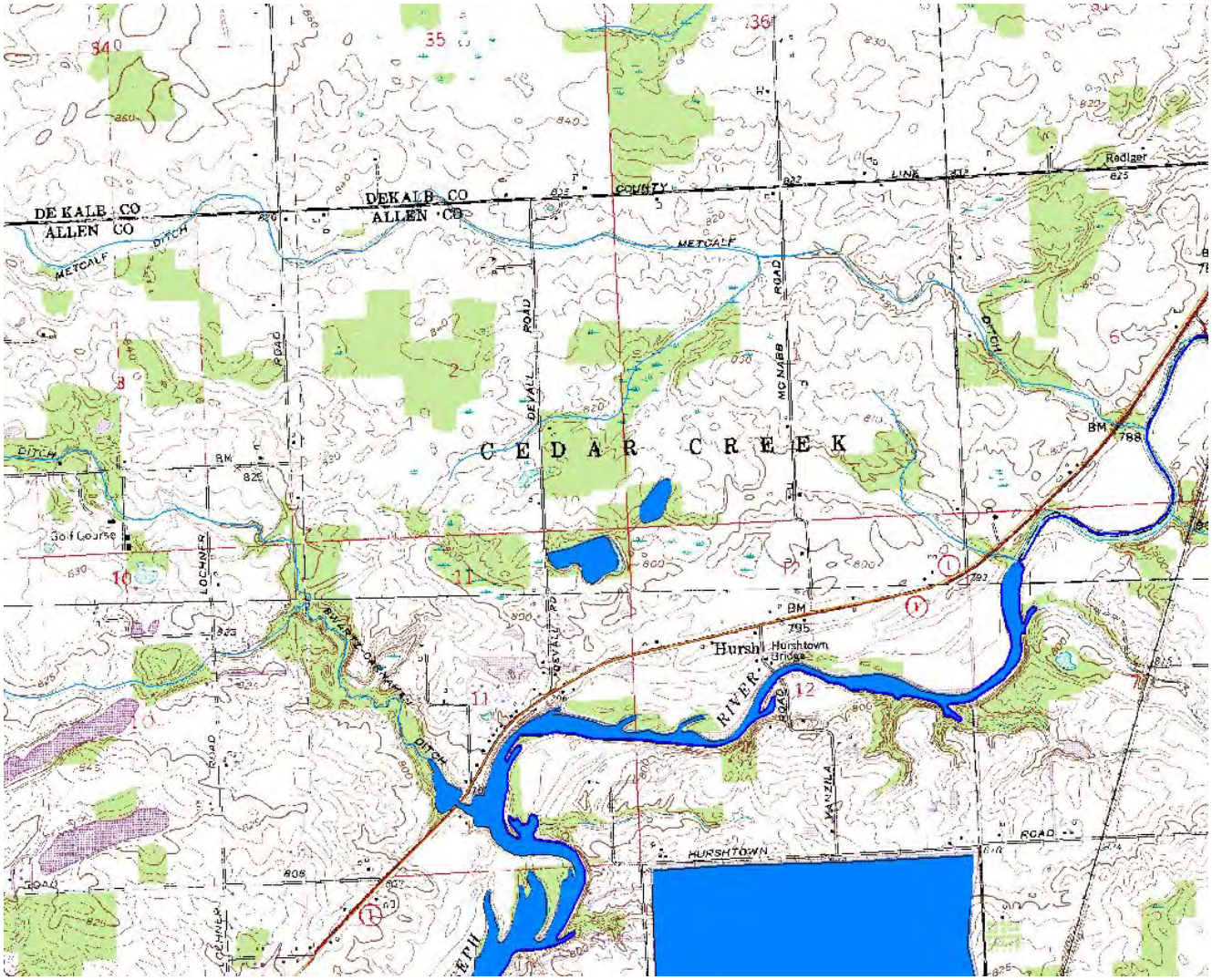

Figure 42 Main stem of the St. Joseph in the area above the Hurshtown Reservoir, Bear Creek sub-watershed. (SJRWI map)

5.2 Transportation corridor: I-69, I-469, State Road 1

- Contaminants
  - Sediment
  - Bacteria
  - Phosphorus
- Problems
  - Loss of wildlife corridor
  - Loss of farmland
  - Loss of woodland and wetlands
  - Increased construction activity and urbanization
  - Increased impervious surfaces and storm water runoff
  - Nuisance geese

Construction of residential and commercial areas along SR 1 (Dupont Road) has greatly increased erosion into the river and its tributaries, in part due to lack of enforcement of storm water management rules. Extensive construction is ongoing at I-69 and Dupont, SR 1 and Tonkel Road, and along SR 1 into Leo-Cedarville. Lack of erosion control mechanisms is quite apparent in this area, as is the increase in impervious surfaces.

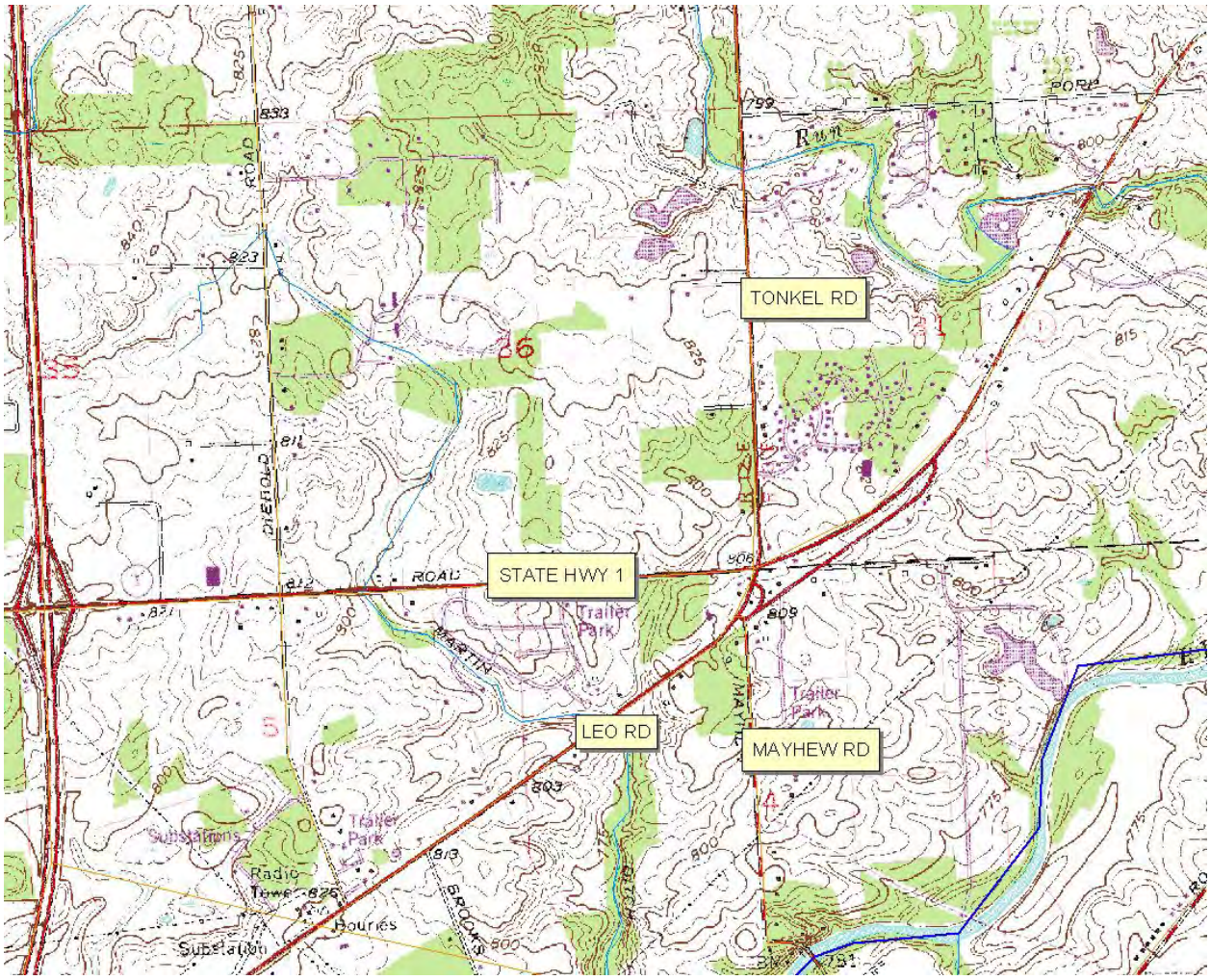

Figure 43 Transportation corridor of I-69, I-469 and State Road 1 (SJRWI)

5.3 Non-sewered areas of Fort Wayne and Allen County

- Contaminants
  - Bacteria
  - Nutrients: Phosphorus and ammonia
- Specific areas of concern
  - Parkerdale Neighborhood (St. Joe Rd. - Evard Rd. area)
  - Hosler and Halter Intersection area (Bear Creek)
  - St. Joe and Wheelock Road area
  - North Coldwater Road
  - Beckett's Run/SR 3 area
- Problems
  - Soils - poor drainage and small lot size
  - Lack of centralized sewer capacity
  - Lack of funding to replace failed septic systems
  - Lack of education for new rural residents about septic system maintenance
  - Diminished aesthetics due to overflows and odors

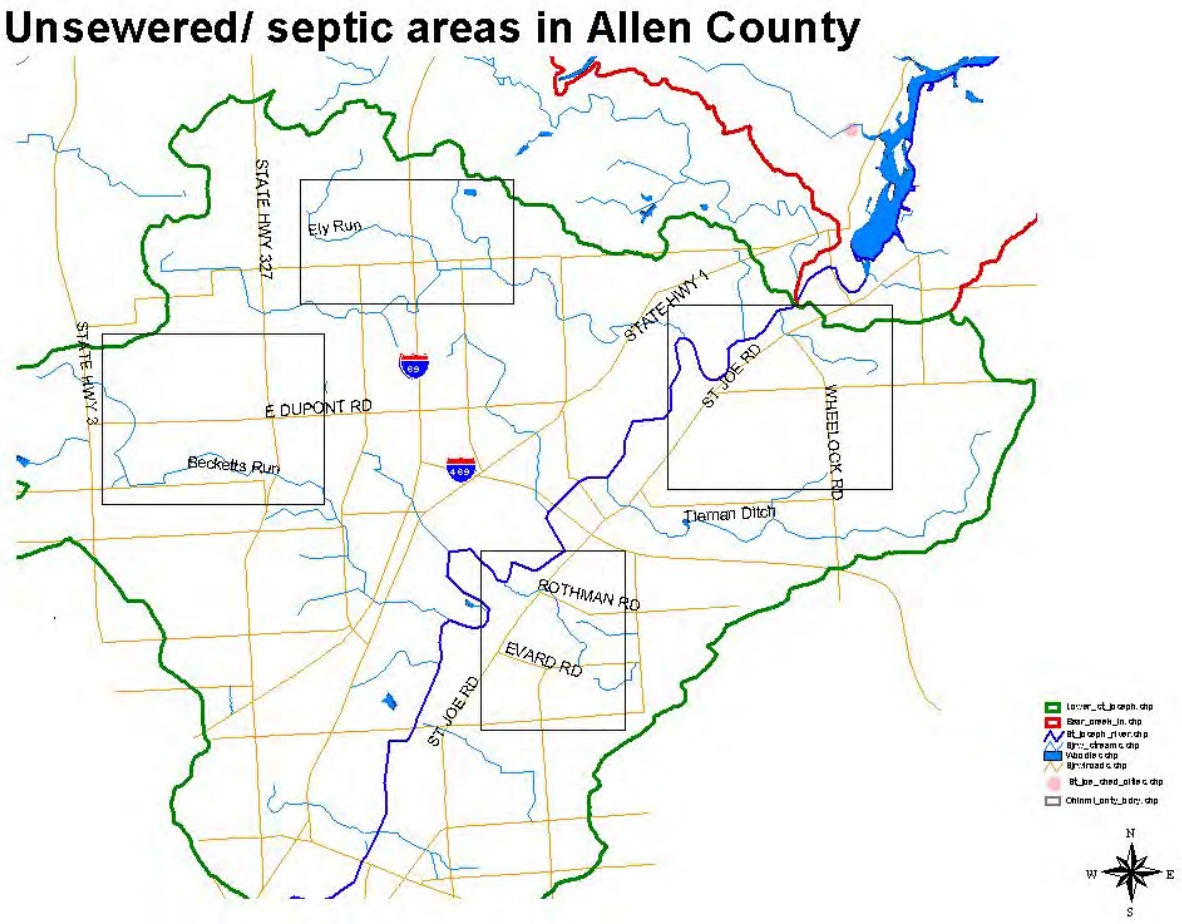

Figure 44 Some of the areas of Fort Wayne and Allen County containing a substantial number of septic systems (SJRWI map)

See also, permitted septic systems map in Appendix H.

5.4 Cedarville Reservoir area, Leo-Cedarville

- Contaminants
  - Bacteria
  - Sediment
  - Phosphorus
  - Algae
- Problems
  - Lack of riparian corridor and contiguous forested cover
  - Loss of reservoir capacity
  - Loss of recreational capacity
  - Loss of wildlife and aquatic diversity, including game fish; fish consumption advisory
  - Increased construction activity
  - Increase in non-pervious surfaces
  - Lack of or diminished public access to reservoir and waterways
  - Nuisance geese

Note on the map in Figure 45, that the lower Cedar Creek, which enters the St. Joseph River between the Lower St. Joseph and Bear Creek sub-watersheds, has extensive forested corridor compared to that on the main stem of the river or the reservoir.

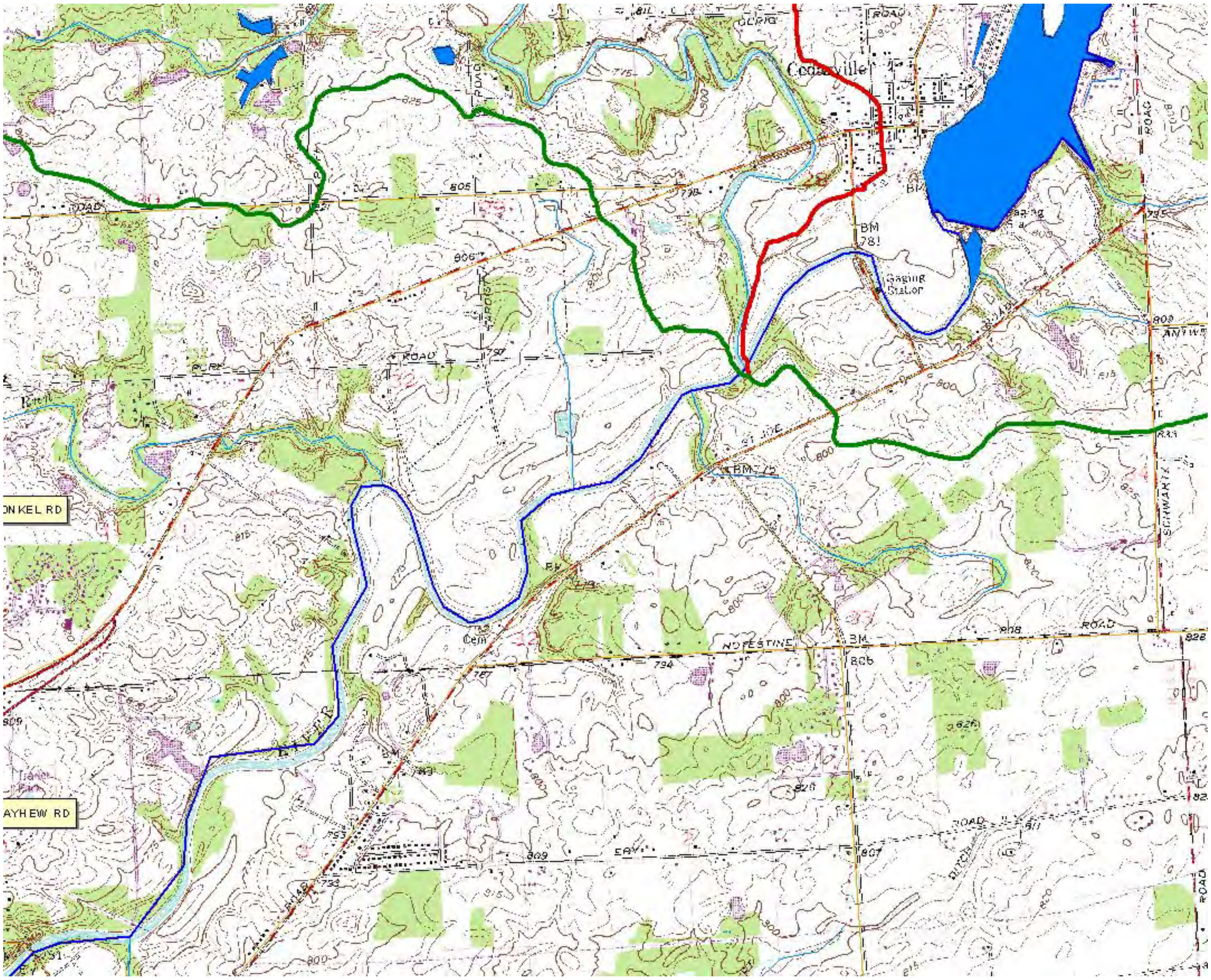

Figure 45 Leo-Cedarville and Cedarville Reservoir area. (SJRWI map)

5.5 Swartz-Carnahan Ditch and watershed

- Contaminants
  - Bacteria
  - Nutrients: Phosphorus and ammonia
  - Sediment
- Problems
  - Loss/degradation of habitat diversity
  - Increased small livestock operations/lack of CNMPs
  - Loss of wetlands
  - Failing septic systems
  - Increased development
  - Increasing impervious surfaces

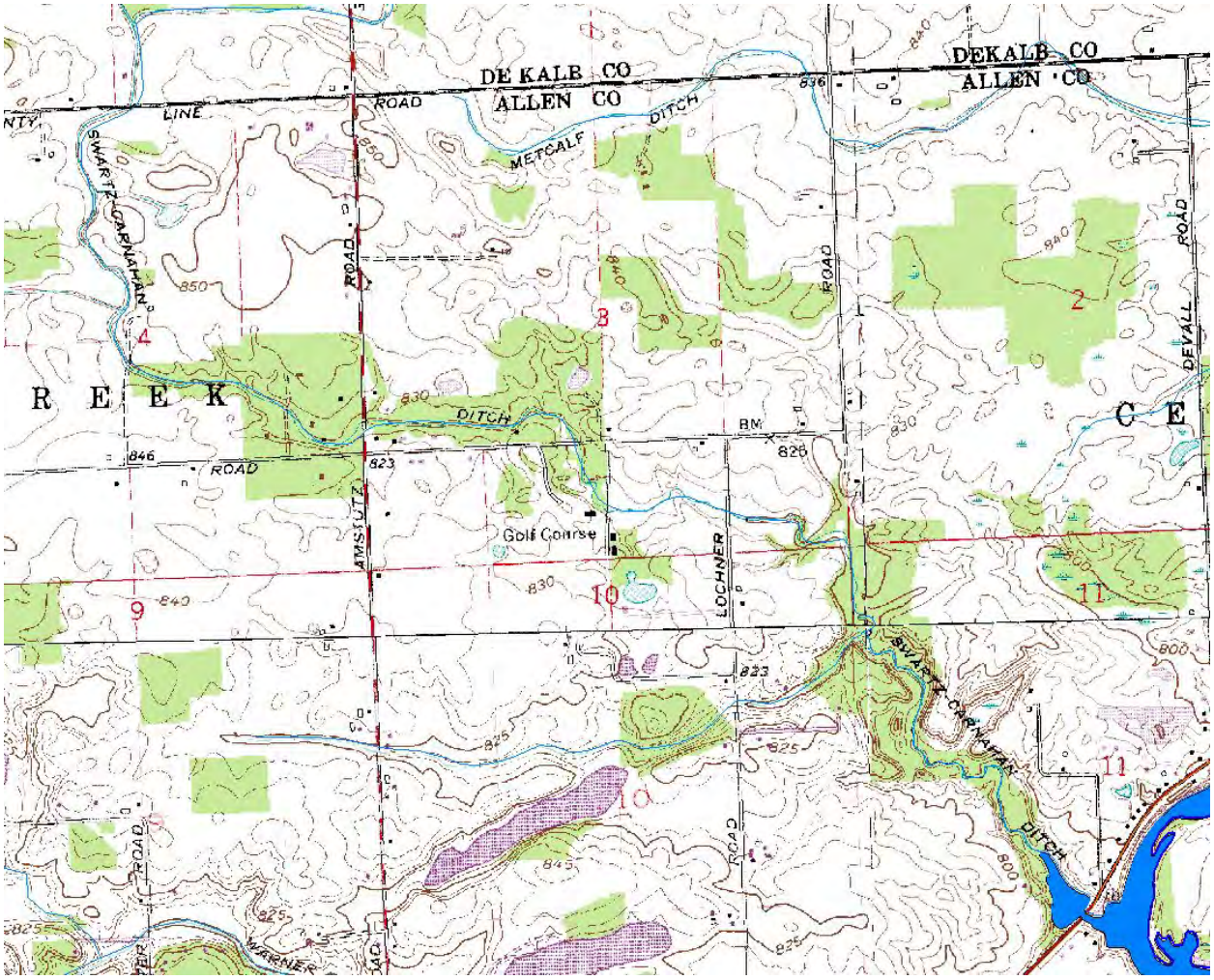

Figure 46 Swartz-Carnahan Ditch and tributaries in Allen and DeKalb counties (SJRWI map)

5.6 Witmer Ditch - Grabill Area

- Contaminants
  - Bacteria
  - Nutrients: Phosphorus and ammonia
  - Sediment
- Problems
  - Loss/degradation of habitat diversity
  - Increased small livestock operations/lack of CNMPs
  - Loss of wetlands
  - Failing septic systems
  - Increased subdivision of farms
  - Increasing impervious surfaces
  - Lack of watershed education in Amish area

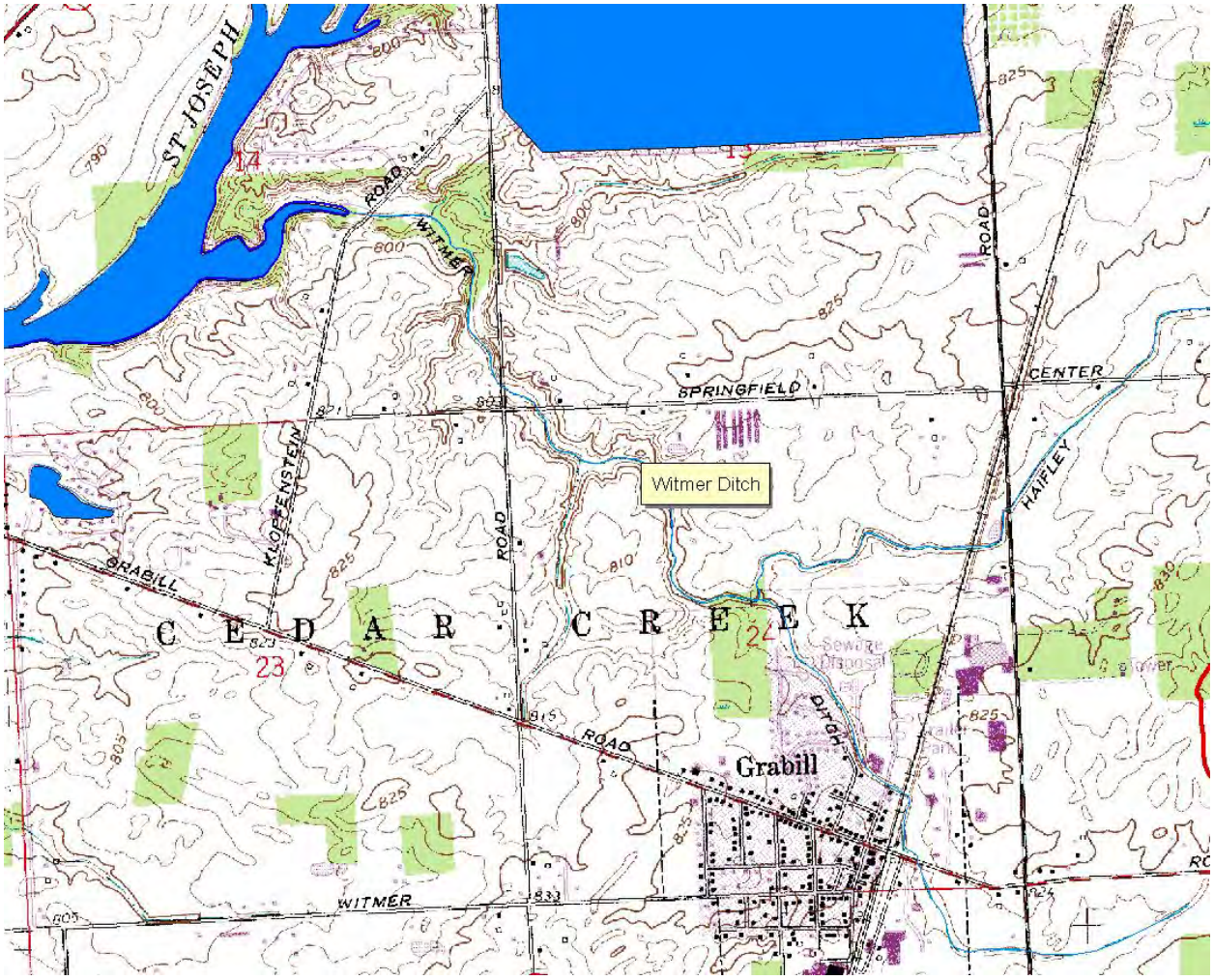

Figure 47 Grabill area and Witmer Ditch and tributaries (SJRWI map)

5.7 Upper Tributaries in the Bear Creek sub-watershed

- Contaminants
  - Bacteria
  - Sediment
  - Pesticides
  - Phosphorus
- Specific Areas of Concern
  - Orangeville (unsewered)
- Problems
  - Failing septic systems/lack of central sewer (Orangeville)
  - Cropping within the river corridor (flood plain and buffer zone)
  - Loss of wildlife and aquatic diversity
  - Lack of contiguous forested corridor and woodlands
  - Loss of wetlands
  - Lack of or diminished public access to rivers and waterways
  - Nuisance geese

Figure 48 Upper Bear Creek agricultural area (SJRWI map)

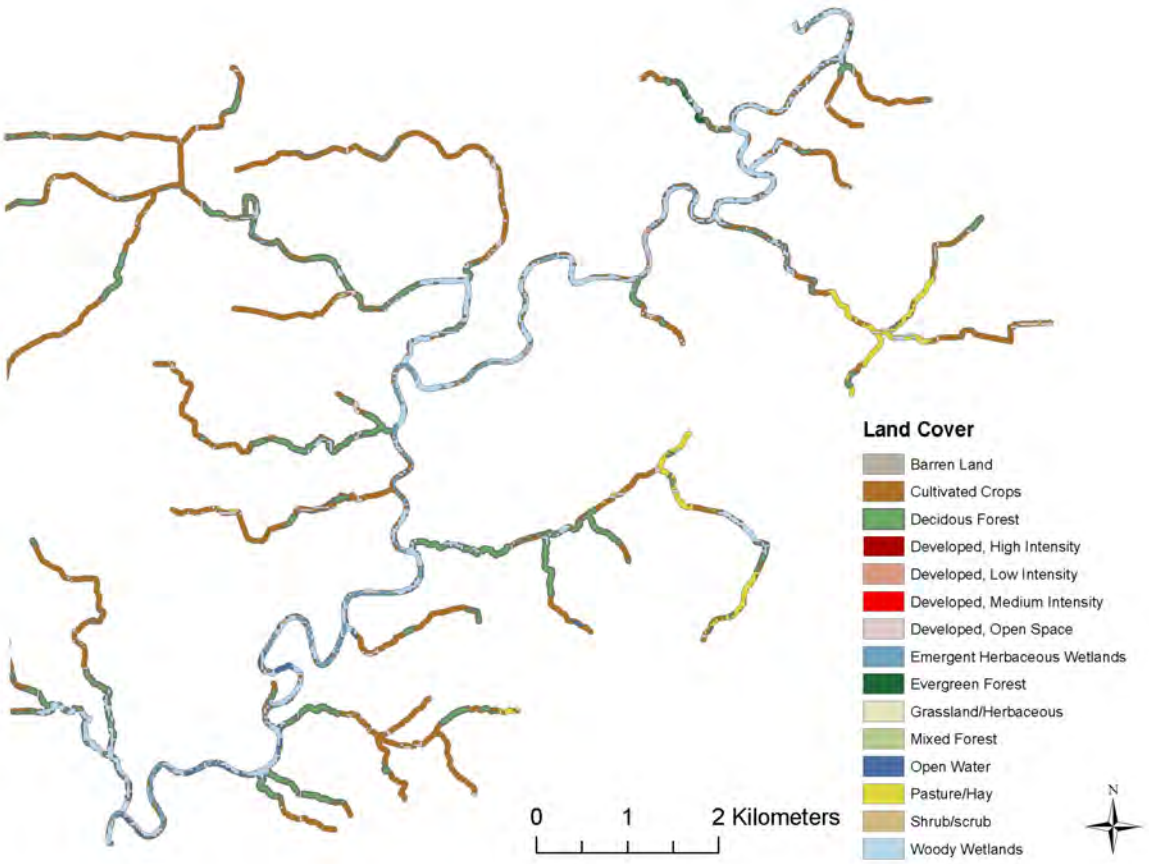

Figure 49 Land use within 30 m buffers in northeast section of Bear Creek sub-watershed (map by S. Gibson, 2007)

The map in Figure 49 illustrates land use within 30 meter buffers either side of the St. Joseph River and its major tributaries in the northeast Bear Creek sub-watershed. Although there are woody wetlands, hayland and deciduous forest within the buffer area, there area also extensive areas of row crops within the buffer area.

Additional buffer mapping and corresponding land use acreage can be found in Appendix M.

5.8 Central (urban) Fort Wayne: Confluence to SR 1

- Contaminants
  - Bacteria
  - Sediment
  - Pesticides
  - Nutrients: Ammonia and Phosphorus
- Problems
  - CSOs
  - Nuisance geese
  - Storm water runoff
  - Loss of wetlands
  - Channelized and altered streams and ditches
  - Loss of contiguous riparian corridor and diverse habitat
  - Loss of wildlife, plant and aquatic diversity
  - Lack of/diminished public access to river
  - Localized flooding

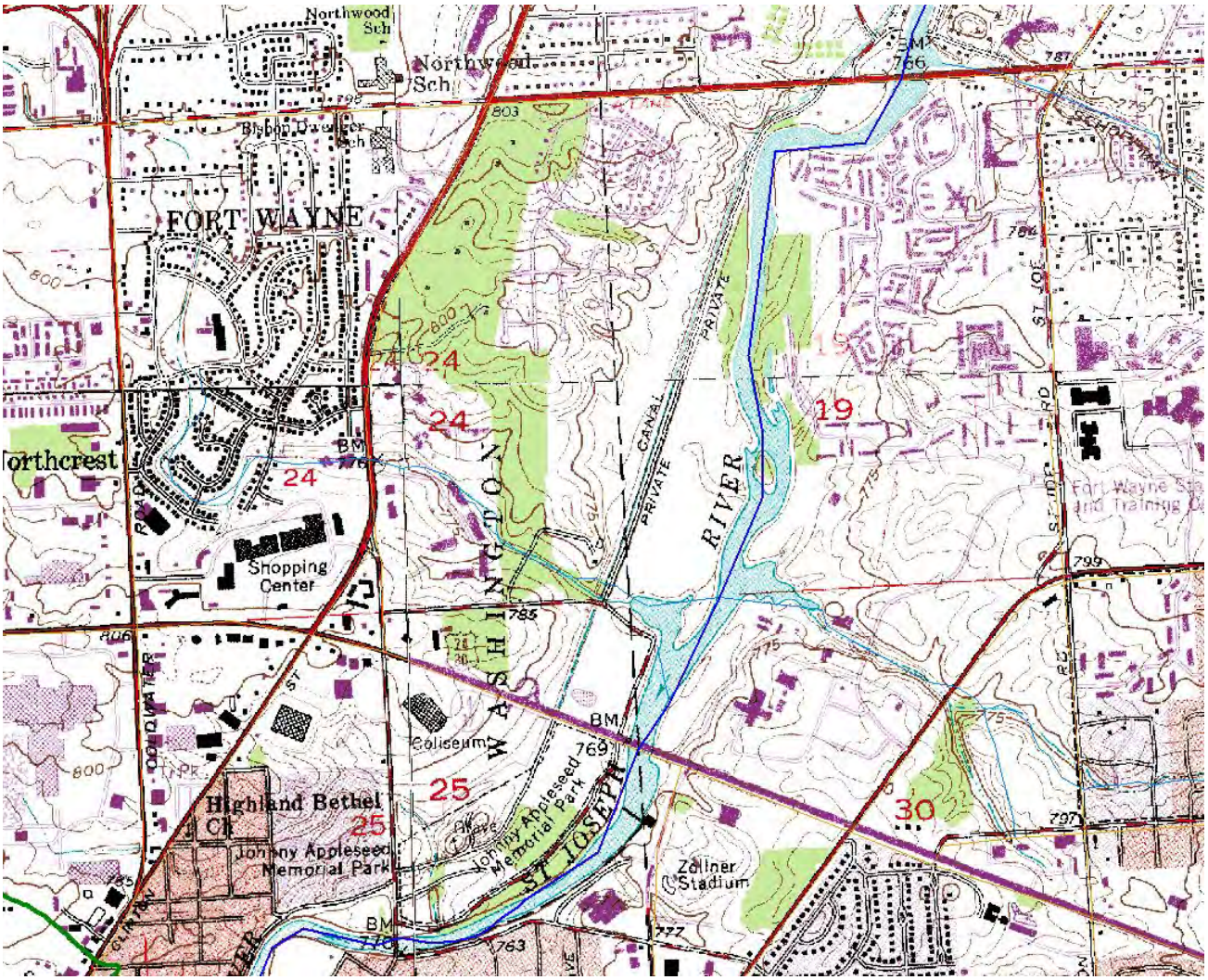

Figure 50 Central Fort Wayne: North Anthony & Coliseum area along St. Joseph River (SJRWI map)

Part 6: Goals and Decisions

In order to address the water quality problems in the critical areas listed in Chapter 5, the following goals and decisions have been formulated. These goals support our vision of making the Lower St. Joseph and Bear Creek sub-watersheds fishable and swimmable by the year 2030, and that the river and its adjacent green space will be accessible to the general public for recreational and educational activities.

Our goals include:

- To reduce bacterial contamination in the watershed so that the River meets full body contact standard on at least 75% of weekly sampling dates.
- To reduce sediment by 50% from urban and suburban lawns and gardens, construction sites, and agricultural operations
- To reduce pesticides in the river to maintain Atrazine at <12 ppm in all tributaries and <3 ppm at the Fort Wayne water intake (St. Joseph River Dam), and similar reductions for other common pesticides.
- To reduce phosphorus entering the river by 50% so that phosphorus levels do not exceed WQ target of 0.3 mg/L in order to reduce algal blooms from the reservoirs, lakes, streams and river.
- To increase wildlife and aquatic habitat diversity through improvement of water quality and protection of flood plains and riparian corridor
- To improve functionality and access to greenways and public access points to river and streams

6.1 Goal 1: To reduce bacterial contamination in the watershed so that the River meets full body contact standards on at least 75% of weekly sampling dates by 2020.

Objectives	Indicators	Action Items
1. Increase the public awareness of problems of bacterial contaminatin of the river	Brochures, PSAs, videos, and other outreach efforts produced to education about proper septic system placement and maintenance Number of failed onsite septic systems replaced, repaired or moved to central sewage treatment WQ monitoring: E. coli and nutrient loads Number of CSOs removed or loads reduced from the St. Joseph River CNMP plans created Number of producers adopting rotational grazing practices and fencing livestock from streams Landowners adopting alternative landscaping practices	1. Mount a public outreach campaign to educate homeowners, developers and public officials about proper placement and maintenance of their septic systems and alternatives to onsite septic systems 2. Partners with municipalities to educate stakeholders about the impact of CSOs and secure their removal from or reduce their impact on the river. 3. Educate stakeholders about the impact of pet and domestic animal wastes on water quality and increase efforts to clean up after pets 4. Promote rotational grazing and CNMPs for confined animal operations 5. Obtain funding to cost-share BMPs for waste handling and nutrient management plans for livestock operations 6. Support efforts by DNR and others to control nuisance wildlife, i.e. geese 7. Obtain funding to support efforts to encourage landscaping to deter nuisance geese 8. Evaluate use of native plant installation on septic system distribution fields and if useful, promote adoption
2. Replace and or remove failing septic systems from the watershed		
3. Reduce the number and/or impact of the Combined Sewer Overflows (CSO)		
4. Insure pet waste and equine, poultry and livestock waste is handled properly to prevent contamination of the river and its tributaries		
5. Reduce populations and the contamination impact of nuisance wildlife in the watershed		

6.2 Goal 2: To reduce sediment by 50% from urban and suburban lawns and gardens, construction sites, and agricultural operations

Objectives	Indicators	Action Steps
1. Increase use of low impact development in the watershed 2. Improve the diversity and viability of native species 3. Improve compliance with storm water rules and erosion controls in the watershed 4. Increase the adoption of conservation tillage methods, perennial crops and cover crops 5. Increase buffers by 75% along the river and open bodies of water 6. Increase wetlands throughout the watershed	GIS maps of new commercial and housing development in the watershed GIS maps of conservation practices installed Tillage transects – number of acres in conservation tillage Water quality monitoring: turbidity measurements QHEI/CQHEI Number of acres of wetlands, buffers and grassed waterways installed Number/acres of rain gardens and bioswales installed	1. Educate the public and municipal officials about the negative effects of sediment and erosion on water quality and encourage compliance with erosion control requirements 2. Support low impact development through educational forums and demonstration sites 3. Secure funding for cost-share of appropriate BMPs aimed at sediment reduction, such as conservation tillage, installation of buffers, grassed waterways, and wetlands, reforestation, and erosion control 4. Publicize the results of tillage transects 5. Support installation of rain gardens and bioswales through education, demonstration sites, and cost-sharing.

6.3 Goal 3: To reduce pesticides in the river to maintain Atrazine at <12 ppm in all tributaries and <3 ppm at the Fort Wayne water intake (St. Joseph River Dam), and similar reductions for other common pesticides.

Objectives	Indicators	Action Steps
1. Insure that the city of Fort Wayne is not required to treat drinking water for pesticide contamination	Water Quality Monitoring: Reduced pesticide levels at Fort Wayne Filtration Plant water intake WQ monitoring: pesticide levels upstream in Bear Creek and at Mayhew Road Bridge. QHEI/ CQHEI GIS mapping: acres of buffers along waterways and water bodies Number of homeowners, parks, golf courses pledging to reduce/adjust pesticide applications on their land	1. Educate stakeholders about the impact and danger of pesticides on water quality of the river. 2. Educate/demonstrate the proper application, handling and disposal of pesticides 3. Obtain funding for cost-sharing agricultural BMPs, such as variable rate sprayers, filtered drainage and tile risers, and GPS-guidance to reduce contamination by pesticides 4. Monitor water quality for improvements in pesticide levels, biological diversity and habitat 5. Work with agricultural producers and urban homeowners and lawn care companies to use more environmentally friendly pesticides 6. Create "pledge" for lawn care companies to encourage proper notification to homeowners, proper type, amount, application and storage of pesticides; and publicize list of companies which take the pledge for cleaner water.
2. Improve the diversity and viability of aquatic plant and animal populations		
3. Increase buffering capability of flood plains and riverine corridors		
4. Reduce pesticide contamination from storage areas, container disposal and equipment rinsing		
5. Reduce the amount of pesticides applied to urban lawns, parks and recreational areas		

6.4 Goal 4: To reduce phosphorus entering the river by 50% so that phosphorus levels do not exceed WQ target of 0.3 mg/L in order to reduce algal blooms from the reservoirs, lakes, streams and river.

Objectives	Indicators	Action Items
1. Reduce the number and intensity of algal blooms in the Cedarville and St. Joseph Reservoirs 2. Increase the buffering capability of the flood plain and the river/stream corridors 3. Decrease the number of failing septic systems in the watershed 4. Decrease the amount of nutrients entering the stream from urban and agricultural land 5. Decrease the impact of nuisance geese in the watershed	WQ Monitoring: levels of phosphorus and ammonia, DO Biological monitoring: number and location of algal blooms in the major streams and reservoirs Number of acres of wetlands installed Number and location of failing septic systems replaced/repaired Number of homeowners, lawn care companies, parks, golf courses pledging to reduce/adjust fertilizer applications on their land Number of parks, homeowners and commercial/public landowners that adopt landscaping and other practices to reduce the population of nuisance geese in the watershed.	1. Educate farmers, homeowners and lawn contractors about the impact of nutrient runoff on water quality and aquatic organisms 2. Obtain funding to cost-share BMPs to reduce nutrient load such as wetland installation/restoration, buffers and filter strips, replacement of failing septic systems, fencing. 3. Promote rotational grazing and use of CNMPs for confined animal operations 4. Encourage adoption of new technology for nutrient stabilization for agricultural crops and urban turf areas. 5. Create “pledge” for lawn care companies to encourage proper notification to homeowners, proper type, amount, application and storage of fertilizers; and publicize list of companies which take the pledge for cleaner water. 6. Educate pet owners and small livestock owners about the impact of animal waste on water quality. 7. Obtain cost-share support for and demonstrate environmentally friendly landscaping that deters nuisance geese 8. Encourage homeowners and restaurants to us non-phosphate detergents for their dishwashers

6.5 Goal 5: To improve the functionality, access and use of greenways and public access points along the river and streams in the watershed.

Objectives	Indicators	Action Items
1. Increase the public awareness of current access points to the river and reservoirs	Number of access points/ number of cars at trailheads or access points Lack of visible erosion at access points Number of users and types of users of the access points and greenway trails Signage along the greenways Monitor types and quality of recreational activities Number of stakeholders participating in stream/access point clean-ups and restorations; number and location of clean-ups annually	1. Work with state, municipal and community organizations and private landowners to create maps of current access points and improve flow of information about use of these sites 2. Secure funding to help restore/improve public access sites with signage, access, parking, amenities and cleanliness, reduce impact of erosion and of land/water traffic 3. Support municipal and other community efforts to improve, expand and promote greenways along the river and its tributaries 4. Sponsor/support river and stream clean-up activities 5. Support activities along the river that encourage water-based recreational opportunities such as canoeing, boating and fishing, as well as non-water activities such as birding, bicycling and wildlife education programs
2. Improve the accessibility of access points to accommodate all stakeholders		
3. Increase the public use of the river and its greenways for recreational activities and aesthetic enjoyment		
4. Reduce trash and litter and dumping activities in and around the river and its tributaries		
5. Support public improvement projects located adjacent to or near the river and tributaries that are designed to improve water quality as well as support conservation and enjoyment of local water resources		

6.6 Goal 6: To improve river corridor and aquatic habitat in order to protect aquatic and wildlife species and improve species diversity in the watershed

Objectives	Indicators	Action Steps
1. Protect the flood plain from construction and row crops	Number of species, plant and animal, land and aquatic, in the watershed	1. Promote agricultural practices in the flood plains that minimize the impact to aquatic habitat
2. Increase net wetland area, particularly adjacent to river and streams	QHEI / CQHEI scores	2. Work with drainage boards and surveyors to improve methods used for maintenance of legal drains
3. Increase forest cover and contiguous forested corridor	Water quality monitoring: Dissolved oxygen, turbidity, pesticide and nutrient measurements	3. Educate landowners and river users about the value of floodplains, wetlands and contiguous wildlife corridors and the impact of human activity such as farming and construction on the floodplains.
	Cropland in the floodplain taken out of production	4. Obtain funding to cost-share appropriate BMPs such as reforestation, wetland restoration, bank stabilization in the river and its corridors
	Number of acres restored to wetlands	5. Organize landowners and other groups to adopt local streams for clean up activities
	Number of acres reforested	6. Increase efforts to manage/eradicate invasive species
	Number of miles of stream bank stabilized	7. Monitor improvement in water quality, biological diversity and habitat
	Number of linear miles of contiguous habitat corridor	

Part 7: Pollutant Loads and Reductions

7.1 Discharge Data

Based on discharge data for the St. Joseph River acquired from the USGS, we have calculated that the Lower St. Joseph and Bear Creek watershed contribute an average total of 16.4 % of the discharge recorded at the USGS gauging station on the lower reaches of the St. Joseph River at Fort Wayne based on SJRWI sampling dates.

This percentage was calculated from the total flow data at Fort Wayne, less the contribution of the upper St. Joseph River as recorded at the USGS gauge in Newville, Indiana and the contribution of the Cedar Creek tributary system as recorded at the USGS gauge near Cedarville, Indiana. In order to obtain a long-term average based on varying wet and dry years, flow in the Bear Creek and Lower St. Joseph was calculated from flow data recorded on the SJRWI sampling dates over six years, April, 2001 through September, 2006. Average daily percentage of flow ranged from a low of 7.5% in 2002 to a high of 22.5% in 2003. (See Appendix D for complete flow calculation tables.)

Samples from the City of Fort Wayne had different sampling dates. Calculations using sampling data provided by the City were performed using flow data and percentages based on the flow from the appropriate sampling dates, so averages vary somewhat from the calculations used for the SJRWI data.

7.2 Pollutant Load Calculations

Pollutant loads were calculated using the Region V Load Calculation Tool available at the IDEM website.

7.2.1 E. coli

Load, target and reduction calculations for E. coli have been performed using data from both the Tennessee Street site (City of Fort Wayne) and the Bear Creek site (Site 128, SJRWI). Flow calculation in each case was based on the average daily flow on the sampling dates, which differed between the two sets of data.

Year	Avg annual E. coli (cfu/100 mL) recorded at the **Tennessee St. Bridge**	Average annual flow (cfs) of LSJ-BC sub-watersheds based on City sampling dates	Current Load cfu/day	Current load cfu/year	Target cfu/day	Target Load cfu/year	Reduction needed cfu/yr	% Reduction needed
2003	145	208.71	9.95 E+11	3.63 E+14	1.61 E+12	5.89 E+14	(2.25 E+14)	(62.1%)
2004	1807	201.16	8.89 E+12	3.24 E+15	1.16 E+12	4.22 E+14	2.82 E+15	87.0%
2005	388	34.8	3.30 E+11	1.21 E+14	2.00 E+11	7.30 E+13	4.75 E+13	39.4%
2006	397	112.11	1.09 E+12	3.97 E+14	6.44 E+11	2.35 E+14	1.62 E+14	40.8%

Table 22 E. coli loads, targets and reduction based on annual average of samples from the Tennessee Street site 2003-2006

Year	Avg annual E. coli (cfu/100 mL) recorded at the **Bear Creek (Site 128)**	Average annual flow (cfs) of LSJ-BC sub-watersheds based on SJRWI sampling dates	Current Load cfu/day	Current load cfu/year	Target cfu/day	Target Load cfu/year	Reduction needed cfu/yr	% Reduction needed
2003	1193.2	279.89	8.17E+12	2.98E+15	1.61 E+12	5.87 E+14	2.39 E+15	80.3%
2004	805.36	173.59	3.42 E+12	1.25 E+15	9.97 E+11	3.64 E+14	8.84 E+14	70.8%
2005	542.5	34.49	4.58 E+11	1.67 E+14	1.78 E+11	7.23 E+13	9.47 E+13	56.7%
2006	1266.67	114.65	3.55 E+12	1.30 E+15	6.59 E+11	2.40 E+14	1.06 E+15	81.4%

Table 23 E. coli loads, targets and reduction based on annual average samples from the Bear Creek (Site 128)

7.2.2 Phosphorus

Phosphorus load calculations were performed using City of Fort Wayne phosphorus data taken at the Tennessee Bridge, the lowest point on the river. Flow data was calculated based on the average flow contributed by the Lower St. Joseph and Bear Creek sub-watersheds based on flow data from the City's sampling dates. The target set for P in these sub-watersheds is 0.3 mg/L. The watersheds exceeded the targets in 2003 and 2006.

Year	Avg annual P (mg/L)	Average annual flow (cfs) of LSJ-BC sub-watersheds based on City sampling dates	Current Load lb/day	Current load tons/year	Target Load lb/day	Target Load tons/yr	Reduction needed tons/yr	% Reduction needed
2003	1.93	280.7	2920.30	532.95	453.93	82.84	450.11	84.5%
2004	0.15	201.16	162.65	29.68	325.30	59.37	(29.68)	(100%)
2005	0.10	34.9	18.81	3.43	56.44	10.30	(6.87)	(200.0%)
2006	0.06	112.1	362.56	66.17	181.28	33.08	33.08	50%

Table 24 Phosphorus loads, targets and reduction based on annual average samples from Tennessee Street 2003-2006

7.2.2 Ammonia

Ammonia load calculations were performed using City of Fort Wayne phosphorus data taken at the Tennessee Bridge, the lowest point on the river. Flow data was calculated based on the average flow contributed by the Lower St. Joseph and Bear Creek sub-watersheds based on flow data from the City's sampling dates. The target set for NH3-N in these sub-watersheds is 1.0 mg/L. The watershed has not exceeded the target loading during the past four recreational seasons.

Year	Avg annual NH3-N (mg/L)	Average annual flow (cfs) of LSJ-BC sub-watersheds based on City sampling dates	Current Load lb/day	Current load tons/year	Target Load lb/day	Target Load tons/yr	Reduction needed tons/yr	% Reduction needed
2003	0.066	280.7	99.87	18.23	1513.11	276.14	(257.92)	(1415.2%)
2004	0.059	201.16	639.77	116.76	1084.35	197.89	(81.14)	(69.5%)
2005	0.081	34.9	152.38	27.81	188.13	34.33	(6.52)	(23.5%)
2006	0.18	112.1	108.77	19.85	604.27	110.28	(90.43)	(455.6%)

Table 25 Ammonia (NH3-N) loads, targets and reduction based on annual average samples from the Tennessee Street site 2003-2006

7.2.3 Turbidity and Total Suspended Solids

Target loading for total suspended solids (TSS) were calculated using City of Fort Wayne TSS data taken at the Tennessee Bridge, the lowest point on the river. Flow data was calculated based on the average flow contributed by the Lower St. Joseph and Bear Creek sub-watersheds based on flow data from the City's sampling dates. The target set for TSS in these sub-watersheds is 80 mg/L. The watershed has not exceeded the target loading during the past four recreational seasons. Table 26 is based on samples from the Tennessee Street site.

Year	Avg annual TSS (mg/L) at Tennessee Street Bridge	Average annual flow (cfs) of LSJ-BC sub-watersheds based on City sampling dates	Current Load lb/day	Current load tons/year	Target Load lb/day	Target Load tons/yr	Reduction needed tons/yr	% Reduction needed
2003	56	280.7	84,733.97	15,463.95	121,048.36	22,091.36	(6,627.41)	(42.9%)
2004	56	201.16	60,723.50	11,082.04	86,47.86	15,831.48	(4749.45)	(42.9%)
2005	19	34.9	3574.42	652.33	15,050.21	2746.66	(2094.33)	(321.1%)
2006	34	112.1	20,545.26	3749.51	48,341.79	8822.38	(5072.87)	(135.3%)

Table 26 TSS loads, targets and reduction based on annual average samples from the Tennessee Street site 2003-2006

Based on the majority agricultural land use in the Bear Creek sub-watersheds, TSS targets were also calculated using TSS data from the Mayhew Bridge site. Flow calculations remained the same, using a percentage of the USGS gauging station at Fort Wayne based on the percentage contribution by the two sub-watersheds on City sampling dates. Using these data, the watershed has not exceeded the target loading during the past four recreational seasons. See Table 27.

Year	Avg annual TSS (mg/L) at Mayhew Road Bridge	Average annual flow (cfs) of LSJ-BC sub-watersheds based on City sampling dates	Current Load lb/day	Current load tons/year	Target Load lb/day	Target Load tons/yr	Reduction needed tons/yr	% Reduction needed
2003	72	280.7	108,943.68	19,882.22	121,049.53	22,091.36	(2,209.14)	(11.1%)
2004	57	201.16	61,807.85	11,279.93	86,747.86	15,831.48	(4,451.55)	(40.4%)
2005	34	34.9	6396.34	1167.33	15,050.21	2746.66	(1579.33)	(135.3%)
2006	49	112.1	29,609.35	5403.71	48,341.79	8822.38	(3418.67)	(63.6%)

Table 27 TSS loads, targets and reduction based on annual average samples from the Mayhew Road site 2003-2006

7.2.4 Pesticides

Loads and targets for pesticides were calculated using selected Atrazine data from the Bear Creek sub-watershed (Site 128) using the EPA Region V Load Calculation Tool. Since the pesticide problems in the watershed appear mainly during the spring season, sample data from the first 12 weeks of the sampling season (April 1 through June 30) were selected for these calculations. Flow data used was based on the average contribution of the Lower St. Joseph and Bear Creek sub-watersheds on the selected SJRWI sampling dates.

Year	Avg annual Atrazine in ppm (ppb x 1000) at Site 128 Bear Creek during peak application dates April 1 - June 30	Average flow (cfs) of LSJ-BC sub-watersheds based on average of SJRWI sampling dates	Current Load lb/day	Current load tons/year	Target Load lb/day	Target Load tons/yr	Reduction needed tons/yr	% Reduction needed
2003	1409.23	309.37	2,350,104.69	428,894.11	5,0002,954.86	913,039.26	(484,145.16)	(112.9%)
2004	23,830	330.8	42,42,929.75	7,754,959.68	5,349,508.57	976,285.31	6,778,674.37	87.4%
2005	1013.3	50.237	274,430.1	50,078.55	812.404.06	148,263.74	(98,185.19)	(196.1%)
2006	2620.91	144.56	2,042,336.88	372,726.48	2,337,741.71	426.637.86	(53,911.38)	(14.5%)

Table 28 Atrazine loads, targets and reduction based on average samples during prime application dates in the Bear Creek sub-watershed 2003-2006

Pesticide loads recorded at the Three Rivers Water Filtration Plant, which dictates the use of powdered activated carbon to reduce levels of Atrazine when the drinking water standard of 3 ppb is exceeded, is an accumulation of all the water in the St. Joseph River. Based on the calculations in Table 28, pesticide average loads, even in the peak application months, did not exceed the 3 ppb target level during 3 of the 4 years 2003-2006 for the Bear Creek sub-watershed. This may indicate that a significant portion of the pesticide load recorded at the water filtration plant is either entering the river from the Cedar Creek, which is the largest tributary of the St. Joseph and enters the river downstream of the Bear Creek sampling site. Complete load calculations for pesticides in the Bear Creek watershed can be found in Appendix I.

Part 8: Implementation

8.1 Timeline for Implementation

Since outreach education and BMP installation are ongoing throughout the larger St. Joseph River watershed, implementation of this plan has already begun on a limited basis. Programs currently available in this watershed include an SJRWI cost-share program for conservation tillage (available through ARN A305-6-108 through March, 2009), and a cost-share program for reforestation and wetlands offered through the St. Joseph River Watershed Initiative with grant support from the USFWS Private Stewardship Grants Program to support wildlife and habitat diversity (available through December, 2008). Additionally, the SJRWI is committed to outreach education through its mission to improve the quality of the St. Joseph River and continues to disseminate watershed information to community groups and organizations.

Additional work is being done to implement our educational and information goals through the outreach efforts of the Allen County Partnership for Water Quality (ACPWQ) which is a partnership created by Fort Wayne, Allen County and New Haven to implement the storm water requirements of Rule 13.

Our top impairment and thus our top priority continues to be impairment by bacteria. A close second is conservation of the river corridor and flood plain.

8.2 Funding

We would expect to apply for Section 319 funding to work on Phase I of the implementation of this grant, focusing on goals achievable by 2020, during the 2008 funding cycle. That would delay the start of work supported by that funding until 2009. It is likely that the SJRWI will lead this effort, with cooperation from its many partners within the St. Joseph River watershed and the City of Fort Wayne. The stakeholder group

which has worked on this plan for the past three years will be reformed to create a steering committee to work on the implementation effort. The implementation effort will likely be led by the SJRWI. In addition to funding to support BMP installation, we would expect at least one full-time staff person would be required to lead the implementation effort for a minimum of two to three years.

8.3 Technical Assistance

Technical assistance and stakeholder support required for implementation will include the following agencies, institutions, organizations and persons:

- Soil and Water Conservation Districts of Allen and DeKalb counties
- NRCS of Allen and DeKalb counties
- City of Fort Wayne, water utilities department
- Health departments of Allen and DeKalb counties
- Surveyors of Allen and DeKalb counties
- The Nature Conservancy with its funding from the Joyce Foundation
- Pheasants Forever
- Ducks Unlimited
- Allen County Parks Department
- Fort Wayne Parks Department
- Indiana University-Purdue University Fort Wayne
- North Anthony Corridor Improvement Association
- Downtown Improvement District
- Northside Neighborhood Association
- Dan Wire
- Allen County Regional Sewer District
- PBS- WFWA
- Northeast Indiana Greenbuild Coalition
- Young Leaders of Northeast Indiana (YLNI)

8.4 Milestones and Measurements

Milestones for our goals are included in Chapter 6.

Water quality monitoring by the City of Fort Wayne at its Mayhew Road and Tennessee Street locations is expected to continue. Additionally, since the SJRWI is committed to continuing its work in the watershed, we expect that our weekly water quality sampling program will continue in this watershed and will help us to monitor progress throughout the implementation phase.

The SJRWI is currently working with IDEM and Tetra Tech (ARN A305-7-170) to create a web-accessible database system that will put the water quality data collected by the SJRWI and the City of Fort Wayne online, making it much more readily available to researchers and to the general public. With easy access to this historical data, it will be possible to track progress over time to measure our impact on each of the pollutants of concern.

Additionally, with support from this current planning grant, the SJRWI has established a Hoosier Riverwatch citizen volunteer monitoring program that has trained many volunteers, some of whom will remain active in the watershed. They will also help with measuring results through chemical, biological and habitat evaluation. We expect the training to continue as we have two trained volunteers trainers available in the watershed.

Also as a part of this planning effort, the SJRWI is attempting to organize a group of river users – boaters, canoeists and landowners – who wish to be actively involved in river and stream clean-up and general groundtruthing specialists.

8.5 Updating the WMP

The Lower St. Joseph – Bear Creek Watershed Management Plan is a living document that should be revisited and revised at least every five years in order to measure progress and maintain focus on our goals. As it is a part of the mission of the SJRWI to continue work with stakeholders across the watershed, the organization will be expected to lead this evaluation and revision effort.