

Chapter 5

LOWER TYLER CREEK SUBWATERSHED

This section presents a summary of the characteristics of the Lower Tyler Creek Subwatershed, as well as specific issues and challenges in this subwatershed that must be addressed in the TCWP

5.1.1 Subwatershed Location

Lower Tyler Creek is the subwatershed located furthest downstream, in the eastern portion of the Tyler Creek Watershed. This subwatershed has an area of 5,008 acres, or 7.8 square miles. The boundary of the Lower Tyler Creek subwatershed shown in Figure 5.1. The subwatershed is located within parts of Elgin, Dundee and Rutland Townships, and is roughly bordered by Interstate 90 on the north, Highland Avenue to the south, State Route 31 to the east, and both Coombs and Tyrell Road to the west.

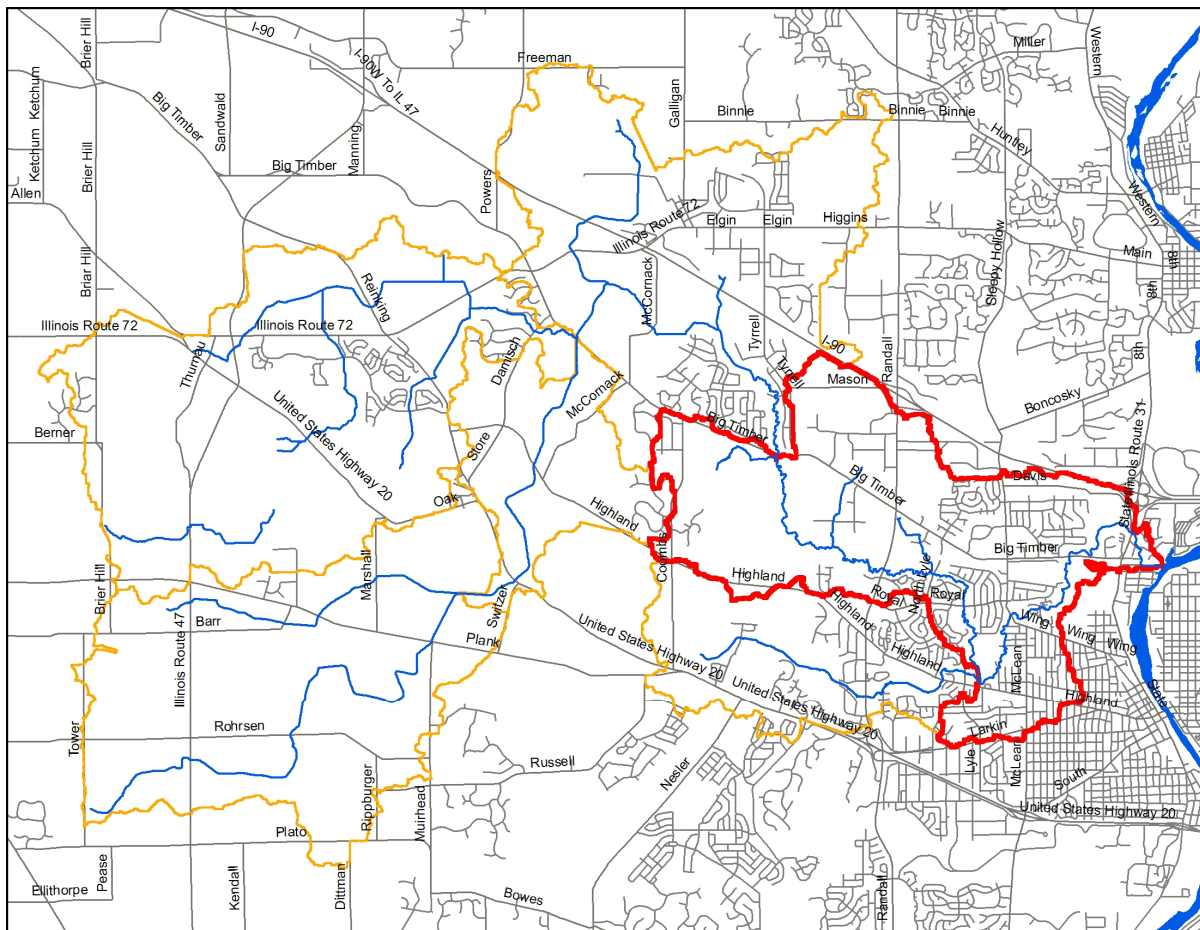


Figure 5.1. Subwatersheds in the Tyler Creek Watershed

5.1.2 Topography & Geology

The topography of the Lower Tyler subwatershed is gently sloping, generally between 0% and 2%, with a maximum elevation of 950 feet and a minimum elevation of 710 feet where Tyler Creek joins the Fox River.

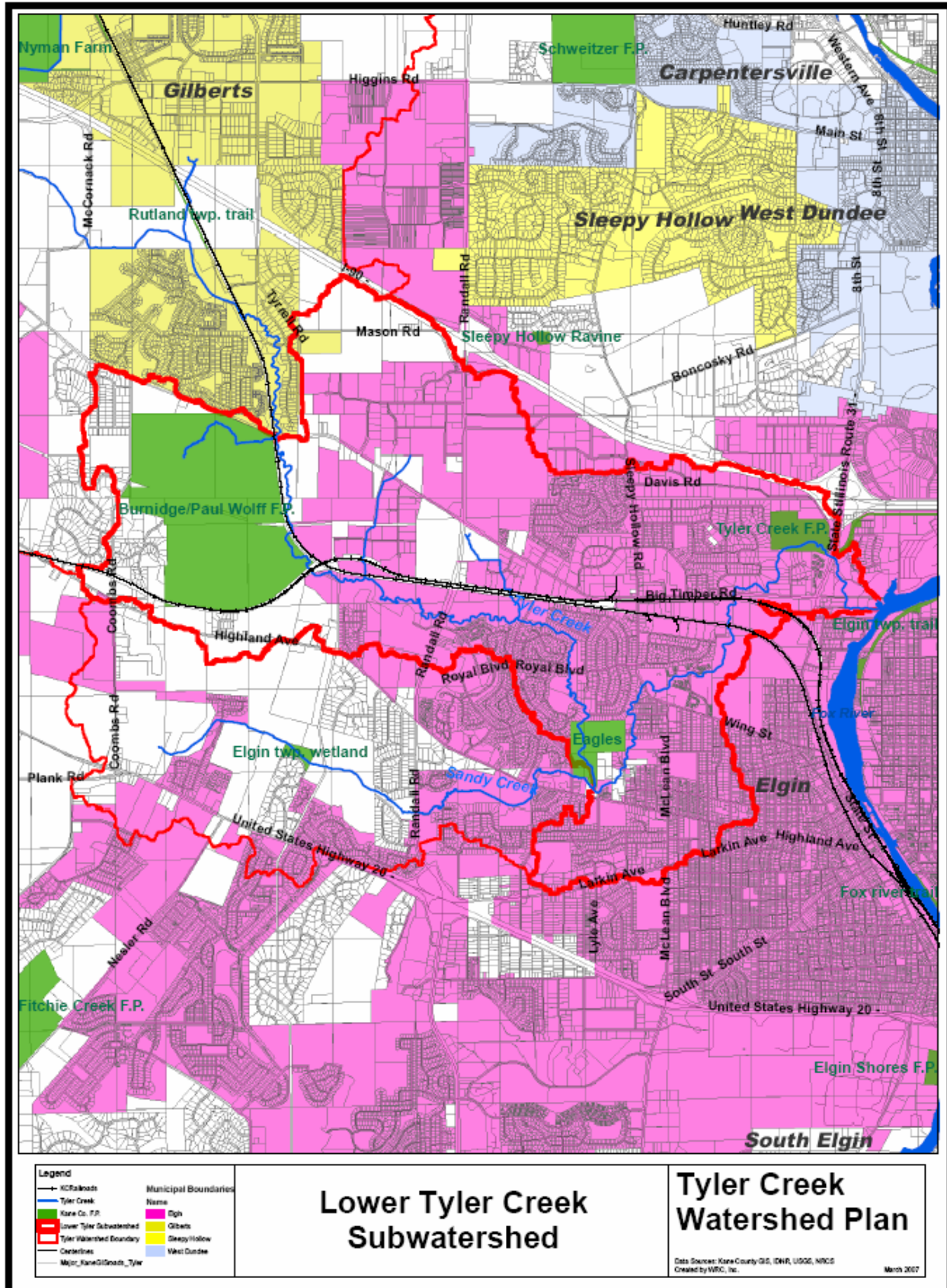


Figure 5.2. Subwatershed Map

5.1.3 Soil Conditions

The glacial advances result in a wide variety of soil map units. The soils in the subwatershed consist of mainly silt loams soil units on 0% - 2% slopes. Each major grouping of soil map units have potential impact on current and future land uses within the subwatershed. For example, hydric (wetland) soils constitute 1,131 acres, or 22.6% of the 5,008 acre subwatershed, and indicate those areas that contain functional wetlands, or former / degraded wetland areas that could be restored or enhanced.

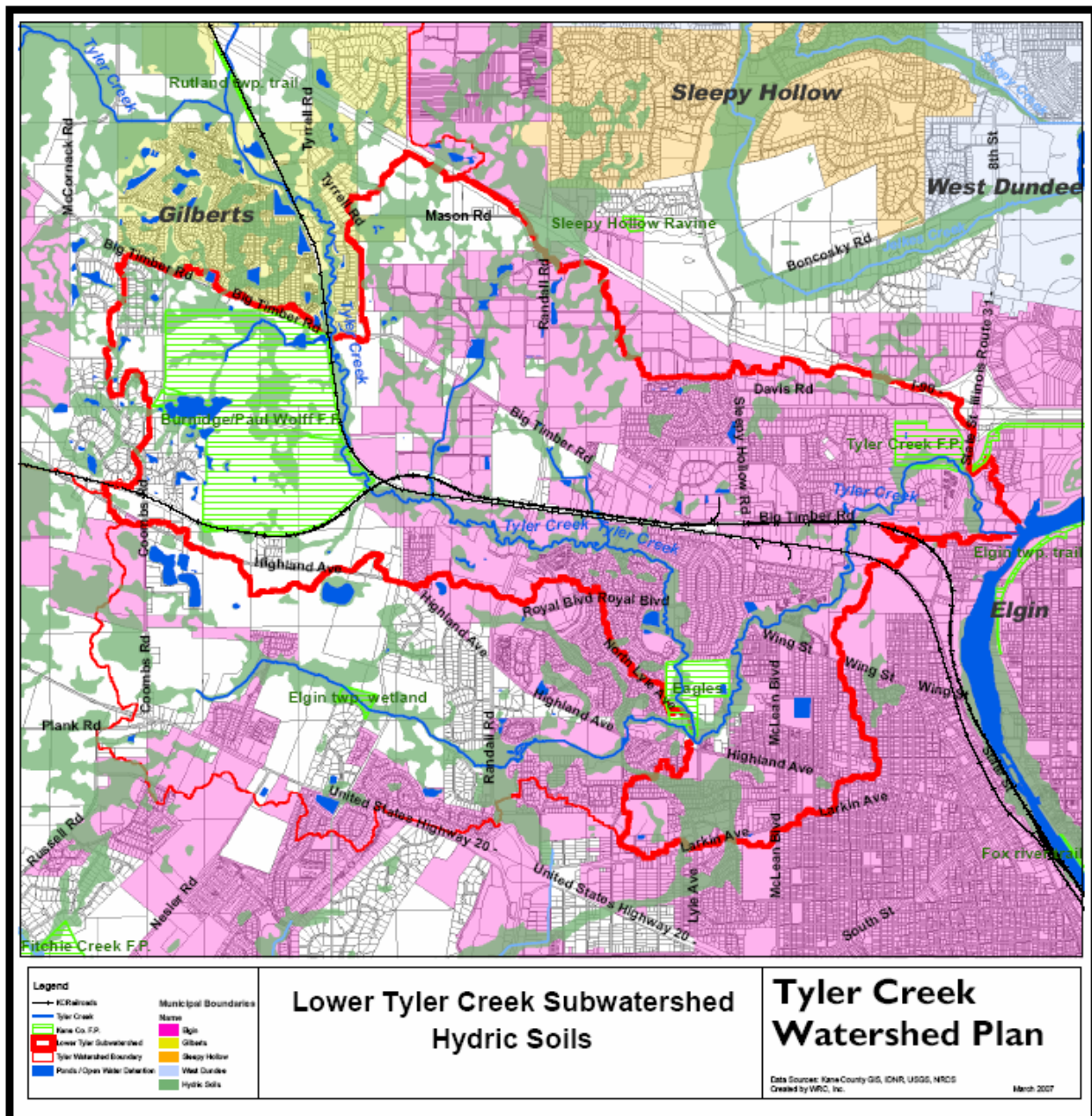


Figure 5.3: Hydric Soils

5.1.4 Subwatershed Drainage Features

Streams

The streams in the Lower Tyler Creek subwatershed consist of the main stem of Tyler Creek and two small unnamed tributaries. This section described the physical conditions of the streams in this subwatershed, including the stream corridor through which they flow. There is a third tributary, Sandy Creek, that enters the Lower Tyler Creek Subwatershed near Highland Avenue, just east of North Lyle Avenue. Detailed information on Sandy Creek can be found in the Sandy Creek Subwatershed portion of this document (Chapter 7).

The main stem of Tyler Creek through this subwatershed varies from good to very high quality in terms of the in-stream habitat and natural features of the stream corridor. At the upstream end, between Big Timber and Randall Road, Tyler Creek is a high quality stream, characterized by a steep gradient (17 ft/mi), pool and riffle sequences, and a well preserved stream corridor of deciduous trees and wetland vegetation. Between Randall Road downstream to Wing Street, Tyler Creek has substantially less gradient (about 9-10 ft/mi) and the natural stream corridor is substantially reduced, although about 40% of this reach is on publicly owned land. Upstream of Royal Blvd, the stream channel is located partly on private property, even though there is a 50-70 ft wide publicly owned greenway between the privately owned residential lots. Portions of this reach have been subjected to various types of stabilization treatments by the individual landowners to address areas of streambank erosion.

Between Wing Street and IL Route 31, Tyler Creek has a very steep gradient; varying between 20 and 30 feet per mile. About two-thirds of this reach is located on private property, and the natural vegetation in the stream corridor is preserved, although degraded due to invasive and noxious species. There are several areas where streambank erosion is rather severe. One is located upstream of Garden Crescent Street and the other is just downstream of Big Timber Road; both are located on primarily private property. Downstream of IL Route 31, the stream gradient flattens out as the stream nears the level of the Fox River. There are remnants of two dams in this reach – both located on the Judson College campus. The upper dam remnant is more substantial (has not fully breached yet), located just downstream of private campus road bridge over Tyler Creek. This dam is a barrier to fish passage at lower flows, although it looks as if moderate to high flows allow fish to move upstream past the dam. The lower dam remnant is located just downstream of the Judson College pedestrian bridge. This dam is fully breached and does not appear to hinder aquatic species movement upstream or downstream.

The first tributary (referred to as Tyler Creek Tributary #1 in this report) begins near the southeast corner of the Big Timber-Randall Road intersection and flows south-southeast through the Randall Point business park on Jansen Farm Drive. The stream has been extensively modified and channelized through the business park and is generally considered to be in a degraded condition. After traversing the business park, the tributary flows south under the two railroad lines and into ADID Wetland #1345. From there, it flows across the wetland and enters Tyler Creek about 200 feet upstream of the North Lyle Avenue stream crossing, north of Clearwater Way.

Tyler Creek Tributary #2 has its origins at the large detention facility at the south end of Britanna Drive, north of Big Timber Road, about one quarter mile west of Randall Road. This tributary has also been heavily disturbed and channelized to fit into the extensive office/industrial land uses that have been constructed in this section of the City of Elgin. The tributary flows south under Big Timber Road to Millennium Drive, and from there it passes under the Iowa, Chicago & Eastern Railroad and Union Pacific Railroad lines and into a high quality natural area owned by the City of Elgin. It enters Tyler Creek about ½ mile west of Randall Road.

Tyler Creek Tributary #3 is a small ephemeral stream located entirely within the Burnidge / Paul Wolff Forest Preserve. The stream originates at the large wetland just east of Coombs Road in the Forest Preserve. The stream flows to the northeast corner of the forest preserve where it is impounded by two on-line ponds constructed by the original property owners in the 1980's. From the Forest Preserve, the tributary flows less than 200 feet under the Union Pacific Railroad and into Tyler Creek on the Boy Scout property.

Analysis of aerial photography indicates that only about 3% of the main stem of Tyler Creek in the subwatershed is channelized. This contrasts with the subwatershed's four tributary streams, where 61% of the 2.5 miles of tributary streams have been subjected to channelization in recent years as part of new office / industrial developments in the subwatershed.

Urban Drainage Systems

Analysis of land uses and aerial photography indicates that as much as 55% of the Lower Tyler Creek Subwatershed is now drained using storm sewer systems. The 1996 Tyler Creek Watershed Plan indicated that there are at least 48 storm sewer outfalls into Tyler Creek in this subwatershed. This network of sewers is under the jurisdiction of the City of Elgin, and the area roughly corresponds to the developed areas within the corporate limits of the City. There are approximately 29 stormwater detention facilities constructed with the subwatershed, again, all under the jurisdiction of the City of Elgin.

It is of special note that most of the development between Illinois Route 31 and Randall Road was constructed without providing any stormwater detention capacity. This was due to a plan in the 1970's & 1980's to construct a large on-line reservoir west of Randall Road in lieu of several smaller detention facilities that would have served the numerous suburban developments planned for the northwest side of Elgin at that time. The developments were built, but the on-line reservoir was not built. The regulatory agencies determined that the substantial adverse environmental impacts outweighed the positive benefits that would be realized by the flood control aspects.

Given the approximate age of the storm sewer system as a whole and the stormwater regulations under which they were constructed, there do not appear to be any type of structures in the system installed to mitigate the poor water quality associated with urban stormwater runoff in Northeastern Illinois.

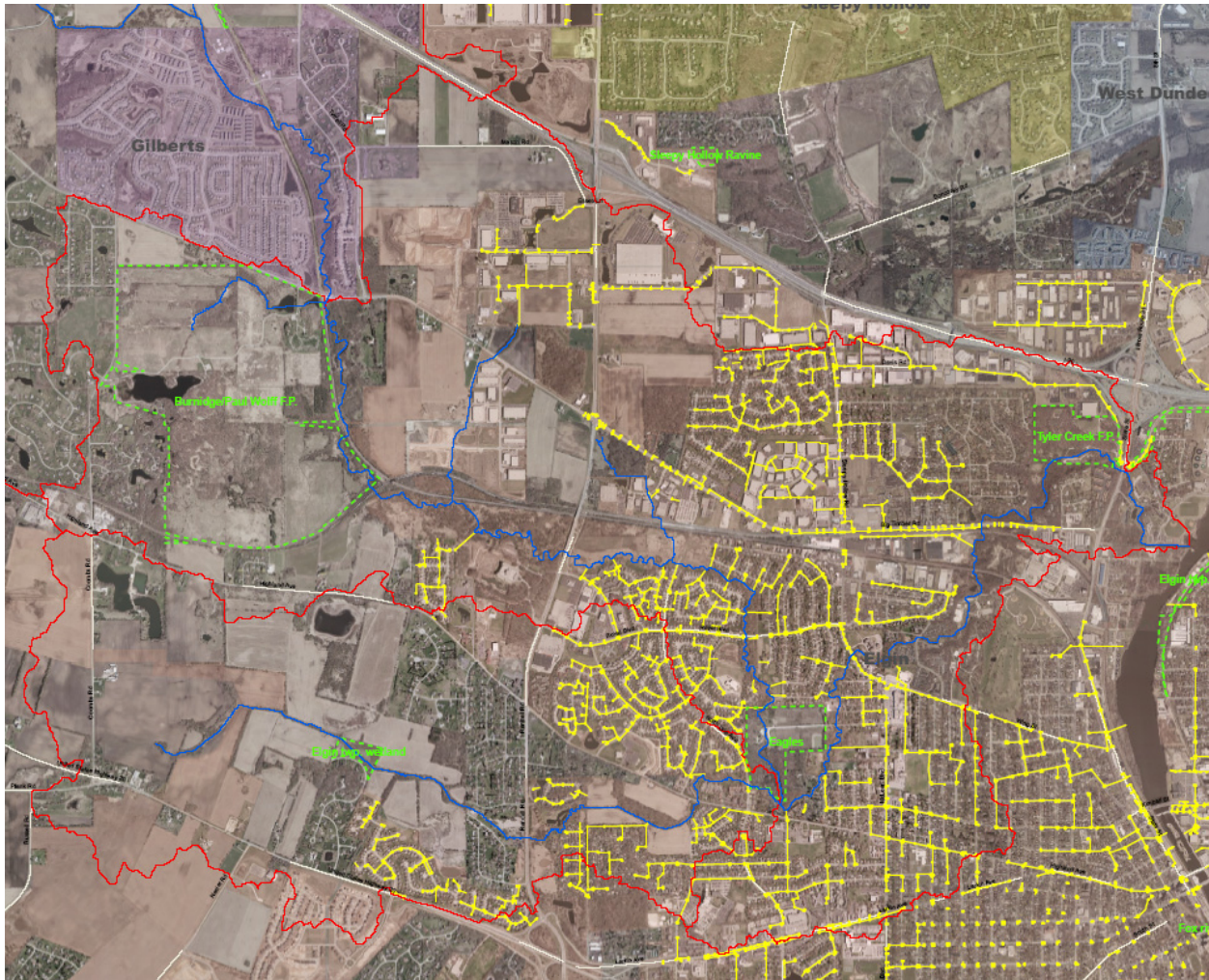


Figure 5.4 Map of storm sewer networks in Lower Tyler Creek and Sandy Creek Subwatersheds

Agricultural Tile Systems

Due to the predominantly urbanized nature of the subwatershed, it is unlikely that there many functioning underground drain tile systems remaining in the subwatershed, particularly in the eastern two-third's of the subwatershed. The western one-third may contain some tile systems, as this region has yet to be fully developed and contains many areas of gently sloping to nearly flat hydric soil complexes. Historically, these were the areas that had poor drainage characteristics, but farmers could successfully convert to agricultural usage by the installation of agricultural drain tile systems.

Identifying agricultural drain tile networks is important in watershed planning because current local flooding and drainage problems can often be linked to damage or age-related failure of drain tile systems. From a watershed preservation / restoration perspective, it is important to identify functional drain tile systems to determine opportunities for their removal or reconfiguration for the purposes of restoring valuable wetland habitat. It is probable that many of the depressional and low lying areas in the subwatershed that are now drained by tile systems were once wetland and wet prairie ecosystems that supported very diverse habitats.

5.1.5 Population

The use and analysis of population data in watershed planning is critical because of there is a direct correlation between the number of people residing in a watershed and the degree of

impacts to the quality and quantity of the watershed's natural resources. According to the 2000 US Census, the population in the Lower Tyler subwatershed was about 14,029 people, or about 1,800 persons per square mile.

5.1.6 Landuse / Landcover

Land cover data for the Tyler Creek Watershed is available from IDNR using LANDSAT data collected between 1998 and 1999. The dominant land cover, according to this data, was urban, which accounted for roughly 53% of the Lower Tyler subwatershed area. Rural grasslands and agricultural row crops each accounted for another 14% (28% total), while wooded areas and wetlands account for an additional 19% of the subwatershed.

Land Cover Description	Total Acres	Percent of SW
Barren & Exposed Land	10.94	0.2%
Corn, Soybeans, Other Small Grains & Hay (row crop agriculture)	716.78	14.3%
Winter Wheat	0.4	0.0%
Rural Grassland	720.64	14.4%
Low Density Urban	367.38	7.3%
Medium Density Urban	1,200.2	24.0%
High Density Urban	359.64	7.2%
Urban Grassland	714.72	14.3%
Shallow Marsh – Emergent Wetland	39.42	0.8%
Partial Forest /Savannah Upland	234.69	4.7%
Upland Forest	610.17	12.2%
Floodplain Forest	1.8	0.0%
Coniferous Forest	0	0.0%
Deep Marsh / Emergent Wetland	5.4	0.1%
Open Water	25.34	0.5%
Total	5,007.52	100.0%

Table 5.1 1999 Landcover for the Lower Tyler Creek Subwatershed

5.1.7 Existing Watershed Development

Development in the subwatershed has occurred principally through the efforts of the City of Elgin in their expansion west and northwest into the former undeveloped land that existed west of the Fox River. Much of this development lies in the area between the Fox River and Randall Road. As of 2006, nearly 63% of the Lower Tyler Subwatershed is within Elgin's municipal borders (3,142 of 5,008 acres). Most of the recent development in the LTCSW has occurred in the northern region of the subwatershed, in the form of office / research / industrial development by the City of Elgin in the area between the Union Pacific railroad (south and west), Randall Road (east), and Interstate 90 (north).

The only other municipality in the subwatershed is the Village of Gilberts, which has extended its municipal boundary to the southeast and now has authority over 44 acres in the LTCSW. Unincorporated parcels and rights of way accounts for about 1,821 acres of the subwatershed, and 625 acres of that total are owned by the Kane County Forest Preserve District.

Municipality	Area (acres)	Percent of SW
Elgin	3,141.8	62.7%
Gilberts	44.2	0.9%
Unincorporated	1,821.7	36.4%

There are 64.3 miles of roads in the subwatershed, which equates to about 218 acres of impervious cover (roadway pavement only – excluding parking lots, sidewalks, and driveways).

5.1.8 Natural Resources

Kane County Forest Preserve Properties

There are three Kane County Forest Preserve properties in the subwatershed, totaling about 694 acres, or 13.8% of the Lower Tyler subwatershed area.

Name	Area (acres)
Burnidge / Paul Wolff F.P.	590
Eagles Property	56
Tyler Creek F.P.	48
Total	694

Other Publicly Protected Land

The City of Elgin owns 31 parcels totaling 187 acres within the subwatershed. 21 of these parcels, totaling 152 acres, are located at three areas within the Tyler Creek stream corridor:

Name	Area (acres)
Upstream of Randall Road; north of Harvest Bible Chapel (12 parcels)	95.1
Near Royal Blvd (8 parcels)	28.2
Wing Park Pool (1 parcel)	28.6
Total	151.9

Wetlands

Kane County completed an Advanced Identification (ADID) Wetland Study in 2004. This study identified a total of 76 wetlands, totaling 441.3 acres, or 12% of the Lower Tyler subwatershed. Of these wetlands, 333.3 acres (75%) were determined to be of High Quality or High Functional Value, the highest rating under the ADID classification system.

ADID Code	Wetland Type	Number of Wetlands	Total Area (acres)
HFV	High Functional Value	14	203.4
HHQ	High Habitat Quality	4	129.9
APH	Artificial Pond in Hydric Soils	12	14.9
APN	Artificial Pond in Non-hydric Soils	5	2.5
LWF	Linear Water Feature	4	4.5
NOW	Natural Open Water	1	1.1
R	Fox River	1	0.2
W	Other Wetlands (lower quality)	35	84.8
	TOTAL	76	441.3

Table 5.5 ADID Wetland Summary for Lower Tyler Creek Subwatershed

All of the ADID wetlands classified as High Habitat Quality are located west / upstream of Randall Road in the subwatershed. There are no known fens or fen recharge areas identified within the Lower Tyler Subwatershed.

Threatened & Endangered Species

The Kane County ADID Wetland Study indicates that there are Threatened and Endangered (T&E) species located within Wetland #1322 (Burnidge / Paul Wolff F.P.) and Wetland #547 (Boy Scout Camp on Big Timber Rd). No data was provided on the specific species and whether the T&E designation was state or federal.

Mussel surveys conducted by the Illinois Department of Natural Resources between 1997 and 2001 indicate that the Slippershell Mussel (*Alasmidonta viridis*), an Illinois State-Threatened Species, is likely to occur in the segment of Tyler Creek between Big Timber Road and Randall Road.

Common Name	Scientific Name	Type	Status
Slippershell Mussel	<i>Alasmidonta viridis</i>	Mussel	IL Threatened

Source: IDNR Stream Surveys 1997-2001

Existing Greenways

While there are no formal greenways established in the Lower Tyler subwatershed, there are several publicly owned parcels along Tyler Creek that form a chain of greenway “segments” in the subwatershed. The City of Elgin and Kane County Forest Preserve District own 18 parcels (317.3 acres) along the stream corridor, providing permanent protection for 3.26 miles of Tyler Creek in the LTSW. This figure represents about 39% of Tyler Creek’s length through the subwatershed.

5.2 Analysis of Subwatershed Data and Problem Identification

5.2.1 Water Quality Data & Identified Problems

The IEPA is tasked with assessing the quality of the surface water resources of Illinois. The IEPA has determined Tyler Creek's designated uses are:

- Aquatic Life
- Fish Consumption
- Primary Contact
- Secondary Contact
- Aesthetic Quality

The IEPA periodically produces a [303\(d\) list](#), which identifies waterways that are not achieving certain designated uses. In the 2006 IEPA 303(d) list, Tyler Creek is identified as being in Full Support of its Aquatic Life Designated Use, which is notable for a stream in northeastern Illinois.

However, Tyler Creek was also determined to be Non-supporting of its Primary Contact Designated Use, due to excessive levels of fecal coliform. This pollutant, associated with human and animal waste, was listed as coming from urban runoff, storm sewers, and runoff from forest / grassland / parklands. The IEPA also identified fish consumption, secondary contact and aesthetic quality as designated uses for Tyler Creek, although the ratings for these uses were classified as "not assessed".

The Illinois Environmental Protection Agency maintains three water quality sampling stations in the LTCSW. They are listed in the table below:

Station	Stream	Location
DTZP01	Tyler Cr.	Tyler Creek at Illinois Route 31 Bridge
DTZP02	Tyler Cr.	Tyler Creek below stone bridge at Tyler Creek Forest Preserve
DTZP04	Tyler Cr.	Tyler Creek at Randall Road

The Fox River Watershed Monitoring Network (FRWMN, administered by the not-for-profit group, *Friends of the Fox River*, maintains ten volunteer stream monitoring sites on Tyler Creek, six of which are located in the LTCSW. During 2005 and 2006 monitoring periods, the six FRWMN sites in the LTCSW reported water quality index values (based on macroinvertebrate sampling) as Fair to Poor. Many of the "Poor" classifications occurred during 2005 when the watershed experienced a severe drought, which likely impacted the number and distribution of macroinvertebrates in the stream channel at the sampling sites.

In 2004, the Valley of the Fox Chapter of the Illinois Sierra Club published a short report on the water quality of streams in the Middle Fox River Area. This study used data collected by Sierra Club volunteers for 12 streams in the Fox Watershed over a three year period.

Name	Phosphate-P	Nitrate – N	Ammonia – N	Chloride	Sulfate	Turbidity
	mg/L	mg/L	mg/L	mg/L	mg/L	Ftu
Tyler Cr.	0.31	2.61	0.13	49.6	60.0	21.4

Table 5.8 Sierra Club Tributary Streams Project Monitoring Results for Tyler Creek

mg/L = milligrams per liter
Ftu =Formazin **Turbidity** Unit

Sierra Club Notes:

1. There currently is no Illinois water quality standard for phosphorus. USEPA recommends 0.08 mg/l total phosphorus as a level indicative of a pristine stream in our ecoregion. Statewide, the average level of total phosphorus (of which phosphates are a subset) in Illinois rivers and streams is 0.38 mg/l.
2. There currently is no Illinois water quality standard for nitrates. USEPA recommends 2.18 mg/l total nitrogen as a level indicative of a pristine stream in our ecoregion. The average level of nitrate-N found in Illinois streams is 3.89 mg/l.
3. Ammonia water quality standards are based on the pH and temperature of the stream as well as the presence of sensitive early life stages of fish. For example, ammonia-nitrogen levels in Tyler Creek should not exceed a monthly average of 1.6 mg/l when early life stages are present. The average level of ammonia found in Illinois streams is 0.32 mg/l ammonia-N.
4. The Illinois water quality standard for both chloride and sulfate is 500 mg/l.
5. There currently is no Illinois water quality standard for turbidity.

The Sierra Club report summarized that of all the streams sampled, Tyler Creek received a “B” grade. The report indicated that water quality of Tyler Creek was roughly the same as Brewster Creek and Mill Creek, but was lower than that found on other Fox River tributaries, such as Poplar Creek, Norton Creek, Waubensee Creek, Ferson Creek, and Indian Creek.

5.2.2 Flooding Problems

Overbank flooding problems occur at the very downstream end of the Lower Tyler subwatershed, on the Judson College campus, where Tyler Creek joins the Fox River. There are two college dormitories on the campus that are located within the 100-year floodplain and have experienced flood damages in the past. Judson College staff has indicated that there seems to have been an increase in the frequency of campus buildings flooding over the last 15 years.



Right: Photo of flood damage to building on west side of Judson University campus following a August 2007 thunderstorm

There are no other records of recent flood damage in the Lower Tyler subwatershed, although some residential structures between Wing Street and North Lyle Avenue appear to be within, or at least very close, to the 100-year floodplain.

5.2.3 Projected Development & Growth

As the entire subwatershed falls within the City of Elgin’s Comprehensive Planning Area, it is likely that virtually all future development in the Lower Tyler subwatershed will be done by the City of Elgin. There are about 765 acres of land available for new development. If development occurs according to Elgin’s plan, about 225 acres of new residential development will be built on parcels along Highland Avenue, Coombs Road, and east of Randall Road along the south side of the railroad right-of-way. The rest of the land to be developed in the subwatershed lies north of the railroad right-of-way and is centered around Randall Road. This 540 acres of land is planned to be developed as office / research / industrial, building onto and adjacent to the existing O/R/I developments previously approved by the City of Elgin.

Based upon the planned residential development patterns proposed by the City of Elgin, the population increase when the subwatershed is “built out” is estimated to be about 2,500 – 3,000. This is in addition to the 14,029 that already call the subwatershed home, or about a 20% increase from the year 2000.

5.2.4 Estimated Pollutant Loading

Water quality concerns in the watershed are closely tied to land uses. Pollutant load estimates in the watershed were estimated under existing and future condition land use scenarios so that strategies for addressing existing and mitigating potential future water quality concerns can be developed. Pollutant load estimates were computed based on land uses using the public domain GIS driven software called the ‘Generalized Watershed Loading Function’ (GWLF) model. A more detailed discussion of the development of the model is presented in Chapter 3 and Appendix 15.2 . As was mentioned in the previous sections, the main pollutants of concern are sediment and nutrients both of which are contributed mainly from the agricultural activities and urbanization and Fecal Coliform bacteria which, according to the IEPA, are generated from urban runoff. A summary of the annual pollutant load estimates from the Lower Tyler Creek subwatershed is presented in below:

Pollutant	Existing Condition (2005)	Future Condition (Total Build-out)
	Lbs	Lbs
Total N	20,331	18,695
Total P	1,301	1,046
Sediment	1194	1188
Runoff (ac-ft)	1,469	1,531
Fecal Coliform (x10 ⁶ FCU)	36,140	37,046

Table 5.9 Estimated annual pollutant loads for the Lower Tyler Creek Subwatershed

5.2.5 Natural Area Protection Problems

Forest Preserve Sites

The natural areas within the Tyler Creek Forest Preserve are degraded due to invasive species spreading into both the stream corridor and the upland forest habitat.

ADID Wetland Sites

In the LTCSW, only 441 acres of wetland remain, compared to an estimated 1,131 acres that existed before settlement. That means that 61% of the wetlands have already been lost and can no longer provide the valuable functions. Therefore, it is critical that the remaining wetland resources in the subwatershed be protected and managed so that stakeholders can enjoy the benefits these wetlands provide.

There are four High Habitat Quality wetlands contained in three areas of the subwatershed. Each of these is in need of either protection and / or restoration to maintain the high quality characteristics that make the wetlands so valuable to the watershed.

High Habitat Quality (HHQ) ADID Wetland #1337 is located along Tyler Creek between Randall Road and the Burnidge / Paul Wolff Forest Preserve. About 85% of this highly valued wetland complex is located on property owned by the City of Elgin. About 10% is on property owned by the Harvest Bible Chapel and is protected under a conservation easement. The remaining 5% of the wetland is located on a privately owned parcel on the western edge adjacent to Iowa, Chicago & Eastern Railroad right-of-way. This wetland is one of the true gems in the Tyler Creek Watershed, containing a sedge meadow, seeps, and a fen/calcareous seep. However, its preservation in the future will be dependent on actively managing the invasive species that are moving into the wetland. Consideration should also be given to implementing innovative water quality controls in the areas that drain directly into the wetland, including the Randall Point Business Park, the Harvest Bible Chapel, and the undeveloped land to the west that will inevitably develop in the near future.

HHQ ADID Wetland #547 is located along Tyler Creek between Big Timber Road and the Randall Point Business Park. About 90% of this highly valued wetland complex is located on property owned by the Three Rivers Council, Inc. of the Boy Scouts of America. The southern 10% of the wetland is located on land within the Randall Point Business Park. The wetland is comprised of a highly valued floodplain forest, however it does not have any form of permanent protection (i.e. conservation easement, etc.), and there is no active management of the wetland to control invasive species or address areas of severe stream bank erosion.

HHQ ADID Wetland #1322 is located at the southwest corner of the Burnidge / Paul Wolff Forest Preserve near Coombs Road. This wetland consists of a degraded marsh with open water pockets and as identified in the ADID study, evidence suggests that there is a fen wetland adjacent to the wetland boundary. About 60% of this wetland is protected by the Kane County Forest Preserve District. The remaining 40% of the wetland is located on private property and has no known permanent protection in place. Prior biological investigations on the publicly owned portion of the wetland have indicated the presence of threatened or endangered species of birds.

There are several other wetland complexes that are also in need of restoration and protection. ADID Wetland #1345 is classified as having High Functional Value. This wetland is located on parcels slated for future development between the east side of Randall Road, the UNION PACIFIC railroad right-of-way, and North Lyle Avenue. New development here should be carefully planned to protect the wetland resources along the Tyler Creek stream corridor and configured so that stormwater infiltration is maximized and runoff that must leave the site is cleaned to the maximum extent practicable.

5.3 Subwatershed-specific Recommendations to Protect Watershed Resources

The following is a summary list of recommendations for the Lower Tyler Creek Subwatershed to help stakeholders and decision makers meet the Goals and Objectives set forth for Tyler Creek. Background information regarding how each type of recommendation addresses watershed concerns and/or impairments (existing or future) can be found in Chapter 3.

Type: Education/Outreach; Regulatory; Natural Habitat Restoration; Monitoring; Permanent Habitat Protection, Water Quality, Flood Control

Target Goals: Which watershed plan goals the recommendation is intended to address.

Initial Cost: the initial cost, in 2007 dollars to initiate the recommended action, if applicable.

Annual Cost: the long term expected annual cost (in 2007 dollars) to successfully implementation of the recommendation

Responsible Party: Identifies the LEAD agency, entity, or landowner who will ultimately have to execute the recommendation. SUPPORTING parties, such as government agencies, grant sources, etc. may also be identified here.

Priority: A ranking of High, Medium, or Low, where High is represents a recommendation of utmost importance to be pursued immediately and Low represents those recommendations which may take more time and are less critical in terms their impact on meeting the watershed plan goals.

Many of the project recommendations in the Lower Tyler Creek Subwatershed are taken directly from the Lower Tyler Creek Management Project, revised in 2000 for the City of Elgin. The costs for water quality recommendations based on that report are based on the project costs reported in 2000 and adjusted for 5% inflation per year (to 2007).

The project cost estimates contained in this report should be considered preliminary, and are only presented to identify the potential magnitude of cost, from a watershed scale perspective. No site-specific investigation, analysis, or design of any recommended project, from which accurate cost information could be obtained, was completed as part of the preparation of the 2007 Tyler Creek Watershed Plan.

If a watershed stakeholder decides to apply for grant funding assistance to implement any of the recommended projects presented in this report, they should first undertake any additional studies / research needed to determine an updated / accurate project cost. They should not solely rely on the cost estimates presented in the TCWP report as the basis for their grant request.

A map of Lower Tyler Creek Subwatershed Recommendations can be found at the end of this section, Figure 5.5

Natural Habitat Restoration Projects

The recommendations in this section are site-specific natural area restoration projects that should be implemented to increase natural habitat quality and diversity along the Tyler Creek stream corridor. Restoration projects not only serve to increase critical native habitats, they also provide many indirect water quality benefits as well. Removing non-native vegetation and installing native, deep – rooted vegetation on slopes and stream banks decreases erosion and the resulting sediment that is washed into the stream. Thinning out invasive and nuisance species along stream corridors also serves to reduce current and potential debris jams, which create artificial, stagnant areas along the stream (resulting in low dissolved oxygen) and also

increases the net amount of nutrient inputs to the stream as the debris breaks down in the channel.

Estimating costs for restoration projects can range from \$100 to more than \$3,000 per acre of woodland, wetland, or prairie habitat restored. The upper range reflects the unit cost for restoration work contracted out to a private contracting company. Costs can potentially be significantly reduced if the work is performed by agency staff or local volunteers.

Annual costs are estimated to be roughly 10% of the initial cost and cover items such as herbicide applications, brush removal, and controlled burns.

Recommendation 1-1

Implement ecological restoration plan for 9.0 acres of bottomland woods in the Tyler Creek Forest Preserve as outlined in the City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 1)

Type: Natural Habitat Restoration

Target Goals: Goal 1; Objectives 2 & 3

Initial Cost: \$27,000

Annual Cost: \$2,700

Responsible Party: Kane County Forest Preserve District

Priority: Medium

Recommendation 1-3

Implement 5.3 acre Wetland & Upland Woods Restoration project along Tyler Creek between Union Pacific railroad right-of-way. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 2)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$16,000

Annual Cost: \$1,600

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-4

Implement Upland Woods Restoration projects (11.5 acres) on Wing Park property along Tyler Creek stream corridor. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 2)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$34,500

Annual Cost: \$3,400

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-9

Implement ecological restoration plan for 11 acres of bottomland woods along Tyler Creek on three private properties between Eagle Road and Hoxie Court. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 3)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$33,000

Annual Cost: \$3,300

Responsible Party: Private Landowner

Priority: Medium

Recommendation 1-10

Implement Upland Woods Restoration project (16 acres) on private and public parcels along Tyler Creek stream corridor near Highland Avenue north of Spring Cove Drive. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 3)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$48,000

Annual Cost: \$4,800

Responsible Party: Private Landowners / Kane County Forest Preserve District

Priority: Medium

Recommendation 1-11

Implement Bottomland Woods Restoration project (10 acres) on Eagle's Forest Preserve property along Tyler Creek north of Highland Avenue and east of North Lyle Avenue Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 4)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$30,000

Annual Cost: \$3,000

Responsible Party: Kane County Forest Preserve District

Priority: Medium

Recommendation 1-12

Implement Upland Woods Restoration project (7.8 acres) on western edge of Eagle's Forest Preserve property Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 4)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$23,400

Annual Cost: \$2,300

Responsible Party: Kane County Forest Preserve District

Priority: Medium

Recommendation 1-15

Implement Upland Woods Restoration project (0.9 acres) on Creekside School Property along Tyler Creek stream corridor. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 4)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$2,700

Annual Cost: \$270

Responsible Party: U-46 School District / City of Elgin

Priority: Low

Recommendation 1-16

Implement Bottomland Woods Restoration project (4.2 acres) on City of Elgin Property along Tyler Creek south of Royal Boulevard. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 4)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$12,600

Annual Cost: \$1,300

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-18

Implement Prairie Restoration Project (1.6 acres) on private property south of Royal Boulevard and between Tyler Creek and Ruth Drive. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 4)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$4,800

Annual Cost: \$500

Responsible Party: Private Landowner

Priority: Medium

Recommendation 1-19

Implement Bottomland Woods Restoration projects (8.9 acres) on City of Elgin Property along Tyler Creek north (upstream) of Royal Boulevard. Reference: City of Elgin's Tyler Creek Improvement Project. (June, 2000 plan set; Ecological Restoration, Reach 5)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$26,700

Annual Cost: \$2,700

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-21

Recognizing that new development is already planned for the parcel(s) north of Tyler Creek just Randall Road, implement applicable parts of the Tyler Creek Improvement Project for this site, including ecological restoration, streambank stabilization, and water quality improvements Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 6, and Stormwater Quality Facility sites 7 & 8)

Type: Water Quality, Natural Habitat Restoration, Permanent Habitat Protection

Target Goals: Goal 1, Objectives 2 & 3; Goal 2, Objective 2

Initial Cost: \$310,000

Annual Cost: \$10,000

Responsible Party: City of Elgin Support & Landowner/Developer

Priority: High

Recommendation 1-22

Implement Upland Woods Restoration projects (18 acres) and Wetland Restoration Projects (43.1 acres) on City of Elgin Property along Tyler Creek west of Randall Road. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 6)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$54,000

Annual Cost: \$5,500

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-23

Work with Harvest Bible Chapel to remove invasive species and provide long-term management of wetlands and upland woods on their property (18.9 acres). Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Ecological Restoration, Reach 6)

Type: Natural Habitat Restoration

Target Goals: Goal 1, Objectives 2 & 3

Initial Cost: \$56,700

Annual Cost: \$5,700

Responsible Party: Not-for-profit Land Trust Organization

Priority: High

Recommendation 1-32

Develop a restoration and flood control plan for the Judson University Campus. Plan will include the following elements:

- 6.5 acres upland woods restoration
- 8.7 acres bottomland woods restoration
- Removal of two partially failed dam structures
- Replacement of existing bridge with a new bridge with a larger span and higher deck elevation (include integrated pedestrian walk)
- Redirect Tyler Creek through Volkman Pond. Remove pedestrian bridge over creek at northeast corner of pond and fill in old channel. Stabilize large, partially wooded slope.
- Install 1000 feet of small flood control levees between Tyler Creek and two low-lying campus buildings.

Type: Natural Habitat Restoration & Flood Control

Target Goals: Goal 1, Objectives 2 & 3; Goal3, Objective 1

Initial Cost: \$650,000 (\$60,000 natural area restoration; \$160,000 new bridge; \$260,000 for stream relocation, dam removal and bank/slope stabilization; \$170,000 flood control levees)

Annual Cost: \$5,000

Responsible Party: Judson College

Priority: High

Recommendation 1-35

Remove abandoned dam on Tyler Creek at Wing Park Pool and replace with constructed rock riffle.

Type: Natural Habitat Restoration & Flood Control

Target Goals: Goal 1, Objectives 2 & 3; Goal3, Objective 1

Initial Cost: \$50,000

Annual Cost: \$0

Responsible Party: City of Elgin

Priority: Low



Water Quality Projects

The following recommendations are site-specific projects intended to provide incremental pollutant load reduction and therefore directly improve water quality in Tyler Creek.

Recommendation 1-33

Prepare a municipal storm sewer inventory and water quality management plan for all sewers draining to Tyler Creek or one of its tributaries. The inventory should delineate tributary service area, and a tabulation of service area land uses and impervious cover types. The WQ management section should identify target pollutants to be treated in each sewershed and identify specific BMP devices and their proposed installation locations within the individual storm sewer networks.

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$35,000

Annual Cost: \$50,000 (cost of minimum 1 BMP structure installation per year)

Responsible Party: City of Elgin

Priority: High

Recommendation 1-2

Implement 155 linear feet of streambank stabilization and outfall protection project along Tyler Creek, north of Big Timber Road (partially on three privately owned lots as well as on Big Timber Road right-of-way). Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Streambank Stabilization Plan, Site 20)

Type: Water Quality

Target Goals:

Initial Cost: \$43,000

Annual Cost: \$500

Responsible Party: Private homeowners with assistance from City of Elgin

Priority: Medium

Recommendation 1-5

Work with townhouse / condo associations to implement a stream corridor restoration plan for 1,700 foot reach of Tyler Creek between Wing Park Pool and Illinois Park Elementary School. Includes bank stabilization and channel relocation. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Streambank Stabilization Plan, Site 18)

Type: Water Quality / Site Restoration

Target Goals: Goal 1, Objective 3

Initial Cost: \$241,000

Annual Cost: \$5000

Responsible Party: Private Homeowners / Condo Association

Priority: Medium

Recommendation 1-6

Implement Water Quality Facility Project at northeast corner of Illinois Park Elementary School property. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Stormwater Quality Facility – site 6)

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$86,000

Annual Cost: \$500

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-7

Implement 150 linear feet of streambank stabilization and bridge abutment protection projects along Tyler Creek, upstream of Eagle Road Bridge (abutment protection on City property; streambank project on private property) Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Streambank Stabilization Plan, Site 21a)

Type: Water Quality

Target Goals: Goal 1, Objective 3 & 5

Initial Cost: \$30,000

Annual Cost: \$500

Responsible Party: City of Elgin & Private Landowner

Priority: Medium

Recommendation 1-8

Implement storm sewer outfall repair project on Tyler Creek, 700 feet upstream (south) of Eagle Road Bridge. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Streambank Stabilization Plan, Site 21b)

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$5,000

Annual Cost: \$150

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-13

Implement 200 linear feet of streambank stabilization and storm sewer outfall repair projects along Tyler Creek, at the end of Kimberly Avenue (streambank project on private property). Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Streambank Stabilization Plan, Sites 3 & 22)

Type: Water Quality

Target Goals: Goal 1, Objective 3

Initial Cost: \$86,000

Annual Cost: \$500

Responsible Party: Private Landowner

Priority: Medium

Recommendation 1-14

Implement Wood Ridge Court storm sewer outfall repair project along Tyler Creek (project on City of Elgin property). Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Site 14)

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$26,000

Annual Cost: \$0

Responsible Party: City of Elgin

Priority: Medium

Recommendation 1-17

Implement Water Quality Facility Project on City of Elgin property behind Creekside Elementary School. Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Stormwater Quality Facility – site 5)

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$200,000

Annual Cost: \$1500

Responsible Party: City of Elgin

Priority: High

Recommendation 1-20

Contact landowners and assist them with implementing ecologically sustainable stabilization practices along Tyler Creek where the stream has migrated out of the publicly owned parcel and has caused excessive stream bank erosion on private property.

Type: Water Quality

Target Goals: Goal 1, Objective 3

Initial Cost: \$25,000

Annual Cost: \$500

Responsible Party: City of Elgin Support: Private Landowner(s)

Priority: Medium

Recommendation 1-30

Implement 180 linear feet of streambank stabilization along Tyler Creek downstream of large storm sewer outfall at Highland Ave. & Thomas Moore Drive. (streambank project on private property). Reference: City of Elgin's Tyler Creek Improvement Project. (June 2000 plan set; Streambank Stabilization Plan, Sites 12)

Type: Water Quality

Target Goals: Goal 1, Objective 3 & 5

Initial Cost: \$86,000

Annual Cost: \$500

Responsible Party: City of Elgin Support: Private Landowner / HOA

Priority: High

Recommendation 1-27

Remove invasive species tree canopy from tributary stream corridor in business park south of Jansen Farm Drive. Work with existing industrial landowners to redirect pavement runoff from stream channel and into new structural BMP devices to treat runoff prior to discharge to the stream.

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$25,000

Annual Cost: \$500

Responsible Party: City of Elgin, business owners.

Priority: Medium

Recommendation 1-28

Retrofit existing 0.9 acre dry bottom detention basin. Remove concrete low-flow channel, re-grade to increase residence time of small runoff events and replant with native vegetation.

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$15,000

Annual Cost: \$500

Responsible Party: Kane County D.O.T.

Priority: Medium

Recommendation 1-29

Retrofit existing 0.6 acre dry bottom detention basin. Replant with native vegetation and provide periodic landscape maintenance to insure survival.

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$12,000

Annual Cost: \$300

Responsible Party: Private Business (Chase); Support from City of Elgin

Priority: Medium

Recommendation 1-34

Retrofit part of existing 2.5 acre dry bottom detention basin to maximize low flow water quality treatment.

Type: Water Quality

Target Goals: Goal 1, Objective 5

Initial Cost: \$25,000

Annual Cost: \$500

Responsible Party: City of Elgin

Priority: Medium

Permanent Habitat Protection Recommendations

Recommendation 1-31:

Protect portions of high-quality ADID Wetland #1322 (near Coombs & Amberwood Drive) that are on private property, by working with landowners to secure conservation easements and providing wetland management assistance to protect T & E species known to occur there.

Type: Permanent Habitat Protection / Natural Habitat Restoration

Target Goals: Goal 1, Objective 1

Initial Cost: \$ unknown

Annual Cost: \$ unknown

Responsible Party: Not-for-profit Land Trust Organization working with private landowners

Priority: Medium

Ordinance/Planning Recommendations

Recommendation 1-24

Encourage new construction in the Randall Point Business Center to utilize conservation development practices to reduce their runoff to Tyler Creek Tributary #1.

Type: Water Quality

Target Goals: Goal 2, Objectives 1,2, & 3

Initial Cost: unknown (municipal staff & elected official time)

Annual Cost: unknown (municipal staff & elected official time)

Responsible Party: City of Elgin

Priority: High

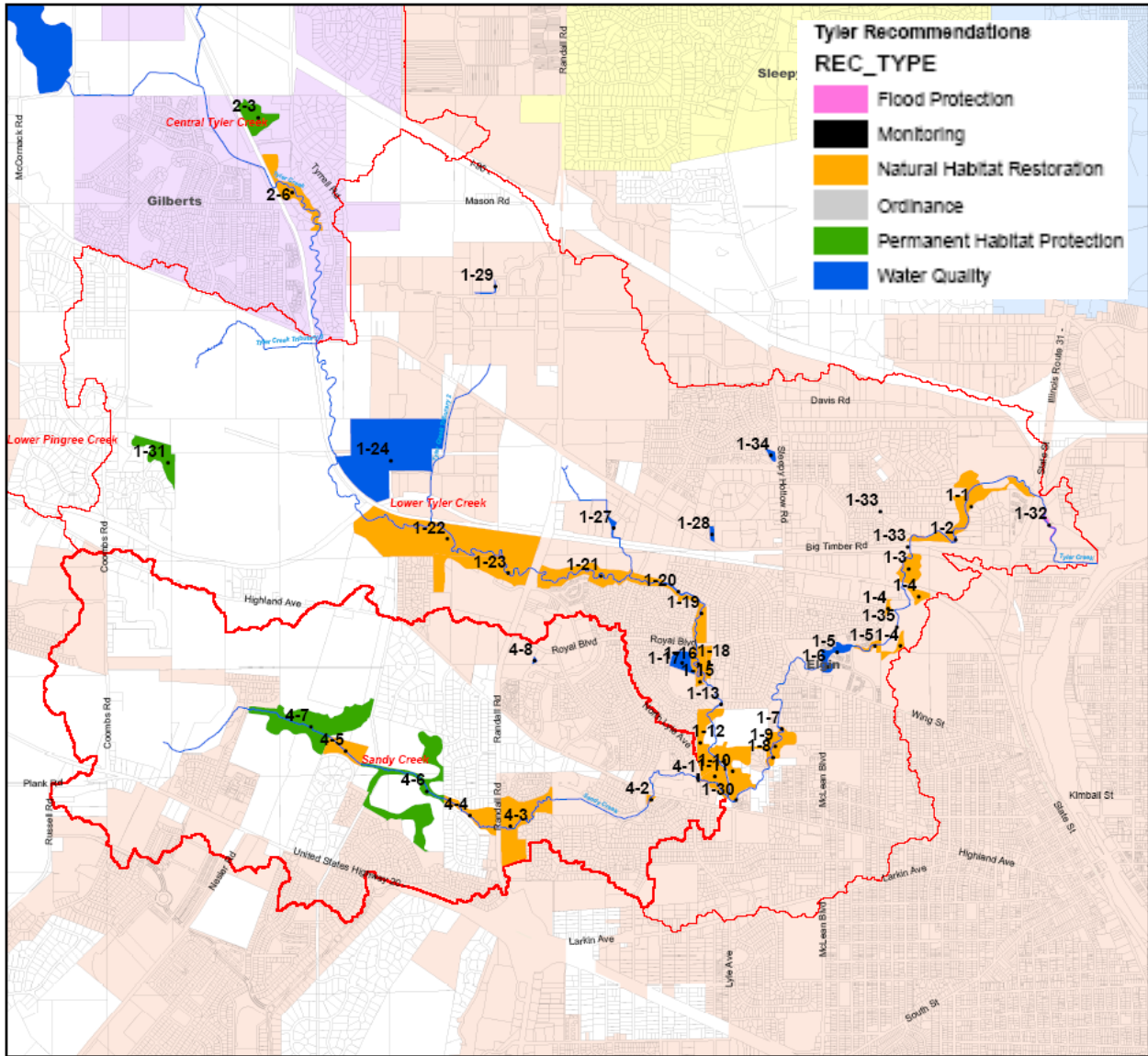


Figure 5.5 : Subwatershed Recommendations Location Map

Table 5.9 Summary of recommended BMPs for the Lower Tyler Creek Subwatershed

REC NUMBER	REC TYPE	DESCRIPTION	RESPONSIBLE PARTY	INITIAL COST	ANNUAL COST	PRIORITY
1-1	Natural Habitat Restoration	Bottomland Woods Restoration on Public and Private Property	KCFPD / Private Landowners	\$27,000	\$2,700	Medium
1-2	Water Quality	Streambank stabilization - 155 LF on Private Property / Big Timber R.O.W.	Private Landowners / City of Elgin	\$43,000	\$500	Medium
1-3	Natural Habitat Restoration	Wetland and Upland Woods Restoration on Public Property	City of Elgin	\$16,000	\$1,600	Medium
1-4	Natural Habitat Restoration	Upland woods restoration at Wing Park	City of Elgin	\$11,500	\$1,100	Medium
1-5	Water Quality	Implement channel relocation and stabilization plan on Private Property	HOA / Condo Association	\$120,500	\$2,500	Medium
1-5	Natural Habitat Restoration	Implement stream corridor restoration plan on Private Property	HOA / Condo Association	\$120,500	\$2,500	Medium
1-6	Water Quality	Construct water quality facility project at Illinois Park Elementary School	City of Elgin	\$86,000	\$500	Medium
1-7	Water Quality	Streambank Stabilization - 150 LF on Public and Private Property	City of Elgin	\$30,000	\$500	Medium
1-8	Water Quality	Storm sewer outfall repair	City of Elgin	\$5,000	\$150	Medium
1-9	Natural Habitat Restoration	Bottomland woods restoration on Private Property	Private Landowners	\$33,000	\$3,300	Medium
1-10	Natural Habitat Restoration	Upland woods restoration at Eagles F.P. and Private Property	KCFPD / Private Landowners	\$48,000	\$4,800	Medium
1-11	Natural Habitat Restoration	Bottomland woods restoration at Eagles F.P. and Private Property	KCFD / Private Landowners	\$30,000	\$3,000	Medium
1-12	Natural Habitat Restoration	Upland woods restoration at Eagles F.P.	KCFPD	\$23,400	\$2,300	Medium
1-13	Water Quality	Streambank stabilization on Private Property	City of Elgin	\$86,000	\$500	Medium
1-14	Water Quality	Repair 12" storm sewer outfall from Wood Ridge Court	City of Elgin	\$26,000	\$0	Medium
1-15	Natural Habitat Restoration	Upland woods restoration at Creekside School	School District U-46	\$2,700	\$270	Low
1-16	Natural Habitat Restoration	Bottomland woods restoration on Public Property	City of Elgin	\$12,600	\$1,300	Medium
1-17	Water Quality	Construct water quality facility project at Valley Creek Subdivision storm outfall	City of Elgin	\$200,000	\$1,500	High
1-18	Natural Habitat Restoration	Prairie restoration on Private Property	Private Property	\$4,800	\$500	Medium

REC NUMBER	REC TYPE	DESCRIPTION	RESPONSIBLE PARTY	INITIAL COST	ANNUAL COST	PRIORITY
1-19	Natural Habitat Restoration	Bottomland woods restoration on Public and Private Property	City of Elgin	\$26,700	\$2,700	Medium
1-20	Water Quality	Streambank stabilization as needed where Tyler has meandered out of publicly owned corridor	City of Elgin	\$25,000	\$500	Medium
1-21	Natural Habitat Restoration	Stream corridor restoration and stabilization on private property scheduled for development	City of Elgin	\$310,000	\$10,000	High
1-22	Natural Habitat Restoration	Upland woods and wetland restoration on City of Elgin Property	City of Elgin	\$54,000	\$5,500	Medium
1-23	Natural Habitat Restoration	Upland woods and wetland restoration on Private Property	Private Landowners / NP Land Trust Org support	\$56,700	\$5,700	High
1-24	Water Quality	Encourage implementation of stormwater conservation practices to minimize excess runoff and water pollution from business park	City of Elgin	N/A	N/A	High
1-27	Water Quality	Install water quality controls to clean parking lot runoff before it enters stream	City of Elgin	\$25,000	\$500	Medium
1-28	Water Quality	Retrofit dry bottom detention; remove concrete low flow channel	KDOT	\$15,000	\$500	Medium
1-29	Water Quality	Retrofit dry bottom detention with native vegetation	Chase Corporation	\$12,000	\$300	Medium
1-30	Water Quality	Streambank stabilization on Private Property	City of Elgin	\$86,000	\$500	Medium
1-31	Permanent Habitat Protection	Permanently protect privately owned portions of ADID Wetland 1322	Private Landowners / NP Land Trust Org support	N/A	N/A	Medium
1-32	Flood Protection	Develop and implement flood control and restoration project at Judson University	Judson College	\$650,000	\$5,000	High
1-33	Water Quality	Develop Storm Sewer Outfall BMP Retrofit Program and install a minimum of one BMP structure per year	City of Elgin	\$35,000	\$50,000	High
1-34	Water Quality	Retrofit part of dry bottom detention basin for low flow WQ treatment	City of Elgin	\$25,000	\$500	Medium
1-35	Natural Habitat Restoration	Remove abandoned dam and construct rock riffle	City of Elgin	\$50,000	\$0	Low

Table 5.9 Summary of recommended BMPs for the Lower Tyler Creek Subwatershed (continued)

5.3.1 Lower Tyler Creek BMPs

Recommended BMPs for reducing pollutant loads, implementation costs and projected reductions in the Lower Tyler Creek subwatershed are presented in Table 5.10. BMPs are prescribed for reducing nutrient loads and fecal coliform loads. The predicted load reductions were computed by the GWLF model in conjunction with the simple spreadsheet approach depending on the nature of the BMP. The BMPs do provide multiple benefits consistent with the overall goals of the watershed plan which includes natural resources protection. The scale and time frame for implementation will be driven by cost considerations. The sizes of the BMPs in Table 5.10 and in subsequent Tables are intended to give the approximate potential size at which the BMP could be implemented. The larger the scale of the BMP, the more its effectiveness in reducing pollutant loads.

Table 5.10 Recommended BMPs for the Lower Tyler Creek Subwatershed

BMP Category	BMP Location	Project Locations ²	BMP		Removal Efficiency**			Total Cost (\$)	Pollutant Load Reduction (lbs/year)			Percentage Reduction (%)		
			Size	Unit	TN	TP	TSS		TN	TP	TSS	TN	TP	TSS
Natural Habitat Protection	Site-specific	1-1, 1-3, 1-4, 1-5, 1-9, 1-10, 1-11, 1-12, 1-15, 1-16, 1-18, 1-19, 1-21, 1-22, 1-23, 1-31	150	acres	30%	35%	60%	\$776,900	914	68	64	4.5	5.2	5.4
Stormwater BMPs	Site Specific	1-27, 1-32	2	each	53%	51%	88%	\$675,000	86	5	8	0.4	0.4	0.7
Stream bank Stabilization	Site Specific	1-2, 1-5, 1-7, 1-13, 1-20, 1-30	98	acres	36%	95%	95%	\$390,500	716	121	105	3.5	9.3	8.8
Retrofit Sewer Outfalls	Site Specific	1-8,1-14, 1-33	3	each	-	-	-	\$66,000	1,017	65	60	5.0	5.0	5.0
Detention Basin Retrofit	Site Specific	1-28, 1-29, 1-34	18	acres	32%	55%	68%	\$52,000	117	13	15	0.6	1.0	1.2
Conservation Development Practices	Site-specific	1-24	1	lump sum	52%	58%	64%	-	33	2	1	0.2	0.2	0.1
Construct Water Quality Facility	Site-specific	1-6, 1-17	81	acres	52%	58%	64%	\$286,000	855	61	37	4.2	4.7	3.1
Dam Removal	Site-specific	1-35	1	lump sum	-	-	-	\$50,000	203	13	12	1.0	1.0	1.0
Regulatory	Watershed-Specific	Subwatershed wide	1	lump sum	-	-	-	\$10,000	1,017	65	60	5.0	5.0	5.0
Nutrient Management	Watershed-specific	Subwatershed wide – agricultural parcels	1,600	acres	70%	28%	-	\$160,000	11,369	582	-	55.9	44.7	-
Total								\$2,466,400	16,327	996	363	80.3	76.5	30.4

² Project locations and details are described in Section 5.3, table 5.9, and map figure 5.5

** TN = total Nitrogen; TP = total Phosphate; TSS = total Suspended Solids or Sediment; "-" = "not available"

Table 5.11 Recommended BMPs for Reducing Fecal coliform Loads in the Lower Tyler Creek Subwatershed

BMP Category	BMP Location	Project Locations ²	BMP		FC Removal Efficiency ^{**}	Total Cost ^{***} (\$)	FC Load Reduction (10 ⁹ FCU/year)	FC Percentage Reduction (%)
			Size	Unit				
Natural Habitat Restoration	Site-specific	1-1, 1-3, 1-4, 1-5, 1-9, 1-10, 1-11, 1-12, 1-15, 1-16, 1-18, 1-19, 1-21, 1-22, 1-23;; 1-31	150	acres	78%	\$776,900	4,222	11.7
Stormwater BMPs	Site Specific	1-27, 1-32	2	each	-	\$675,000	238	0.7
Stream bank Stabilization	Site Specific	1-2, 1-5, 1-7, 1-13, 1-20, 1-30	98	acres	75%	\$390,500	2,653	7.3
Retrofit Sewer Outfalls	Site Specific	1-8,1-14, 1-33	3	each	80%	\$66,000	1,446	4.0
Detention Basin Retrofit	Site Specific	1-28, 1-29, 1-34	18	acres	78%	\$52,000	507	1.4
Conservation Development Practices	Site-specific	1-24	1	lump sum	-	-	18	0.0
Construct Water Quality Facility	Site-specific	1-6, 1-17	81	acres	-	\$286,000	2,280	6.3
Dam Removal	Site-specific	1-35	1	lump sum	-	\$50,000	-	-
Regulatory	Watershed-Specific	Subwatershed wide	1	lump sum	-	\$10,000	1,807	5.0
Street Sweeping (bi-weekly)	Watershed-specific	Subwatershed wide/Streets	64	curb miles	2%	\$49,920	37	0.1
Pet Waste Management	Sub-watershed	Subwatershed wide	1	watershed	90%	\$5,000	3,285	9.1
Sand Filters	Site specific	1-17, 1-34,1-28, 1-29, infiltration basins	19	Units	37%	\$38,000	507	1.4
Illicit connection control	Site specific	Sewer & Stormwater Drainage system	1	watershed	-	\$10,000	1,084	3.0
Education and Outreach	Sub-watershed	Residential areas	1	each	-	\$1,000	904	2.5
Total						\$2,410,320	18,988	53

² Project locations and details are described in Section 5.3, table 5.9, and map figure 5.5.

^{**} FC = Fecal coliform; “-“ = Nominal removal efficiency has been applied or Not applicable

^{***} Some BMPs, which contribute to the reduction of other pollutants (Total N, Total P, and TSS/Sediment), are also listed here; The costs of those BMPs are re-added up to the “Total Cost (\$)” in this table.

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