Executive Summary

The East Branch South Branch Kishwaukee River

The East Branch South Branch Kishwaukee River watershed is located in east-central DeKalb County and southwestern Kane County (Figure 1). The East Branch South Branch Kishwaukee River is a major tributary to the South Branch Kishwaukee River in DeKalb County, with the confluence about one mile west of Shabbona. The watershed drains approximately 123 square miles of land into the South Branch Kishwaukee River (Figure 2). The South Branch Kishwaukee River continues to flow west to its confluence with the Kishwaukee River. From this confluence, the Kishwaukee River flows westward through Rockford before joining the Rock River. The Rock River flows to the southwest before joining the Mississippi River in the Quad Cities area (Moline, Illinois; Rock Island, Illinois, Davenport, Iowa; and Bettendorf, Iowa).

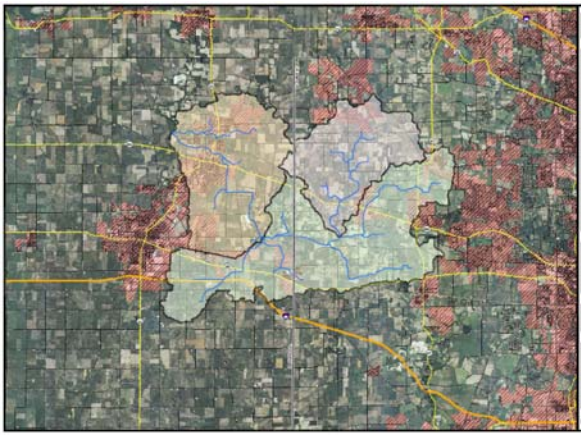

Figure 1: General Watershed Location

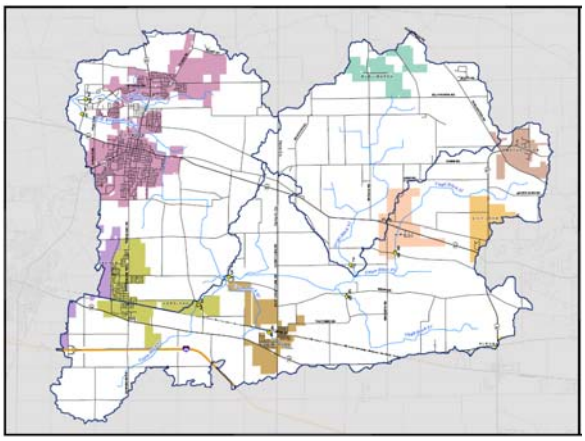

Figure 2: Watershed Map

The East Branch South Branch Kishwaukee River Watershed can be divided into 3 primary subwatersheds: Virgil Ditch, Union Ditch, and the East Branch South Branch Kishwaukee River (Figure 3-2). The Virgil Ditch subwatershed finds its headwaters in northwestern Kane County and flows south into Union Ditch. The Union Ditch system generally flows west from Kane County into DeKalb County and flows into the East Branch South Branch Kishwaukee River. As noted above, the East Branch South Branch Kishwaukee River is a major tributary to the South Branch Kishwaukee River.

Collectively, there are 72.7 stream miles in the East Branch South Branch Kishwaukee River Watershed: 21.3 miles attributed to East Branch South Branch Kishwaukee River, 13.7 miles of Virgil Ditch and 37.7 miles of Union Ditch. Available data indicates that 2,475 acres of wetlands are located within the East Branch South Branch Kishwaukee River watershed. There is one major surface impoundment in the watershed: Sycamore Lake. Sycamore Lake is 7.5 acres in size and is located within the East Branch South Branch Kishwaukee River subwatershed.

Two counties, eight municipalities and eleven townships comprise the East Branch South Branch Kishwaukee River watershed. Approximately 49.1% of the watershed is in DeKalb County and the remaining 50.9% in Kane County. Approximately 17.07% is incorporated in one of the eight municipalities: Village of Burlington, Village of Cortland, City of DeKalb, Village of Elburn, Village of Lily Lake, Village of Maple Park, City of Sycamore, and Town of Virgil. The East Branch South

Branch Kishwaukee River Watershed is approximately 84.34% agricultural and 11.35% developed. The remaining 4.31% is parks and open space.

The Watershed Over Time

The streams and ditches within the East Branch South Branch Kishwaukee River Watershed have undergone significant changes since the time of European settlement in the late 1800s. Two hundred years ago, the much of the watershed would have been comprised on wetlands and very few defined stream channels. The United States Township plat book survey for Virgil Township dated June 1877 indicates that Virgil Ditch #2 and Virgil Ditch #3 did not extend as stream channel north of the Town of Virgil. Additionally, Virgil Ditch #1 is not shown. Presumably, the watershed upstream of Town of Virgil was a wetland slough, falling gradually as it flowed westerly and southwesterly. The presence of the wetlands made agriculture difficult due to the presence of standing water. According to information provided by Kane County, the first recorded right-of-way for the construction of a portion of the Virgil Ditch system was issues to the Drainage Commissions of the Virgil Ditch Drainage District #1 of the Town of Virgil on October 31, 1883. Subsequent right-of-way permits were issued and a large percentage of the watershed's wetlands were filled and the ditches were installed to drain water away from agricultural fields. By the time the 1937 United States Geological Survey (USGS) Topographic Map was prepared, Virgil Ditches #1, #2, and #3 and Union Ditch are shown in their current configuration.

Similarly in the DeKalb County portion of the watershed, significant alterations were made to the watershed in the late 1800s to early 1900s. On the Map of Cortland Township dated 1871, Union Ditch #1, Union Ditch #3, and the East Branch South Branch Kishwaukee River are shown in an alignment similar to what is present today. A wetland complex is identified in the current location of Union Ditch #2. By 1892, excavation of Union Ditch #2 has begun near the current location of downtown Maple Park. A large wetland complex is still present north of Maple Park separating Union Ditch #2 and Union Ditch #3. By 1908, the wetland complex has been drained.

The Impact of Watershed Development

In the late 1800s as people moved into the watershed, they drained wetlands by excavating ditches as a means of removing water so that the land could be used for agriculture. It appears that the majority of the streams that make up Virgil Ditch #1, Virgil Ditch #2, Virgil Ditch #3, and Union Ditch #2 were manmade. These manmade ditches are unstable and channelized. Additionally, the natural occurring stream channels of Union Ditch #1, Union Ditch #3, and the East Branch South Branch Kishwaukee River were also channelized during the late 1800s and early 1900s as a means of increasing flow capacities to move water away from the agricultural field as quickly as possible.

While these changes increased the agricultural productivity of the watershed, there are problems resulting from the channelization of streams and manmade ditches. Channelization is detrimental for the health of streams and rivers through the elimination of suitable in-stream habitat for fish and wildlife by limiting the number of natural in-stream features such as pool-riffle sequences in the channel. Additionally, in many locations, a berm comprised of historic side-cast dredge spoils cuts off the stream channels from the floodplain.

Additionally, hydromodification, defined as human induced activities that change the dynamics of surface or subsurface flow, is prevalent in the watershed. Impacts from hydromodification can be seen as early as the late 1800s with the draining of wetlands, construction of the ditches, and the channelization of streams to increase agricultural production. Early settlers of the Midwest quickly realized that the soils found under wetlands and wet prairies were ideal for crop production once the water was removed. In order to "dry" the wetlands and the wet prairies, systems of sub-surface drainage tiles were installed in order to re-route the groundwater away from the wetlands and wet prairies and discharged into streams and ditches. Given that the drain tiles were drained by gravity flow, the receiving surface water needed to be a lower elevation than the tile. As such, ditches were installed and naturalized stream channels were often excavated to a deeper depth and straightened to facilitate quicker drainage of the fields. Once the water was removed, these areas could be put into successful agricultural production. This creation of agricultural land was at the cost of the loss of wetlands, wet prairies, and riparian habitat. Hydromodification attributed to the installation of drain tiles is prevalent throughout the East Branch South Branch Kishwaukee River.

Starting in the mid-1900s, the municipalities in the watershed including the City of Sycamore and the Villages of Cortland and Maple Park began to transition from rural communities into more suburban communities. This transition from rural to suburban is continuing to occur across the watershed as growth pressure increased from the communities located east and west of the watershed. Without proper planning, the transformation to a more suburban environment the East Branch South Branch Kishwaukee River watershed will begin to experience water quality and habitat degradation.

Under natural and undisturbed conditions, precipitation that falls onto the land surface is allowed to soak into the soil and become groundwater in a process referred to as infiltration or evaporated into the air by plants or from soil or surface waters in a process known as evapotranspiration. Typically, 75-90% of the rainfall either soaks into the ground or evaporates. Precipitation that is not infiltrated or evapotranspired is called runoff. Urban development in the watershed is reducing the amount of land available for the natural infiltration of rainfall into the ground (Figure 3). Instead of precipitation falling on vegetation where it can be infiltrated, it falls on parking lots, rooftops, and roads. The surfaces that prevent infiltration are known as impervious surfaces. From these impervious surfaces, the runoff is quickly conveyed into streams and creeks via a constructed drainage system comprised of drainage ditches, swales, and storm sewers. As a result, streams receive large pulses of water in shorter periods of time, resulting in erosion and destabilization of the stream channel and streambanks. As physical modification of the stream occurs, adjacent property can be damaged. Additionally, when the landscape or stormwater system is insufficient to contain these pulses of water, flooding can occur.

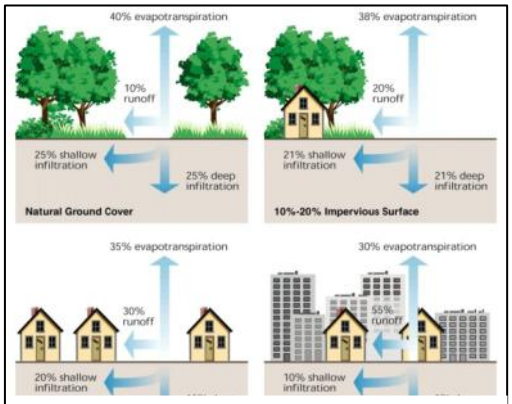

Figure 3: Impacts of increase urbanization on stormwater runoff (FISRWG)

In addition to the change of the volume and rate of runoff, pollutants such as oil and grease, road salt, eroding soil and sediment, metals, bacteria from pet wastes, and excess nutrients (nitrogen and phosphorus) from fertilizers are washed from streets, parking lots, construction sites, lawns, roofs, and golf courses into streams. This type of pollution is called nonpoint source pollution. Additional

pollutants include increased water temperature, altered pH, and low dissolved oxygen levels, all of which can make the streams unhealthy for fish and other aquatic species.

Thus, the health of the East Branch South Branch Kishwaukee River Watershed is directly related to historical, current and future land use activities throughout the watershed. These activities not only impact the residents of the watershed but those of the communities, both human and natural, living downstream on the Kishwaukee River. Fortunately, there are proven measures and practices for addressing these impacts that watershed stakeholders can utilize to take positive action towards improving the watershed. One of the first steps in the process is to understand watershed problems and make a plan for moving forward – a watershed-based plan.

Watershed Planning

Watershed planning is a collaborative approach to addressing a variety of related water resource issues including water quality protection. This approach allows stakeholders to share information, better target limited financial resources, and address common water-related challenges. These challenges can include improving stream and lake water quality, preserving and protecting groundwater resources, managing stormwater, reducing soil erosion and flood damage, conserving open space, protecting wildlife habitat, providing safe recreational opportunities, supporting opportunities for economic development, and other issues of concern.

The following general steps were used in developing this watershed plan:

1. Conduct monthly meetings of the DeKalb County Watershed Steering Committee (DCWSC) with watershed stakeholders.
2. Solicit public input on watershed problems and opportunities to develop watershed goals and objectives.
3. Review and analyze existing studies, watershed conditions, and available watershed data to identify watershed problems and opportunities.
4. Identify best management practices (BMPs) and polices to improve water resources.
5. Develop a detailed watershed action plan and implementation plan.

Watershed Issues and Goals

Early in the planning process, DCWSC members, using input obtained from stakeholders during a public meeting, developed a list of watershed issues and concerns. Watershed concerns included:

- Non-point source runoff
    - Agricultural runoff (silt, pesticides, fertilizers, etc.)
    - Industrial runoff (oils, grease, etc.)
    - Fecal coliform/E. coli
- The ecological condition of the stream channels including lack of fish and wildlife habit
- Hydrologic modification (erosion, channelization, lack of riparian habitat, etc.)
- Development in the floodplain/Potential sources of non-point source pollution (oils, grease, etc.)
- Problem hydraulic structures (undersized culverts, bridges, etc.)
- Overbank flooding
- Stormwater management and drainage issues

- Uncompleted FEMA maps, especially the need for establishing base flow elevations in all Zone A areas
- Regulatory/enforcement differences between the ACOE Chicago District and the ACOE Rock Island District
- Funding challenges for large scale water quality/flood remediation projects

Figure 4 below includes photos of problem areas identified in the watershed Goals were drafted directly from the concerns expressed by the Watershed Steering Committee members and watershed stakeholders. The final goals were adopted on October 9, 2013 meeting and capture the desired outcomes and vision for East Branch South Branch Kishwaukee River (including Union Ditch and Virgil Ditch) watershed. Objectives assigned to each goal are intended to be measurable so that the DCWSC can assess future progress made towards each goal. The goals are not listed by order of importance.

A. Protect and enhance overall surface and groundwater quality in the East Branch South Branch Kishwaukee River Watershed.
B. Reduce existing flood damage in the watershed and prevent flooding from worsening.
C. Improve aquatic and wildlife habitat in the East Branch South Branch Kishwaukee River watershed.
D. Develop open space in the East Branch South Branch Kishwaukee River watershed and provide recreational opportunities
E. Increase coordination between decision makers and other stakeholders in the watershed.
F. Raise stakeholder awareness (residents, public officials, etc) about the importance of best management practices of watershed stewardship

Figure 4: Photos of Watershed Concerns

Watershed Inventory and Assessment

An assessment of watershed conditions was conducted based on available data, studies, and stakeholder input. The assessment includes information on stream corridor conditions, stormwater infrastructure, flooding, water quality, land use, wetlands, and other relevant information. This information not only provides a snapshot of current conditions but also serves as baseline data for comparing future watershed assessments. Four important conclusions based on this watershed assessment are summarized here.

1. Water quality is impacted by low dissolved oxygen levels and elevated levels of total suspended solids, bacteria and nutrients.

2. Stream channels are impacted by streambank erosion and channelization resulting from poor riparian management, flashy hydrology, unstable streambanks, and stormwater runoff.
3. The conversion of vacant, agricultural, or open land to urban uses has the potential to negatively impact water quality in the watershed.
4. Municipalities, residents, business owners, landowners, and other watershed stakeholders lack the coordination and communication necessary to improve watershed resources.

Watershed Best Management Practices (BMPs) and Solutions Toolbox

The watershed-based plan includes a description of BMPs and solutions that when properly applied can reduce stormwater impacts and improve water quality and stream habitat. The toolbox contains BMPs that can be implemented by all levels of watershed stakeholders from residents and landowners to municipalities. BMPs and solutions in the toolbox include:

- Stabilizing and restoring streambanks using bioengineering techniques.
- Installing rain gardens and bioinfiltration practices to help slow, infiltrate, cool, and cleanse stormwater runoff before being discharged into stream.
- Constructing new and retrofitting existing detention basins to help reduce volume and rate of stormwater released during storm events into streams.
- Reducing the area of impervious surfaces and using permeable pavements that allow water to infiltrate into the ground instead of running off as stormwater runoff.
- Restoring and maintaining native riparian buffers along stream and detention basins.
- Creation/restoration of wetlands to help slow, infiltrate, cool, and cleanse stormwater runoff before being discharged into stream

Prioritized Action Plan

The effectiveness of the East Branch South Branch Kishwaukee River Watershed-Based Plan will be largely dependent on the successful implementation of the Prioritized Action Plan by watershed stakeholders. The Action Plan serves as a roadmap for watershed improvement and provides the "who, what, where, and when." The Prioritized Action Plan includes programmatic, policy, and site-specific recommendations. Programmatic Actions are focused on watershed-wide action items that are not site specific while the Site Specific Action Plan identifies specific and actual locations where water quality, hydrological modification, and/or flood reduction/prevention projects can be implemented (Figure 5). The six most important general recommendations include:

1. Remediate existing flood problems and protect against future flooding by reducing stormwater runoff and preserving and restoring areas for surface water storage such as depressional areas, floodplains, and wetlands. These areas also provide water quality improvement benefits.
2. Construct new and retrofit existing stormwater management system including detention basins and storm sewer outfall culverts to reduce runoff volume and rate and improve water quality in streams.
3. Reduce impervious areas by incorporating permeable pavements and bioinfiltration practices such depressed islands and rain gardens in parking lots and streets throughout the watershed.
4. Stabilize streambanks to reduce erosion, protect property and infrastructure, and improve water quality and habitat.

5. Provide public education and outreach to all watershed stakeholders as means of enhancing the understanding of watershed resources and provide opportunities for stakeholders to become involved in plan implementation.
6. Monitor and evaluate watershed plan implementation and changes in watershed conditions to gauge progress on reaching watershed goals.

Figure 5: Examples of BMPs that could be implemented in the watershed

Monitoring and Evaluation Plan

The final chapter of the watershed plan includes the Monitoring and Evaluation Plan. The Monitoring and Evaluation Plan was designed to provide a straightforward means of measuring progress towards watershed goals and plan implementation. Stakeholders should utilize this plan to monitor watershed resources and track whether meaningful progress is being made towards reaching the watershed-based plan's goals. The monitoring plan includes a series of Report Cards developed for each of the goals. The Report Cards are intended to provide a brief description of current conditions, suggest performance indicators that should be evaluated and monitored, milestones to be met, and remedial actions if milestones are not being met.

Where Do We Go From Here?

Historical land uses have played a significant role in the degradation of water resources in the East Branch South Branch Kishwaukee River Watershed. Fortunately, there are actions outlined in this plan can be taken to mitigate existing issues and prevent additional future problems. The future health of the watershed is largely dependent on how stormwater is managed. The business-as-usual approach using conventional development practices, stormwater management techniques and landscape management practices will result in a continued decline of the watershed resources and water quality. A new approach that includes proven and environmentally-sensitive practices and approaches to stormwater management can reverse this trend and begin to improve water quality and stream health in the watershed.

There is no single fix for the water quality and flooding problems in the East Branch South Branch Kishwaukee River Watershed. These problems are the cumulative result of decisions made since people moved to the watershed in the 1800s. It will take the decisions and actions of every stakeholder living in the watershed to work together to improve the health of the watershed. Likewise, actions will need to be taken on every scale from the individual lot to the neighborhood to the municipalities in order to positively impact watershed resources.

This watershed-based plan is the first step in helping watershed residents and stakeholders understand what can be done to restore the valuable resources of the East Branch South Branch Kishwaukee River Watershed.