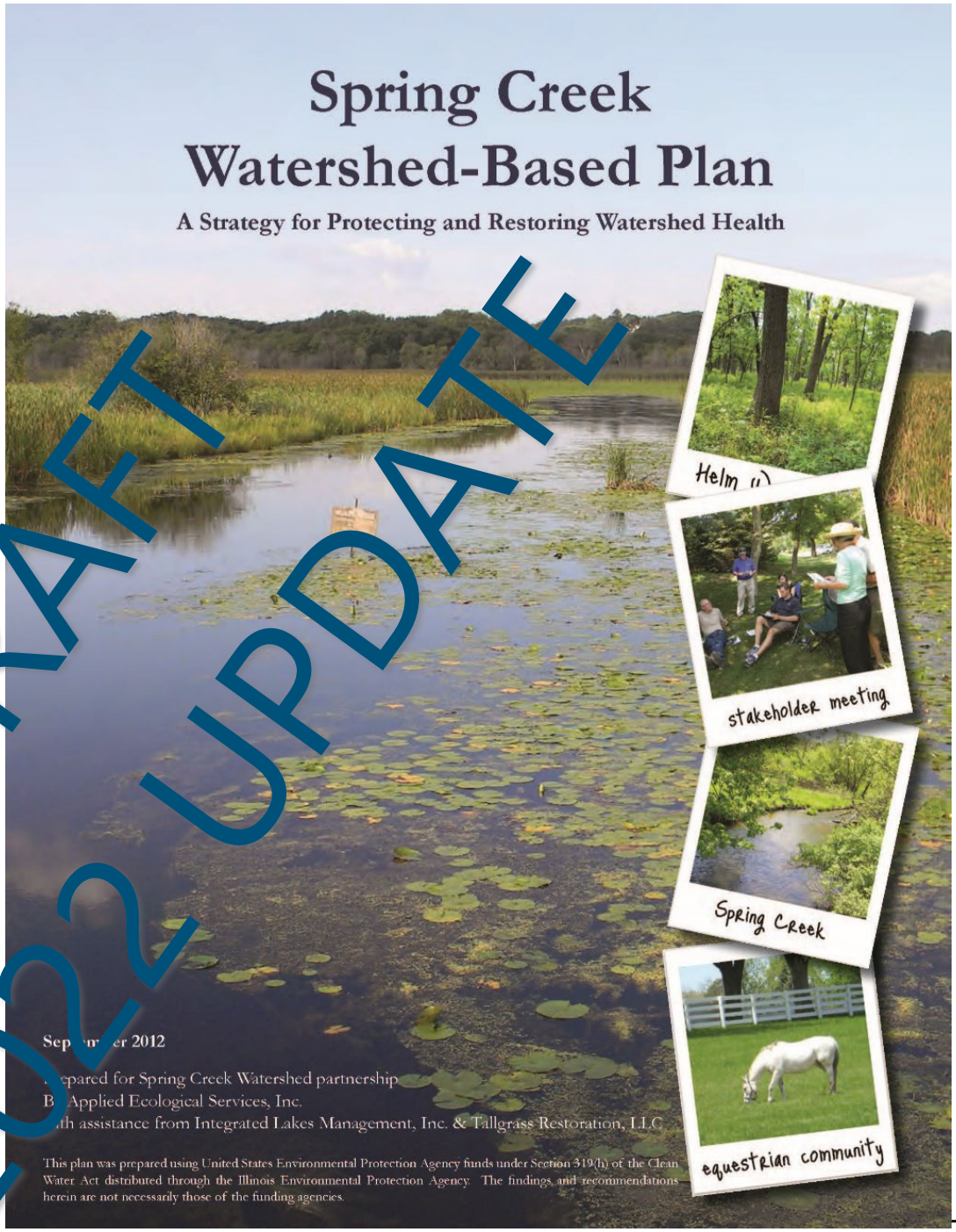
SPRING CREEK WATERSHED-BASED PLAN 2022 UPDATE

McHenry, Lake, Kane, and Cook Counties, Illinois



DRAFT 2022 UPDATE

A Watershed-Based Guide for Protecting and Restoring Watershed Health

May 2022 Update
Original Plan approved September 2012

Developed by the Flint Creek/Spring Creek Watersheds Partnership, with assistance from RES

INTRODUCTION

The Spring Creek Watershed-based Plan was approved by IEPA in 2012 and served as a comprehensive guide to protecting and restoring the health of the watershed. In preparation for the update, Jeff Weiss, Coordinator of the Flint Creek/Spring Creek Watersheds Partnership (FCSCWP) completed a Watershed-Based Plan Joint Evaluation Form (December 8, 2021) on the original plan to serve as a roadmap for necessary updates that might be needed. According to that evaluation, the original plan still meets the United States Environmental Protection Agency's (USEPA's) requirements for an approved watershed-based plan, and it was determined after meeting (December 1, 2021) with Illinois Environmental Protection Agency (IEPA) staff that the update be written as a stand-alone document that references the original plan and incorporates new and additional information and activities that have developed over the ensuing ten years as necessary.

The Spring Creek Watershed-Based Plan is first and foremost a protection plan, rather than a restoration plan – much of the watershed and green infrastructure network is still intact today with fair to good water quality and valuable natural resources, especially compared to the surrounding suburban area. Many of those resources are on protected public land in Cook and Kane County. There is no protected public land in McHenry County. There are many opportunities to protect and restore water and natural resources on private land throughout the watershed and this update is aimed at furthering those efforts. The plan update will serve as a valuable roadmap to follow up on existing protection and restoration opportunities, identify and prioritize new opportunities, detail new information and accomplishments that have occurred since the plan was approved, inspire stakeholders to get or stay involved in the watershed, and help stakeholders secure grant funding for implementation of the plan and its recommendations.

The 2012 plan was a project of the Spring Creek Watershed Partnership. Shortly after the plan was completed, the group merged with the Flint Creek Watershed Partnership to form the FCSCWP. FCSCWP operates as a committee of Citizens for Conservation (CFC). CFC is a 501(c)3 non-profit corporation and provides banking and fiscal agent services to FCSCWP. FCSCWP is led by a management committee, with a board liaison to CFC, and five other board members. The management committee retains a paid part-time coordinator, who conducts water quality, education, and stewardship activities on behalf of FCSCWP, and serves as Steering Committee and custodian for the two watershed plans.

In the ten years since the plan was originally approved, several major accomplishments have occurred that affect the Spring Creek watershed. These include:

- Preservation of Horizon Farm and a few smaller parcels,
- Ongoing work at Spring Creek Forest Preserve and a few other project areas,
- An Army Corps of Engineers project to disable drain tiles and assess restoration opportunities across Spring Creek Forest Preserve,
- Formation of the Barrington Greenways Initiative, which includes the entire Spring Creek watershed,
- Large scale studies into groundwater resources by Illinois State Water Survey, the Barrington Area Council of Governments (BACOG) and McHenry County,
- Local representation on the Northwest Water Planning Alliance, which is committed to maintaining high quality drinking water supplies into the future, and
- Numerous other collaborative, educational, and outreach efforts.

MEETINGS

In preparation for updating the watershed-based plan, the Flint Creek/Spring Creek Watersheds Partnership, under the leadership of Coordinator Jeff Weiss, met with numerous partners and held three stakeholder meetings dedicated to plan review, gathering additional information, and rejuvenating stakeholder engagement in the plan. An outline of meeting agendas, and a brief summary of what took place during each is included in Table 1.

Table 1. Spring Creek watershed-based plan update meeting schedule.

Date	Agenda	Summary
January 19, 2022 (via Zoom)	Introduction Report Card Watershed Success Stories Site-specific projects Discussion and next steps	40 stakeholders attended and participated with many comments and questions in the Spring Creek plan update kick-off meeting on January 19. Justin Pepper gave a talk about the work being done by Spring Creek stewards to protect and restore the aquatic and other natural resources at Spring Creek Forest Preserve. Jeff Weiss reviewed the watershed Report Card and asked for input prior to the next meeting. Many comments and suggestions for the plan update came up in the meeting. They were discussed in follow up meetings and many of them are addressed in the updated plan.
March 16, 2022 (via Zoom)	Plan updates Finalize report cards Project review One-on-one meetings Speakers – collaborating for success	20 stakeholders attended and assisted in the review of the report card from the 2012 Spring Creek Watershed Plan. We identified accomplishments for all watershed goals and acknowledged that a lot more needs to be done to protect the Spring Creek watershed. Jeff Weiss presented the report card segment of the meeting. The second theme of the meeting was collaboration. Melissa Kinast, Barrington Area Conservation Trust, discussed the work of her organization to protect the land, water and other natural resources in the Greater-Barrington Area. Steve Zimmerman from RES presented a model for conservation from Riverwoods in the Des Plaines watershed. Meeting attendees offered several comments related to specific topics covered in the report card review.
May 18, 2022 (via Zoom)	Plan update status report Call for new projects Speakers: • Jim Anderson, Barrington Greenway Initiative • Spring Duffey, Soil & Water Conservation District,McHenry/ Lake, and • Jeff Edstrom, I-EPA, Funding for watershed projects	18 stakeholders attended the third and final stakeholders meeting. Jeff Weiss announced that the draft plan was available for review on the Flint Creek/Spring Creek Watersheds Partnership web site and urged stakeholders to review the plan and take the Spring Creek Challenge, a five-question quiz related to the plan content. He summarized the plan sections that have been updated and focused on the following topics: • Programmatic action plan. Discussion focused on street sweeping, salt applications and reduction of suspended solids. • Green infrastructure project resources • Water quality monitoring • Spring Creek report card • Site-specific action plan Three speakers made presentations • Jim Anderson spoke about the Barrington Greenway Initiative • Spring Duffey, Soil & Water Conservation District of McHenry-Lake presented programs for • Jeff Edstrom, Illinois EPA, discussed financial assistance programs for water quality and watershed protection

During the January meeting some comments and suggestions for the plan update came up. They were discussed in follow up meetings, addressed in the updated plan as appropriate and are summarized here:

- Leaky septic systems are a source of nutrient release into streams. The plan supports regular inspections and maintenance.

- Levels of chloride in surface and ground water from winter salt applications are increasing. The plan update urges more focus on this issue. Smart Salt programs are being implemented in communities across the region to combat this issue.
- Climate resiliency and adaptation goals were suggested. We decided against changing the six goals for the watershed, but added new actions and milestones to recognize and address this issue.
- Water control structures to sustainably manage beaver populations. Beavers are finding new friends in stream restoration and should be included as an option for certain site-specific projects.
- Projects on Homeowner Association sites - we identified several HOA's who are working on site-specific projects and recognize that this is an important stakeholder group that should be supported with grant funding where possible.
- Homeowners removing understory in oak and planting turfgrass - there was a discussion about ordinances to prevent this unsustainable practice. We conducted ordinance reviews and found that Barrington Hills has a "heritage tree ordinance" to protect trees but not the associated oak ecosystems.
- Incentives for homeowners to use native plantings, which reduce stormwater runoff and release of nutrients into streams, lakes, and ponds. Steve Zimmerman presented an example from Riverwoods in the Des Plaines watershed that includes native plantings and cost-sharing with residents as a model for local conservation.
- Role of Lake County and other agencies in the Barrington Greenway Initiative. This important region-wide program is a cornerstone of our future green infrastructure network!
- The Habitat Corridors project was mentioned. This initiative is active in our watershed and connected to the success of our watershed planning efforts.
- Jeff Edstrom from Illinois EPA introduced himself. He will review our plan update. He described the evaluation and review process and offered encouragement and helpful suggestions about taking our plan forward.

This plan update is a product of these stakeholder meetings and many other meetings with municipalities, other stakeholder organizations, and individual stakeholders.

UPDATES to the 2012 Spring Creek Watershed-Based Plan

The following sections have been identified as needing to be updated to bring the original 2012 current to 2022. Updates have been organized by section. Each section references and corresponds to the original Spring Creek Watershed-Based Plan sections and then details any new, additional, or updated information as appropriate.

1.6 Prior Studies and Work updates

Various studies and research have been completed since the 2012 plan was written that provide additional insight into describing and analyzing conditions within Spring Creek watershed. A list of additional studies completed in the last 10 years and relevant to this effort is summarized below.

1. Flint Creek/Spring Creek Watersheds Partnership completed a baseline water quality study for the Flint and Spring Creek Watersheds (Thomsen 2016). https://flintcreekspringcreekwatersheds.org/wp-content/uploads/FSCWP-Baseline-Report-Final.pdf
2. McHenry County's Groundwater Protection Action Plan (McHenry County 2009) addresses groundwater issues by presenting model policies that all local government can consider and modify to address their individual needs.
3. Illinois State Water Survey has completed a number of groundwater studies for the 11-county Northeastern Illinois Regional Water Supply Planning area, which includes the Spring Creek watershed (2009, 2012, 2013, 2015).
4. The Village of Fox River Grove updated their Comprehensive Plan in 2014.
5. In 2014-15, the Army Corps of Engineers conducted a study for the Forest Preserve District of Cook County at Spring Creek Forest Preserve. Most of the network of agricultural drain tiles were disabled in order to restore natural hydrology. A detailed assessment of the work required to restore hydrological function and other natural resources at the preserve was published in October 2015. https://www.lrc.usace.army.mil/Missions/Civil-Works-Projects/Spring-Creek-Valley/.
6. In 2015, Barrington Area Council of Governments (BACOG) developed a groundwater monitoring system protocol and published a Baseline Surface and Groundwater Water-Level Condition study (Thomsen, 2015).

https://flintcreekspringcreekwatersheds.org/wp-content/uploads/GWL-Report-KOTECI_BACOG_February-2015-FINAL.pdf

7. BACOG assessed the sustainability of the area's shallow aquifer system (2018). Nearly all Barrington Area residents, including those within Spring Creek watershed, draw water from this interconnected source, whether they rely on a municipal water system or have a private or community well and the report thoroughly details their findings based on data spanning from 2008-2018.
8. In 2018 Citizen's for Conservation (CFC) launched the Barrington Greenway Initiative (BGI). The objective of the BGI is to create unbroken, linked habitat corridors, increased biodiversity, and strengthened ecosystems to deliver benefits to our community. BGI has brought together strategic conservation partners to collaboratively plan, act and deliver on what is best for nature and the greater Barrington area.
9. In February 2019, Illinois State Water Survey produced a report entitled Water Quality Trend Analysis for the Fox River Watershed: Stratton Dam to the Illinois River that was based on water quality data collected by Fox River Study Group.
10. The Village of Barrington Hills adopted a new Comprehensive Plan in 2019.
11. McHenry County developed and adopted the McHenry County Water Resources Action Plan in 2011. The McHenry County WRAP Task Force completed an update that was adopted on November 17, 2020. The updated WRAP is a comprehensive guide designed to educate decision-makers from the county, municipalities, businesses and individuals about water resources, the potential threats to those resources, and Best Management Practices that can help protect or restore them. The County also updated their Stormwater Management Ordinance.
12. In October 2021, the Forest Preserve District of Cook County completed an assessment of Spring Creek near the Donlea Road bridge. It was primarily a biological survey, but also included chemical water quality data for Spring Creek.
13. BACOG completed a groundwater report entitled *2021 Water Level Measurements in the Shallow Aquifer System of the BACOG Area* in October 2021. The report details program components, facilities, and the data collected – it is not an analysis of the data.

2.2 Goals and Objectives updates

As part of the update process, the original goals and objectives of the plan were reviewed and it was determined that a couple of the objectives, particularly for Goal A, needed to be reworded to align with current policies and practices.

Goal A, Objective 3:

Original objective: Use alternative to road salt.

Revised objective: Local governments implement Best Management Practices for snow/ice control that maintain safety for pedestrians, drivers, vehicles and property while eliminating the unnecessary use of salt in order to save money and minimize impacts to water quality and the environment.

Goal A, Objective 8:

Original objective: Illinois EPA/IDNR begin monitoring Spring Creek as part of Intensive River Basin Survey program, monitor major lakes via the Illinois Volunteer Lake Monitoring Program, and continue RiverWatch and Friends of Fox River programs.

Revised objective: Increase water quality monitoring of surface waters in Spring Creek watershed leveraging the assistance of the IEPA, IDNR, FCSCWP, Illinois Volunteer Lake Monitoring Program, RiverWatch, Fox River Study Group, and other volunteer monitoring programs.

3.5 Jurisdictions, Roles, & Protections updates

Ordinance Review

Protection of natural resources and green infrastructure during future growth will be important for the future health of the Spring Creek watershed. To assess how future growth might further impact the watershed, an assessment of local ordinances was performed to determine how development currently occurs in each local government. In this way, potential improvements to local ordinances can be identified. As part of the assessment, municipal governments were asked to compare their local ordinances against model policies outlined by the Center for Watershed Protection (CWP) in a publication entitled "Better Site Design: A Handbook for Changing Development Rules in Your Community" (CWP, 1998)

and complete The Code & Ordinance Worksheet: A Tool for Evaluating Development Rules in Your Community (CWP, 2017).

CWP's recommended ordinance review process involves assessments of four general categories including Residential Streets & Parking Lots, Lot Development, Conservation of Natural Areas, and Runoff Reduction. Various questions with point totals are examined under each category. The maximum for the Suburban worksheet is 126 points and final scores are depicted as a percentage of the total. CWP also provides general guidance based on scores. Scores between 60 and 80 suggest that it may be advisable to reform local development ordinances. Scores less than 60 generally mean that local ordinances are not environmentally friendly and serious reform may be needed. McHenry County scored 59 points or 47%, the Village of Algonquin scored 63 points (50%), and South Barrington scored 55% (adjusted from an older form where they scored 55 of 100 points). No other local governments within the watershed returned the worksheets. Although scores are relatively low, it should be noted that this assessment is meant to be a tool to local communities to help guide development of future ordinances and draw awareness to sections that might be easy to update to improve scores. Various policy recommendations are included in the Action Plan section of the report to address general ordinance deficiencies.

3.7 Future Land Use updates

The 2012 plan provides a detailed analysis of current and future land use. Land use has changed very little in the intervening decade. One of the critical areas identified in the 2012 plan was developed in South Barrington for residential use. Several other open parcels are likely to be developed in the next ten years in the southern headwater areas of Hoffman Estates and South Barrington. Two large developments have been approved at Higgins Road and IL Route 59 and zoned for commercial development, but construction has been delayed due to economic factors. Potential impacts include:

- increase in impervious surfaces that could increase flood hazards in large storm events,
- new detention areas, that will require maintenance, and
- significant increase in the amount of salt applied to new commercial and mercantile roads, driveways, and sidewalks.

3.10 Green Infrastructure updates

The green infrastructure network in the Spring Creek Watershed is anchored by Spring Creek Forest Preserve, a 4,000-acre Cook County Forest Preserve that contains the main stem of Spring Creek, several tributary streams, wetlands, and two lakes. The Army Corps of Engineers completed a project in 2015 to assess the preserve. Sections of the preserve were in crop production until recently, and extensive agricultural drainage systems that utilize ditches and tiles were found through much of the site. Most of the drain tiles were disabled by the Army Corps. Overall objectives of the project included:

- Hydrology and hydraulics analysis,
- Restoration of wetlands in the lower elevations throughout the project area by tile removal and ditch obstruction,
- Restoration of the appropriate flow regime and stability of the creek,
- Removal of invasive species in wetlands and prairie/savanna buffers, and
- Design and high-level cost estimates to restore degraded ecosystems across the preserve.

The Forest Preserve District of Cook County (FPDCC) funds habitat restoration work by contractors at the Spring Creek Nature Preserve and supports the volunteer efforts of the Spring Creek Stewards (SCS), who are working to restore several areas within the preserve. The additional work identified in the Army Corps plan design has not been funded to date.

SCS are a community of volunteers that work to restore the ecological health of Spring Creek Forest Preserve. SCS have been active at Spring Creek Forest Preserve since approximately 2005 and lead campaigns to remove invasive species and reestablish native vegetation at several higher quality areas within the preserve. SCS receive support from several non-profit organizations, including Bobolink Foundation, CFC, Audubon Chicago Region, and Friends of the Forest Preserves.

In 2018 the Barrington Greenway (BGI) was initiated by CFC. BGI brings together seven strategic partners, across several geographic jurisdictions, to collaboratively share priorities, plans and resources to deliver greater benefits to nature.

Working together is producing larger, higher quality and more strategic restorations. The partners are working together to create a linked greenway from the Spring Creek Forest Preserve area on the south to the Port Barrington area to the north. This area encompasses more than 14,000 acres of prairies, wetlands, and woodlands. BGI coordinates volunteer efforts with and provides part of CFC's native seed harvest to Spring Creek Stewards. It is hoped that over time, more of the land acquisition budget of BGI might go to the Spring Creek watershed.

In 2019, FPDCC completed its acquisition of Horizon Farm, a nearly 400-acre former horse farm. Sections were opened to the public in 2021, with trails for walking and equestrian use. Some of the land is maintained as habitat for grassland birds. Barrington Area Conservation Trust (BACT) owns several parcels in the watershed and is conducting restoration work at Far Field, Mondchine, and Katie's Marsh; BACT also has conservation easements which form "heritage corridors" along rustic roads in the watershed. Kane County Forest Preserves has conducted recent brush clearing work at its 204-acre Helm Woods, which is an Illinois Nature Preserve. Dundee Township owns and manages Helm Prairie as part of the Nature Preserve. These preserves expand the footprint of the Spring Creek green infrastructure network.

It is worth noting that there are no protected natural areas in the 4,000 acres of the Spring Creek watershed located in McHenry County. Despite natural resources that include stream corridors, wetlands, and basins with significant potential for restoration, and opportunities to mitigate water quality issues, none of the 50 McHenry County site-specific projects on private land in the 2012 plan have been initiated. Private landowners should be encouraged to take constructive action on their property, utilizing the pollution reduction analyses in the site-specific action plan for Spring Creek. Funding opportunities are available for some projects, which should be brought to the attention of landowners.

3.12.4 FEMA Floodplain updates

Cook and Kane Counties are in the process of updating the Federal Emergency Management Agency (FEMA) Flood Maps within Spring Creek watershed. Revised maps are undergoing review by the community in spring of 2022. Once the maps become effective, they will be used as the basis for flood insurance ratings as well as local flood protection regulations adopted under the National Flood Insurance Program. FEMA also intends that they be used as tools to assist planning processes and outreach efforts to quickly respond to and recover from future events. According to the preliminary revised maps, Barrington Hills has a minor risk of flooding over the next 30 years. Once the revised maps are finalized, they should be included in the updated Spring Creek Watershed-Based Plan via amendment (as outlined in Section 7.5).

3.13 Groundwater updates

Over the last decade, several studies and reports on groundwater resources within Spring Creek have been completed. Illinois State Water Survey published a report in 2015 entitled *Changing Groundwater Levels in the Sandstone Aquifers of NE Illinois*. This report shows that the sandstone aquifers below Spring Creek watershed have exhibited 400-600 feet of drawdown as compared to predevelopment head levels (Figure 1). Additionally, McHenry County developed and adopted the McHenry County Water Resources Action Plan in 2011 followed by an update that was adopted on November 17, 2020. The updated WRAP is a comprehensive guide designed to educate decision-makers from the county, municipalities, businesses and individuals about water resources, the potential threats to those resources, and Best Management Practices that can help protect or restore them. The WRAP contains more detailed mapping of the potential risk of declining well performance by 2050, as detailed by ISWS (Figure 2). These areas are experiencing desaturation and may face increasing challenges to pumping and water supplies in the future. Much more detailed information about groundwater resources in Spring Creek watershed can be found in both the ISWS 2015 report and the Updated McHenry County WRAP (2020), both available online from their respective websites.

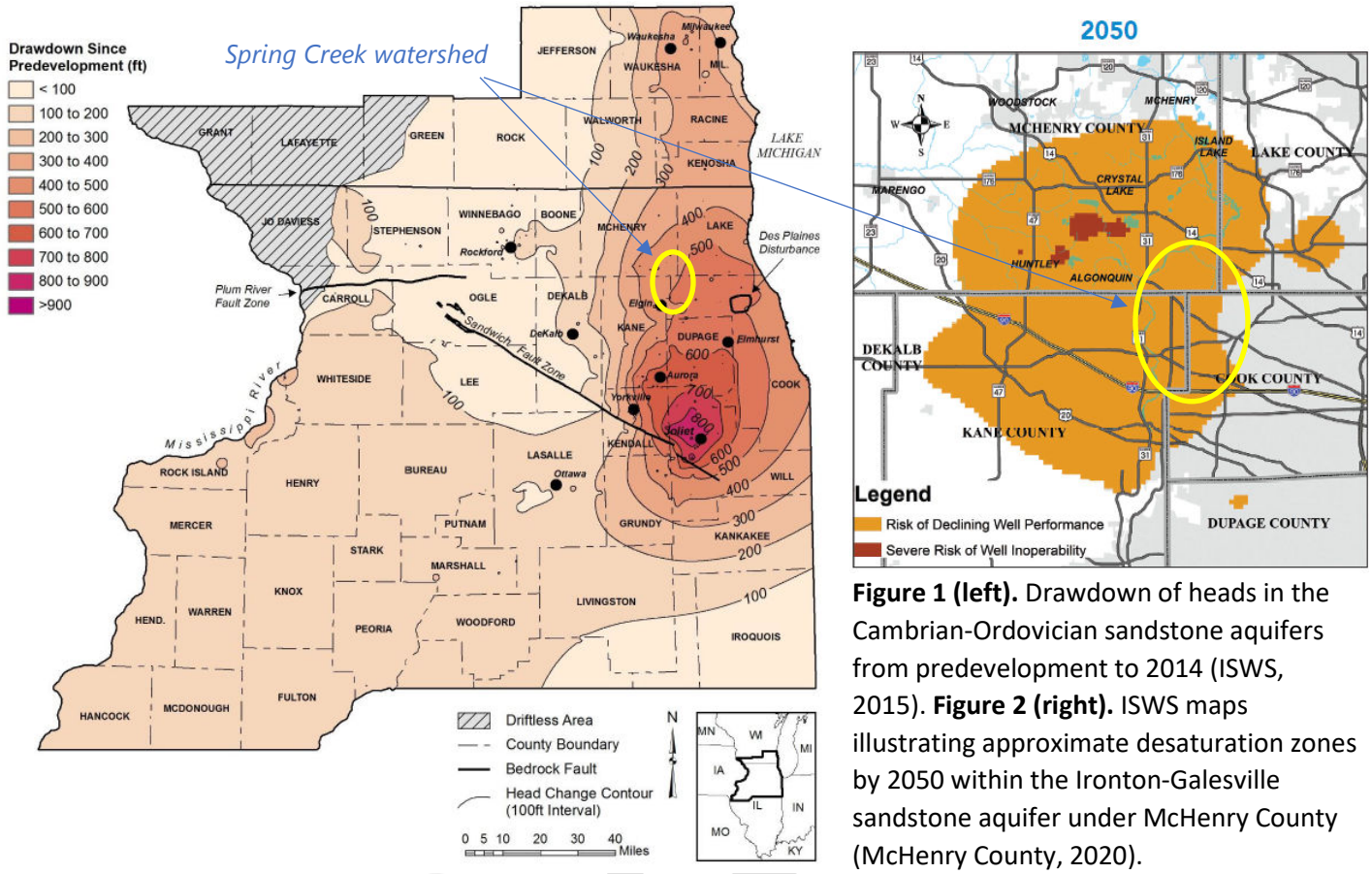


Figure 1 (left). Drawdown of heads in the Cambrian-Ordovician sandstone aquifers from predevelopment to 2014 (ISWS, 2015). **Figure 2 (right).** ISWS maps illustrating approximate desaturation zones by 2050 within the Ironton-Galesville sandstone aquifer under McHenry County (McHenry County, 2020).

Finally, some of the studies identified or underway by Barrington Area Council of Governments (BACOG) in the original plan were completed. BACOG published two reports: *Assessment of Natural Groundwater Quality in the Shallow Aquifer System of the BACOG Region, 2008-2018* and *2021 Water Level Measurements in the Shallow Aquifer System of the BACOG Area* in October 2021. Nearly all Barrington Area residents, including those within Spring Creek watershed, draw water from an interconnected groundwater source, whether they rely on a municipal water system or have a private or community well and the report thoroughly details their findings based on data spanning from 2008-2018. A summary from the 2018 report, which focused on groundwater quality, reads as follows:

> *"Overall, groundwater in the BACOG area is good quality, with low levels of most contaminants but also with a few areas of concern. The major contaminants with MCLs in Illinois that relate to potential negative effects on human health – arsenic, fluoride, and nitrate -- do not appear to be an issue in the BACOG area. There were only 1-2 samples for each of the three contaminants having an elevated level, the elevated samples totaled less than 1% of all tested samples for that parameter, and all were in different locations; this does not represent a concern for the region's groundwater."*

The 2021 BACOG report details program components, facilities, and the data collected – it is not an analysis of the data. For more detailed information on BACOG's analysis and reporting, refer to the reports which can be found on BACOG's website at https://bacog.org/.

3.14 Water Quality Assessment updates

Limited new water quality data has been collected since the 2012 plan. None of the communities in the watershed conduct water quality testing or analysis for surface or lake water in the Spring Creek watershed. FCSCWP conducted one time per year stream flow and chemical sampling for several Spring Creek locations in late summer in 2015, 2020 and 2021 as indicated on Figure 3 and summarized in Table 2. Shading in Table 2 is based on the Spring Creek water quality guidelines for streams and other indicators, as indicated in Table 3.

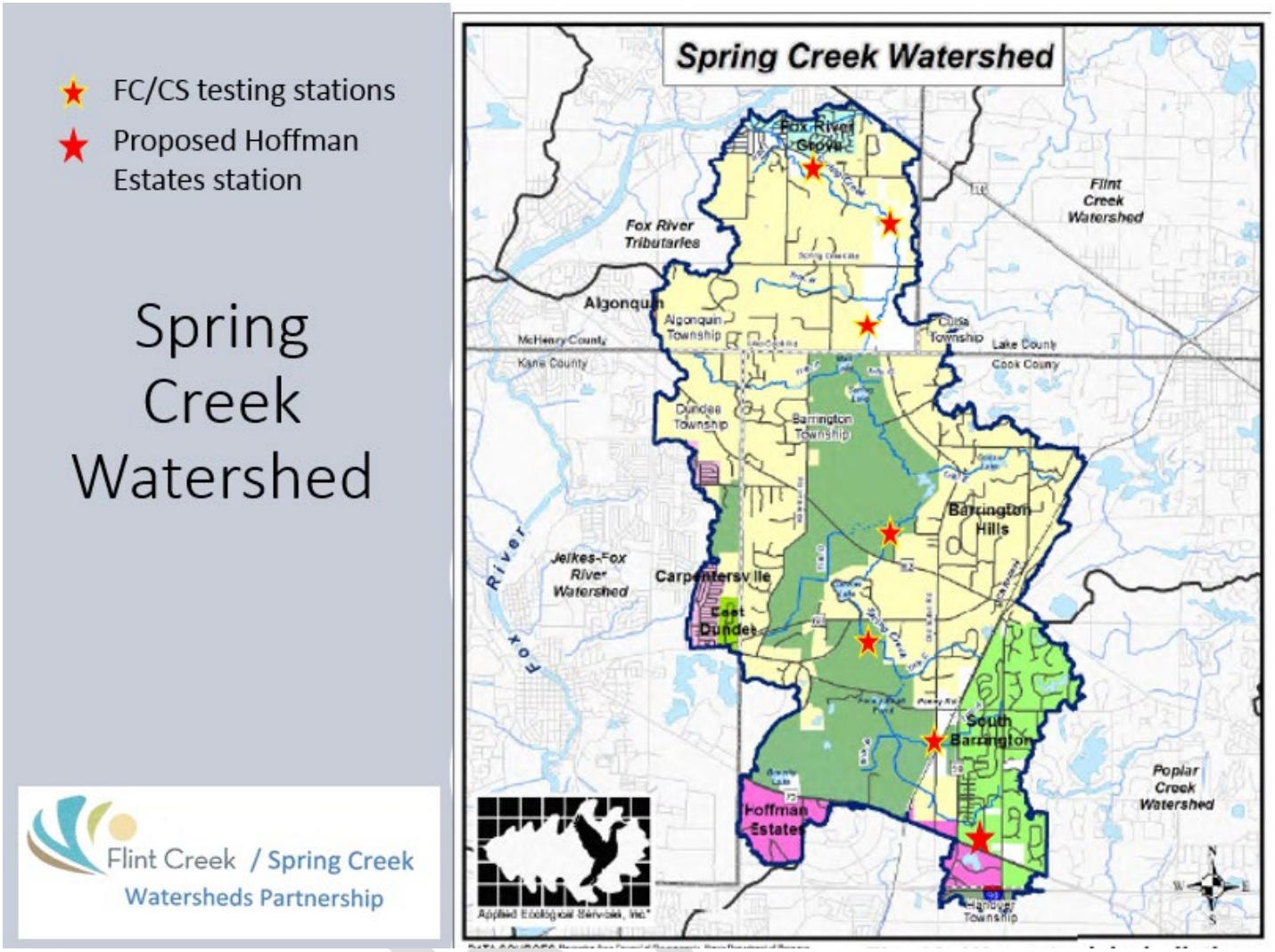


Figure 3. Water quality sampling locations in Spring Creek watershed.

Development and installation of impervious surfaces increase stream flows, especially during extreme storm events, which are occurring more frequently with the onset of climate change. New development near the headwaters in Hoffman Estates and South Barrington may increase flows on these occasions. Spring Creek Forest Preserve is an important resource for storing and slowly releasing stormwater downstream. In 2021, the drought drew down water tables that support stream flow. As a result, the downstream station in Fox River Grove was the only station to record any stream flow.

Table 2. Spring Creek new water quality data summary.

	August 2015 Baseline									
Location/ parameter	Flow (cfs)	Temp C	Temp F	pH (s.u.)	DO (mg/l)	E. coli CFU/100ml	Chloride (mg/l)	TDS (mg/l)	TKN (mg/l)	Total P (mg/l)
South Barrington										
Barrington Hills 1										
Barrington Hills 2	1.31	23.0	73	7.70	6.14	139	258	767	1.10	0.050
Barrington Hills 3	2.17	22.2	72	7.16	0.05	11	106	533	1.20	0.050
Barrington Hills 4										
Fox River Grove	1.52	23.3	74	8.16	8.76	157	73	533	0.06	0.040

	August 2020									
Location/ parameter	Flow (cfs)	Temp C	Temp F	pH (s.u.)	DO (mg/l)	E. coli CFU/100ml	Chloride (mg/l)	TDS (mg/l)	TKN (mg/l)	Total P (mg/l)
South Barrington										
Barrington Hills 1										
Barrington Hills 2	1.15	19.5	67	7.68	7.75	161	148	767	<0.105	<0.0400
Barrington Hills 3	-	23.5	74	7.57	2.97	365	83	595	<0.105	0.275
Barrington Hills 4										
Fox River Grove	15.93	25.0	77	8.34	8.63	276	68	583	<0.105	0.119

	August 31/September 1 2021										
Location/ parameter	Flow (cfs)	Temp C	Temp F	pH (s.u.)	DO (mg/l)	E. coli CFU/100ml	Chloride (mg/l)	TDS (mg/l)	Susp. Slds. (mg/l)	TKN (mg/l)	Total P (mg/l)
South Barrington	0				9.22		447	56	1100		<0.100
Barrington Hills 1	0				7.09		254	856	<10.0		0.108
Barrington Hills 2	0				7.03	25	436	1040	<10.0		<0.100
Barrington Hills 3	0	18.8	66	7.22	2.85		153	715	<10.0		<0.101
Barrington Hills 4	0				9.42	105	106	593	<10.0		0.139
Fox River Grove	1.71	20.7	69	8.29	9.72	187	78	570	<10.0		0.110

Value outside of guidelines
Concern (exceeds other guidelines)
Acceptable levels
Below detection level
No data/no standard

Table 3. Spring Creek water quality guidelines for streams.

Parameter	Statistical, Numerical, or General Use Guidelines
Dissolved Oxygen (DO) (mg/l)	>5.0 mg/l*
pH	>6.5 or <9.0*
Total Phosphorus (TP) (m/l)	<0.0725 mg/l**
Nitrate-Nitrite (NO2+NO3) (Calculated) (mg/l)	1.798 mg/l**
Ammonia Nitrogen (NH3) (mg/l)	<15 mg/l*
Average Total Kjeldahl Nitrogen (TKN)	0.663 mg/l**
Total Nitrogen (TN) (mg/L), calculated	<2.461 mg/l**
Total Suspended Solids (TSS) (mg/l)	<19 mg/l***
E. coli (MPN/mL)	<200 CFU/100ml*
Chloride (mg/l)	<500 mg/l*

* Illinois EPA General Use Standard

** Ambient Water Quality Criteria Recommendations: Rivers and Streams in Nutrient Ecoregion VI (USEPA 2000)

*** Present and Reference Concentrations and Yields of Suspended Sediment in Streams in the Great Lakes Region and Adjacent Areas (USGS 2006)

Because no broad-based testing had been conducted previously. the baseline testing conducted in 2015 included many metals, organic chemicals, and other pollutants. These included Cadmium, Copper, Lead, Potassium, Zinc, Phenolics, Oil & Grease, Sulfate, Aluminum, Barium, Calcium, Magnesium, Manganese, and Sodium. Phenolics are "a class of chemical compounds consisting of one or more hydroxyl groups (--OH) bonded directly to an aromatic hydrocarbon containing solely carbon and hydrogen atoms" (Thomsen, 2016). Fortunately, none of these pollutants was found at detectible levels and thus were not included in subsequent testing.

Spring Creek has never appeared on the "303(d) list" of impaired and threatened waters in Illinois. For a stream that is located near a major metropolitan area, the limited water quality data suggest that stream water quality in Spring Creek is relatively good. However,

- Chloride levels were relatively high across the watershed during the drought year of 2021, exceeding the EPA chronic level of 230 mg/l at two stations. Chloride is an issue across the upper Midwest where large quantities of salt are applied in winter to roads, parking lots and other surfaces to promote safe conditions for drivers and pedestrians. The salt dissolves in surface and ground water, where even small concentrations of salt can harm sensitive plants and wildlife and pollute groundwater, which residents depend on for their drinking water. This is a critical issue and is likely to get worse as more development occurs in the headwater areas of Spring Creek. Lack of data for chloride levels in winter and spring is a major gap in the data. FCSCWP hopes to address this gap by expanding its network of stream gages to include the Spring Creek watershed. FCSCWP and BACOG maintain five stream gages in the Flint Creek watershed, three of which are equipped to capture hourly "proxy" data (conductivity and salinity) that can be converted into chloride concentration and allow continuous tracking of this pollutant. Once stream data includes both stream flow and pollutant concentration, then "loadings" or total quantity of pollutants can be calculated.
- Dissolved oxygen levels below 5 parts per million mean that Spring Creek is impaired for aquatic life in at least one stream reach for each year that tests were performed.
- One high level measurement of suspended solids (1,100 mg/l) was noted at the South Barrington station in 2021. Suspended solids commonly originate from eroding soil along stream banks and basins, and algae blooms. However, there was no flow at this station, so this measurement is probably not meaningful.
- Elevated levels of nutrients (phosphorus and nitrogen) are noted periodically. Nutrients originate from a wide variety of sources, some of which can be mitigated by sound practices that can be implemented by individuals, homeowner associations and communities.
- Increased turbidity (suspended solids) is usually caused by eroded soils and algae. Contributing factors include fertilizer applications that wash into streams and basins and promote algae blooms; steep, shaded streambanks with bare soils that are exposed to erosion; wildlife and pet waste, including horses; and landscape waste.
- So far, no harmful algae blooms (cyanobacteria) have been recorded in the Spring Creek watershed. Lake monitoring measures should be continued to assess this issue. FCSCWP sponsors lake water quality and clarity testing by residents in two lakes in the Spring Creek watershed.

Greater frequency of water quality testing in the future is needed to make better overall assessments of water quality, identify trends over time, and locate sources of pollutants.

In October 2021, the Forest Preserve District of Cook County completed an assessment of Spring Creek near the Donlea Road bridge. It was primarily a biological survey, but also included chemical water quality data for Spring Creek. Unfortunately, there was very low flow during a drought period, so the findings may not be representative. The report contained the following conclusions and recommendations.

"Spring Creek is known as one of the highest quality streams in the area" (Spring Creek Watershed Based Plan – 2012), yet its diversity of fish species was only average when compared to the other streams surveyed throughout the Forest Preserves. And while, some of these species are found in only a few streams within the Forest Preserves and one, the Pugnose Minnow has only been observed in Spring Creek, you would expect higher biodiversity from such a high-quality stream. The lack of species diversity may be due to the time of the year when this survey was done, sampling methods, or the survey location. The high Chloride levels and sedimentation from sheet erosion may also play a factor in the low species numbers. The lack of non-indigenous invasive species in Spring Creek is a very encouraging sign and continued

monitoring is paramount to keeping invasive species out. Additionally, surveys elsewhere on Spring Creek are needed in order to get a better understanding of the overall fishery of this stream.

After analyzing the macro-invertebrate samples collected it was determined that Spring Creek had a Family Biotic Index (FBI) of 5.27 which indicates that it has "Fair Water Quality" and indicates that some organic pollution is likely. Being surrounded by 3,910 acres of forest preserves including the 560-acre Spring Lake Nature Preserve it is hard to tell what would be contributing to this since this creek is well buffered from urban development. Spring Lake Preserve has 45-miles of unpaved trails running through it. These trails get used heavily by horseback riders. The land erosion from trail usage and horse droppings/urine may be loading the creek with organic nutrients. Determining where this organic pollution is coming from and taking measures to decrease it should help improve water quality and the biodiversity of the macro-invertebrates. Sampling the macro-invertebrates of Spring Creek during the late spring to early summer would also be interesting and helpful in determining macro-invertebrate biodiversity and water quality. Further surveys should be done in the near future.

The restoration of the vegetation along the stretch of Spring Creek that extends south of the bridge at Donlea Road should be explored. Reed Canary Grass in this area is a serious issue and its removal, and the restoration of the shoreline is needed. This work would allow, with a little help, the small amount of quality stream vegetation that persists here, to spread and stabilize the streambanks. Likewise, removing the European Buckthorn and reestablishing a native ground layer of vegetation in this area would help reduce the siltation caused by sheet erosion. Stopping the flow of sediment into Spring Creek would in turn help improve the natural riffles and pools that native fish and macro-invertebrates need to thrive.

Additional surveys of Spring Creek in this area and elsewhere is recommended in order to maintain and improve this high-quality stream."

5.1 Programmatic Action Plan updates

In addition to the Programmatic Actions to address goal objectives outlined in the 2012 Plan, extensive policy and general, watershed-wide recommendations have been developed in the ensuing years in support of improving water quality in the Spring Creek watershed.

5.1.1 Policy Recommendations (new)

Various recommendations are made throughout this report related to how local governments can improve the condition of Spring Creek watershed through policy. Policy recommendations focus on improving watershed conditions by preserving green infrastructure, protecting groundwater, minimizing road salts, minimizing lawn fertilizer, sustainable management of stormwater, and allowances for native landscaping. The process of creating and implementing policy changes can be complex and time consuming. And, although there are numerous possible policy best practices for the watershed, the following guidance is considered the most important and highest priority for implementation.

Green Infrastructure Network Policy Recommendations

- Identify important unprotected green infrastructure parcels then protect and implement long term management where practicable.
- Leverage the existing work of the Barrington Greenways Initiative to further protect and restore green infrastructure.
- Work with private landowners along stream corridors to manage their land for green infrastructure benefits.
- Use the Green Infrastructure Network to identify new trails and trail connections.

Groundwater Policy Recommendations

- Encourage stormwater management practices that clean and infiltrate water in any development or redevelopment.
- Limit impervious cover within new and redevelopments occurring within Subwatershed Management Unit 2 which is ranked as highly vulnerable to future impervious cover increases.

Road Salt Policy Recommendations

- Encourage supplementing existing programs with deicing BMPs such as utilizing alternative deicing chemicals, anti-icing or pretreatment, controlling the amount and rate of spreading, controlling the timing of application, utilizing proper application equipment, equipment calibration, and educating/training deicing employees.
- Consider establishing additional new best management practice recommendations based on the results of various ongoing studies and research being produced by Illinois Tollway to reduce, re-use, and offset the impacts of winter roadway operations. These include converting invasives to energy, to harvest cattails for the purpose of removing excess nutrients, potentially quantifying chloride removal, re-using the plant mass for compost or compressed into an Energy product or potentially using the byproducts of the biomass as a replacement for beet juice on roadways (Illinois Tollway, 2019; Paap, 2019; and Wetlands Research, 2019).

Lawn Fertilizer and Paving Policy Best Recommendations

- Discourage use of phosphorus in private fertilizer application without soil testing pre-application.
- Discourage use of coal tar sealants within the watershed.
- Encourage the use of pavement alternatives such as permeable pavers in appropriate areas.

Stormwater Management Facility Policy Recommendations

- Encourage new development and redevelopment to use stormwater management techniques/ facilities that serve multiple functions including storage, water quality benefits, infiltration, and wildlife habitat.
- Encourage the use of reduced runoff volume from new and retrofitted detention basins.
- Encourage local governments to allow stormwater trees or create a stormwater tree program.

Native Landscaping/Natural Area Restoration Recommendations

- Allow native landscaping within local ordinances.
- Ensure local "weed control" ordinances do not discourage or prohibit native landscaping.
- Include short- and long-term management with performance standards for restored natural areas and stormwater features within new and redevelopment.

Climate Change Adaptation Recommendations

- *Local municipalities follow the Climate Change Adaptation Recommendations as outlined in the McHenry County Water Resources Action Plan 2020 Update or similar.*

5.1.2 Dry & Wet Bottom Detention Basin Design/Retrofits, Establishment, & Maintenance (new)

Detention basins are best described as human made depressions for the temporary storage of stormwater runoff with controlled release following a rain event. Most existing wet bottom basins are essentially ponds planted with turf grass along the slopes, and the majority of the dry bottom basins are similarly planted with turf grass from end to end. These attributes do not promote water quality improvement, good infiltration, or wildlife habitat capabilities. Studies conducted by several credible entities over the past two decades reveal the benefits of detention basins that serve multiple functions. According to USEPA, properly designed dry bottom infiltration basins reduce total suspended solids (sediment) by 58%, total phosphorus by 26%, and total nitrogen by 30%. Wet bottom basins designed to have wetland characteristics reduce total suspended solids (sediment) by 78%, total phosphorus by 44% and total nitrogen by 20% (MDEQ, 1999).

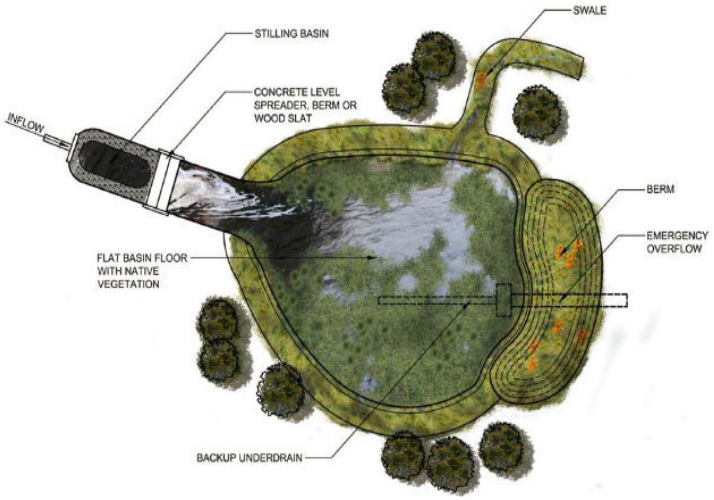


Figure 4. Naturalized dry bottom infiltration basin

Detention Basin Recommendations

Future detention basin design within the watershed should consist of naturalized basins that serve multiple functions, including appropriate water storage, water quality improvement, natural aesthetics, and wildlife habitat. There are also many opportunities to retrofit existing dry

or wet bottom detention basins by incorporating minor engineering changes and naturalizing with native vegetation. Site-specific retrofit opportunities are identified in the Site-Specific Action Plan. Location, design, establishment, and long-term maintenance recommendations for naturalized detention basins are included below. Note: requirements of applicable county stormwater management ordinances, such as volume and release rates, will apply to the design recommendations included below.

Detention Location Recommendations

- Naturalized detention basins should be restricted to natural depressions or previously drained hydric soil areas and adjacent to other existing green infrastructure in an attempt to aesthetically fit and blend into the landscape. Use of existing isolated wetlands for detention should be evaluated on a case-by-case basis.
- Basins should not be constructed in any average to high quality ecological community.
- Outlets from detentions should not enter sensitive ecological areas.

Detention Design Recommendations

- One appropriately sized, large detention basin should be constructed across multiple development sites rather than constructing several smaller basins.
- Side slopes should be no steeper than 4H:1V, at least 25 feet wide, planted to native mesic prairie, and stabilized with erosion control blanket. Native oak trees *(Quercus sp.*) and other fire-tolerant species should be the only tree species planted on the side slopes.
- Dry bottom basins should be planted to mesic or wet-mesic prairie depending on site conditions.
- A minimum 5-foot-wide shelf planted to native wet prairie and stabilized with erosion control blanket should be constructed above the normal water level in wet and wetland bottom basins. This area should be designed to inundate after every 0.5-inch rain event or greater.
- A minimum 10-foot-wide shelf planted with native emergent plugs should extend from the normal water level to 2 feet below normal water level in wet and wetland bottom basins.
- Permanent pools in wet and wetland bottom basins should be at least 4 feet deep.
- Irregular islands and peninsulas should be constructed in wet and wetland bottom basins to slow the movement of water through the basin. They should be planted to native mesic or wet prairie depending on elevation above normal water level.
- A 4-6-foot-deep forebay, accessible to operations & maintenance crews, should be built at inlet(s) of wet/wetland bottom basins to capture sediment; a 4-6-foot-deep micropool should be constructed at the outlet to prevent clogging.

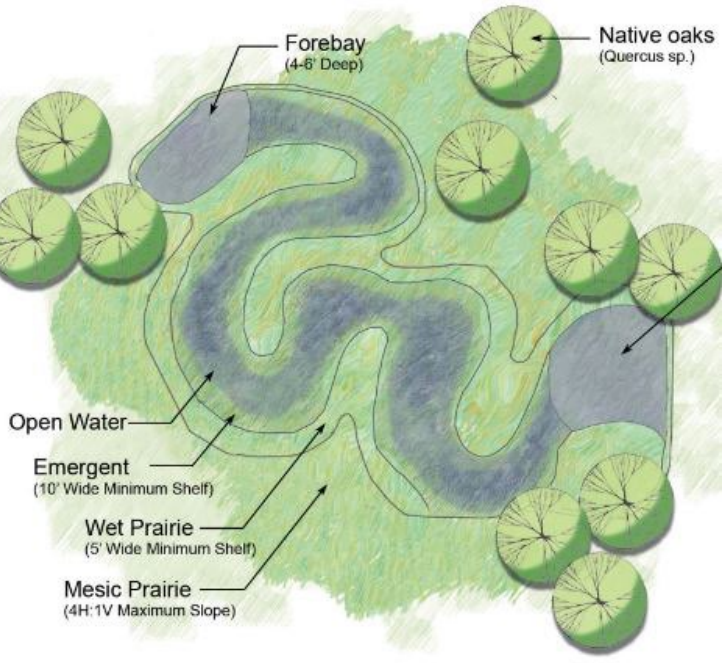


Figure 5. Naturalized wet bottom detention basin design.

Short Term (3 Years) Native Vegetation Establishment Recommendations

In most cases, the developer or owner should be responsible for implementing short term management of detention basins and other natural areas to meet a set of performance standards. A minimum of three years of management is needed to establish native plant communities within detention basins. Measures needed include mowing during the first two growing seasons following seeding to reduce annual and biennial weeds. Spot herbiciding is also needed to eliminate problematic non-native/invasive species such as thistle, reed canary grass, common reed, purple loosestrife, and emerging cottonwood, willow, buckthorn, and box elder saplings. In addition, the inlet and outlet structures should be checked for erosion and clogging during every site visit. Table 4 includes a three-year schedule appropriate to establish native plantings around naturalized detention basins.

Table 4. Three-year vegetation establishment schedule for naturalized detention basins.

Year 1 Establishment Recommendations
Mow prairie areas to a height of 6-12 inches in May, July, and September.
Spot herbicide non-native/invasive species throughout site in late May and again in August/September. Target thistle, reed canary grass, common reed, purple loosestrife, and emerging woody saplings.
Check for clogging and erosion control at inlet and outlet structures during site visit & after >1" rain event.
Year 2 Establishment Recommendations
Mow prairie areas to a height of 12 inches in June and August.
Spot herbicide non-native/invasive species throughout site in May and again in August/September. Target thistle, reed canary grass, common reed, purple loosestrife, and emerging woody saplings.
Plant additional emergent plugs if needed and reseed any failed areas in fall.
Check for clogging and erosion control at inlet and outlet structures during site visit & after >1" rain event.
Year 3 Establishment Recommendations
Spot herbicide non-native/invasive species throughout site in May and again in August/September. Target thistle, reed canary grass, common reed, purple loosestrife, and emerging woody saplings.
Check for clogging and erosion control at inlet and outlet structures during site visits & after >1" rain event.

Long Term (3 Years +) Native Vegetation Maintenance Recommendations

Long term management of most detention basins associated with development should be the responsibility of the homeowner or business association or local municipality. Often, these groups lack the knowledge and funding to implement long term management of natural areas resulting in the decline of these areas over time. Future developers should be encouraged to donate naturalized detention basins and other natural areas to a local municipality or conservation organization for long term management who receive funding via a Special Service Area (SSA) tax. Table 5 includes a cyclical long-term schedule appropriate to maintain native vegetation around detention basins.

Table 5. Three-year cyclical long-term maintenance schedule for naturalized detention basins.

Year 1 of 3 of Maintenance Cycle
Conduct controlled burn in early spring. Mow to height of 12 inches in November if burning is restricted.
Spot herbicide problematic non-native/invasive species throughout site in mid-August. Specifically target thistle, reed canary grass, common reed, and emerging woody saplings such as willow, cottonwood, buckthorn, and box elder.
Check for clogging and erosion control at inlet and outlet structures during site visits & after >1" rain event.
Year 2 of 3 of Maintenance Cycle
Spot herbicide problematic non-native/invasive species throughout site in August. Specifically target thistle, reed canary grass, common reed, and emerging woody saplings such as willow, cottonwood, buckthorn, and box elder.
Mow prairie areas to a height of 6-12 inches in November.
Check for clogging and erosion control at inlet and outlet structures during site visits & after >1" rain event.
Year 3 of 3 of Maintenance Cycle
Spot herbicide problematic non-native/invasive species in August. Specifically target thistle, reed canary grass, common reed, and emerging woody saplings. Cut & herbicide stumps of some woody saplings as needed.
Check for clogging and erosion control at inlet and outlet structures during site visits & after >1" rain event.
Cycle begins again with Year 1 of Maintenance Cycle above

5.1.3 Rain Gardens (new)

Rain gardens have become a popular new way of creating a perennial garden that cleans and infiltrates stormwater runoff from rooftops and sump pump discharges. A rain garden is a small shallow depression that is typically planted with deep rooted native wetland vegetation. These small gardens can be installed in a variety of locations but work best when located in existing depressional areas or near gutters and sump pump outlets. Not only do rain gardens clean and

infiltrate water, but they also provide food and shelter for many birds, butterflies, and insects. Rain gardens are typically 100-300 square feet in size, should be installed outside of wetlands and floodplains, and planted with native plants to improve water quality and habitat benefits. They should be placed at least 10 feet away from any building or structure and need to be excavated to a depth of 18-24 inches below the exiting grade. Soil amendments are recommended to ensure support of native plants. After installation, rain gardens require ongoing maintenance to ensure they are performing properly. The intent of a rain garden program for residents is to encourage and provide an incentive for applicants to install rain gardens on private property to "micro-manage" stormwater runoff as close to the source (like downspouts, driveways, sump pump discharges) as possible. Typically, this incentive comes in the form of a cost-share program designed to reimburse residents for a portion of the costs incurred by installing a rain garden on their property.

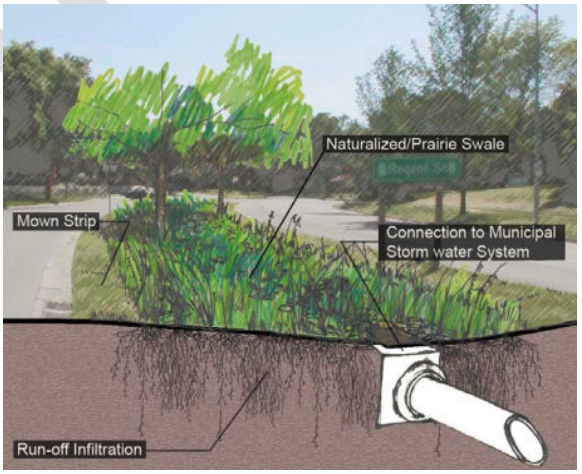
Rain garden adjacent to single family home

Rain Garden Recommendations

Information programs in the watershed should focus on teaching residents and businesses the beneficial uses of rain gardens. Local governments, schools, and public agencies in the watershed should also install demonstration rain gardens as a way for the general public to better understand their application. Local governments could hold rain garden training seminars and potentially provide partial funding to residents and businesses that install rain gardens.

5.1.4 Vegetated Swales (Bioswales) (new)

Vegetated swales, also known as bioswales, are designed to convey water and can be modified slightly to capture and treat stormwater for the watershed. Vegetated swales are designed to remove suspended solids and other pollutants from stormwater running through the length of the swale. The type of vegetation can dramatically affect the functionality of the swale. Turf grass is not recommended because it removes less suspended solids than native plants. In addition, vegetated swales can add aesthetic features along a roadway or trail. They can be planted with wetland plants, or a mixture of rocks and plant materials can be used to provide interest.



Dry vegetated swale rendering with engineered soils

Swales can be designed as either wet or dry swales. Dry swales include an underdrain system that allows filtered water to move quickly through the stormwater treatment train. Wet swales retain water in small wetland like basins along the swale. Wet swales act as shallow, narrow wetland treatment systems and are often used in areas with poor soil infiltration or high-water tables.

Water quality is improved by filtration through engineered soils in dry swales and through sediment accumulation and biological systems in wet swales. According to USEPA, vegetated swales reduce total suspended solids (sediment) by 65%, total phosphorus by 25%, and total nitrogen by 10% (MDEQ, 1999).

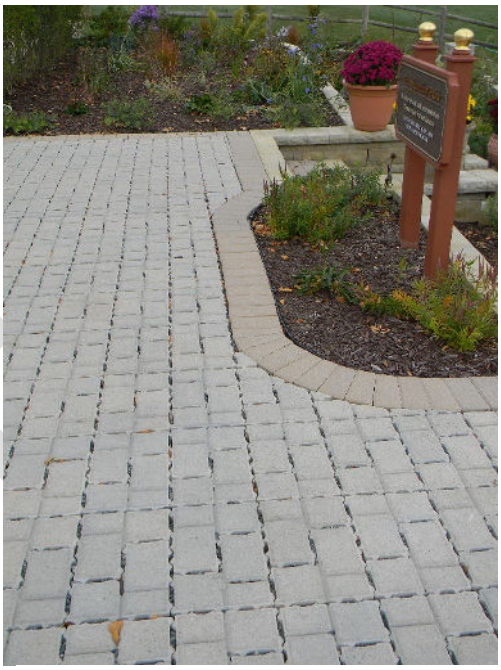
Vegetated Swale Recommendations

Vegetated swales should be used in place of pipes or curbs in new and redevelopment where feasible. Swales can easily be integrated into various urban fabrics with curb cuts for water to access them from roadways, or they can be added between existing lots or in the grassy parkways between roads and sidewalks. Typically, swales are used in lower density

settings where infiltration might be maximized. Dry swales should be used for smaller development areas with small drainages. Wet swales should be used along larger roadways, small parking areas, and commercial developments.

5.1.5 Pavement Alternatives (new)

Pervious concrete, permeable asphalt, and paver systems are potential alternatives to conventional asphalt or concrete parking lots and roadways. These alternatives allow for natural infiltration of the water by allowing water that falls on the surface to flow to a storage gallery through holes in the pavement. Areas that are paved with pervious pavement produce less stormwater runoff than conventionally paved areas. Traditionally, the quantity and quality of water running off from paved and other impermeable surfaces are the primary reason for the need for stormwater treatment. Pavement alternatives reduce runoff rates and volumes and can be used in almost every capacity in which traditional asphalt, concrete, or pavers are used. Pavement alternatives capture first flush rainfall events and allow water to percolate into the ground. Pavement alternatives treat stormwater through soil biology and chemistry as the water slowly infiltrates. Groundwater and aquifers are recharged and water that might otherwise go directly to streams will slowly infiltrate, reducing flooding and peak flow rates entering drainage channels. Studies documented by USEPA show that properly designed and maintained pervious pavements reduce total suspended solids (sediment) by 90%, total phosphorus by 65%, and total nitrogen by 85% (MDEQ, 1999).



Permeable pavers installed adjacent to a park

In recent years, concerns have been raised about the environmental effects of the use of coal-tar sealants. Coal-tar sealant is a surface treatment typically applied to protect asphalt on driveways and parking lots which contains polycyclic aromatic hydrocarbons (PAHs). PAHs are a group of chemicals that have been linked to cancer in humans and have been shown to be toxic to aquatic life and damaging to the environment (Needleman, 2015). According to studies, "PAHs are significantly elevated in stormwater flowing from parking lots and other areas where coal-tar sealcoats were used as compared to stormwater flowing from areas not treated with the sealant (USEPA, 2016a)." Pervious concrete, permeable asphalt, and paver systems are all potential alternatives to the need for coal-tar sealants. Additionally, several states and municipalities have banned the use and/or sale of coal-tar sealants to further protect their communities.

Pavement Alternatives Recommendations

Future development and redevelopment in the Spring Creek watershed should consider the use of pavement alternatives where appropriate, particularly for parking lots adjacent to parks or preserves. Pavement alternatives can be used in a variety of settings including parking lots, parking aprons, private roads, fire lanes, alleys, residential driveways, sidewalks, and bike paths. It is important to note that there are limitations to using pavement alternatives based on subsoil composition and they do require annual maintenance to remain effective over time.

5.1.6 Vegetated Filter Strips (new)

Vegetated filter strips are shallowly sloped vegetated surfaces that remove suspended sediment, and nutrients from sheet flow stormwater that runs across the surface. This Management Measure is often referred to as a buffer strip. The type of vegetation can dramatically affect the functionality of the filter strip. Filter strips can either be planted or can be comprised of existing vegetation. Turf grass should be avoided as it removes less total suspended solids than filter strips planted with native vegetation.

The wider they are the more effective filter strips are because the amount of time water has for interception/ interaction with the plants and soil within the filter strip is increased. When installed and functioning properly, the USEPA has documented that filter strips can reduce total suspended solids (sediment) by 73%, total phosphorus by 45%, and total nitrogen by 40% (MDEQ, 1999).

Vegetated Filter Strip Recommendations

Vegetated filter strips work in a variety of locations. Vegetated filter strips in rural and urban areas should be installed along streams, lakes, or ponds. Additionally, they can be used adjacent to buildings and parking lots that sheet drain. The water would then pass through the vegetated filter strip and into a waterway, such as a vegetated swale, stream, lake, pond, or other stormwater feature.

Filter strip along municipal building in Algonquin, Illinois

5.1.7 Natural Area Restoration & Native Landscaping (new)

Natural area restoration and native landscaping are essentially one in the same but at different scales. Natural area restoration involves transforming a degraded natural area into one that exhibits better ecological health and is typically done on larger sites such as nature/forest preserves. Native landscaping is done at smaller scales around homes or businesses and is often formal in appearance. Both require the use of native plants to create environments that mimic historic landscapes such as prairie, woodland, and wetland. Native plants are defied as indigenous, terrestrial or aquatic plant species that evolved naturally in an ecosystem. The use of native plants in natural area or native landscaping is well documented. They adapt well to environmental conditions, reduce erosion, improve water quality, promote water infiltration, do not need fertilizer, provide wildlife food and habitat, and have minimal maintenance costs. Several environmental agencies support the use of native plants including Illinois Nature Preserves Commission (INPC), Illinois Department of Natural Resources (IDNR), Citizens for Conservation, FCSCWP, all four counties, McHenry County Conservation District, the local Soil and Water Conservation Districts, U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), National Wildlife Federation (NWF), and the Conservation Foundation (TCF).

Native landscaping near residential home

Natural Area Restoration/Native Landscaping Recommendations

Large residential lots with existing natural components such as oak woodlands and wetlands and golf courses provide many of the best opportunities for natural area restoration and native landscaping at a larger scale. Homeowners interested in restoring natural areas or implementing native landscaping can find guidance through the agencies listed above or by contacting a local ecological consulting company. Backyard habitats can be certified through the National Wildlife Federation's Certified Wildlife Habitat program or the Conservation Foundation's Conservation@Home program.

5.1.8 Wetland Restoration (new)

Wetlands are essential for water quality improvement and flood reduction in any watershed and also provide habitat for a wide variety of plant and animal species. RES reviewed potential wetland restoration sites during the field inventory and unfortunately found no wetlands that were considered potentially feasible to restore. In most cases, the remaining hydric soils that were not already wetlands were either too

Wetland restoration at Carrington Reserve Conservation Development in West Dundee, Illinois

small, too disturbed, or poorly located to make for a potentially feasible wetland restoration site. The wetland restoration process involves returning hydrology (water) and vegetation to soils that once supported wetlands. The USEPA estimates that wetland restoration projects can reduce suspended solids (sediment) by 77.5%, total phosphorus by 44%, and total nitrogen by 20% (MDEQ, 1999).

Wetland Restoration Recommendations

Local governments should consider requiring "Conservation Design" that incorporates wetland restoration on parcels slated for future development. Another potential option is to restore wetlands as part of a wetland mitigation bank where wetlands are restored on private land and become "fully certified." Then, developers are able to buy wetland mitigation credits from the wetland bank for wetland impacts occurring elsewhere in the watershed. It is also possible that in the future, Illinois EPA may require more strict nutrient policies for wastewater treatment plants. Wetland banks may provide an opportunity for plant owners to buy "water quality trading credits."

5.1.9 Stormwater Trees/Tree Planting Program (new)

Trees provide extensive evapotranspiration and cooling benefits improve water and air quality, provide habitat, increase property values, and improve aesthetics in urban landscapes (see Figure 6). Trees play a valuable role in trapping absorbing stormwater, reducing pollutants, and holding soils in place during rain events and help to recharge groundwater supplies. A 25-foot canopy diameter tree can process the runoff of a 2,400 square foot adjacent impervious surface (EPA, 2016b). Depending on the size and species, one tree can store 100 gallons or more of stormwater (Fazio, 2010).

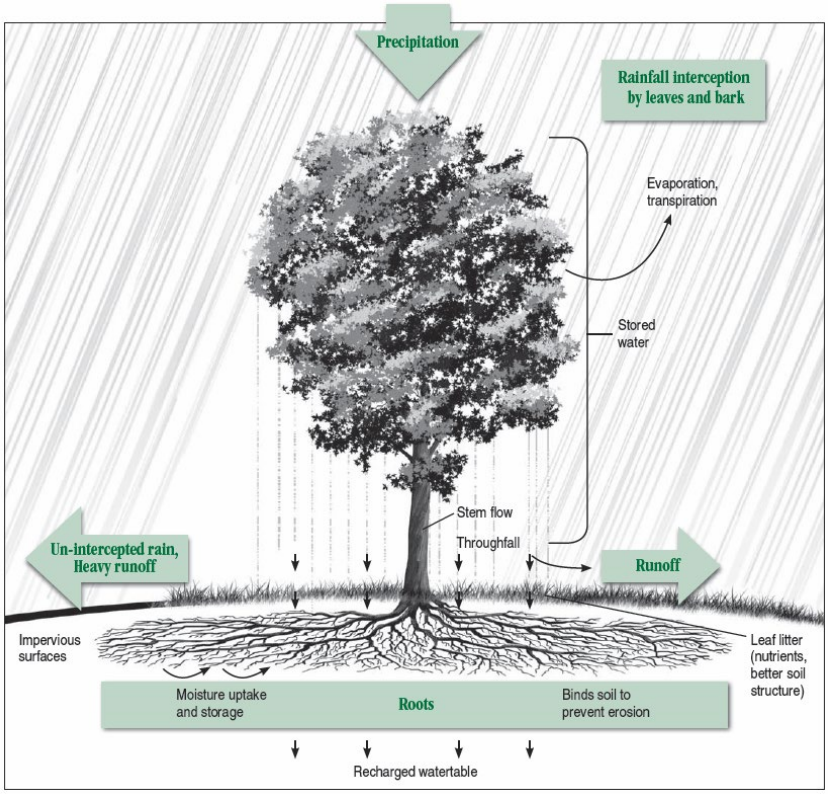


Figure 6. Illustration of how trees help with stormwater management (Source: Fazio, 2010).

Implementing a successful stormwater tree program can be complicated. Space and soil quality constraints can often be the limiting factors on whether a site is appropriate for installing stormwater trees. Other constraints include finding an appropriate species of tree, steep slopes, utility lines, impervious surfaces and pre-existing structures. With a little planning and engineering, many of these constraints can be overcome. In 2016, the USEPA produced a Technical Memorandum on Stormwater Trees that provides detailed information on the benefits and challenges to implementing an effective Stormwater Tree program and maintaining the trees over time. This report is available on the EPA's website at https://www.epa.gov/green-infrastructure/stormwater-trees. Municipalities in the watersheds should consider adopting a stormwater tree or tree planting program where these are not already in place.

5.1.10 Street Sweeping & Yard Waste Management (new)

Street sweeping is often overlooked as a Management Measure option to reduce pollutant loading in watersheds. Increased municipal street sweeping programs could help reduce nonpoint source pollutants from urban areas in Spring Creek watershed. Street sweeping works because pollutants such as sediment, trash, road salt, oils, nutrients, and metals that would otherwise wash into stormsewers and streams following rain events are gathered and disposed of properly. The USEPA and Center for Watershed Protection (CWP) report similar pollutant removal efficiencies for street sweeping; weekly

street sweeping can remove between 9% and 16% of sediment and between 3% and 6% of nitrogen and phosphorus (MDEQ, 1999; CWP 2017).

Routine street sweeping is an effective Management Measure

Yard waste, such as grass clipping and leaf litter, can also impact water quality when not managed correctly. "Grasscycling and composting are two techniques homeowners can use to reduce waste disposal and possible water contamination as well as save time, money and energy while returning valuable nutrients back into their lawns and gardens. (Gibb, 2012)" Composting of yard waste and grasscyclying, or leaving grass clippings on a lawn, can keep nutrients such as nitrogen in place. When grasscycling or composting, it is important to keep clippings on the lawn and off sidewalks, driveways, or other impervious surfaces where they might otherwise get washed into adjacent drainage systems (Gibb, 2012).

Street Sweeping & Yard Waste Management Recommendations
It is likely that several if not all the municipalities in the watershed already implement street sweeping to some degree. The frequency of street sweeping is a matter of time and budget and should be determined by each municipality. Weekly street sweeping would provide the best results, but bi-weekly sweeping is cited as being sufficient in most cases. Homeowners should also compost yard waste and practice grasscycling at home.

5.1.11 Stream & Riparian Area Restoration & Maintenance (new)


Stream restoration project in Barrington, IL

Stream and riparian area restorations are one of the best Management Measures that can be implemented to improve water quality and the overall health of the watershed. This work involves improvements to a stream channel using artificial pool-riffle complexes, streambank stabilization using a combination of bioengineering with native vegetation and hard armoring with rock if needed, and adjacent riparian area improvements via removal of non-native vegetation and replacement with native species. These practices are typically done together as a way to improve water quality by reducing sediment transport, increasing oxygen, and improving habitat. The USEPA cites that as much as 90% of sediment, phosphorus, and nitrogen can be reduced following stream restoration. The downside to stream restoration is that it is technical and expensive. Stream restoration projects include detailed construction plans, often complicated permitting, and construction that must be done by a qualified contractor. With so many individual landowners with parcels intersecting Spring Creek and its tributaries, routine maintenance of stream systems is challenging. In many cases, landowners simply do not have the knowledge or are not physically capable of maintaining streams on their property. Stream maintenance includes an ongoing program to remove blockages caused by accumulated sediment, fallen trees, etc. and is a cost-effective way to prevent flooding and streambank erosion.

Riparian buffers are defined as land adjoining any water body including ponds, lakes, streams, and wetlands. In 2010 the Southeastern Wisconsin Regional Planning Commission (SEWRPC) produced a document entitled "Managing the Water's Edge: Making Natural Connections" (SEWRPC, 2010). The research presented in SEWRPC's document was conducted to determine if an optimal riparian buffer design or width could be determined that effectively reduces pollutants, provides water quality protection, helps prevent channel erosion, provides adequate fish and wildlife habitat, enhances environmental corridors, augments baseflow, and moderates water temperature.

Interestingly, no consensus of optimal buffer width could be determined but what is apparent is that many riparian corridors no longer fulfill their potential due to encroachment by agricultural and urban development. SEWRPC's document summarizes how to maximize both water quality protection and conservation of aquatic and terrestrial wildlife populations using buffers as shown in Figure 7. As described in SERWPC's document, implementing the green infrastructure network to connect open space and other natural area features should be embraced, whereby 75% minimum of the total stream length should be naturally vegetated to protect the functional integrity of the water resource and 75-foot-wide minimum riparian buffers are recommended from the top edge of each stream bank that are naturally vegetated to protect water quality.

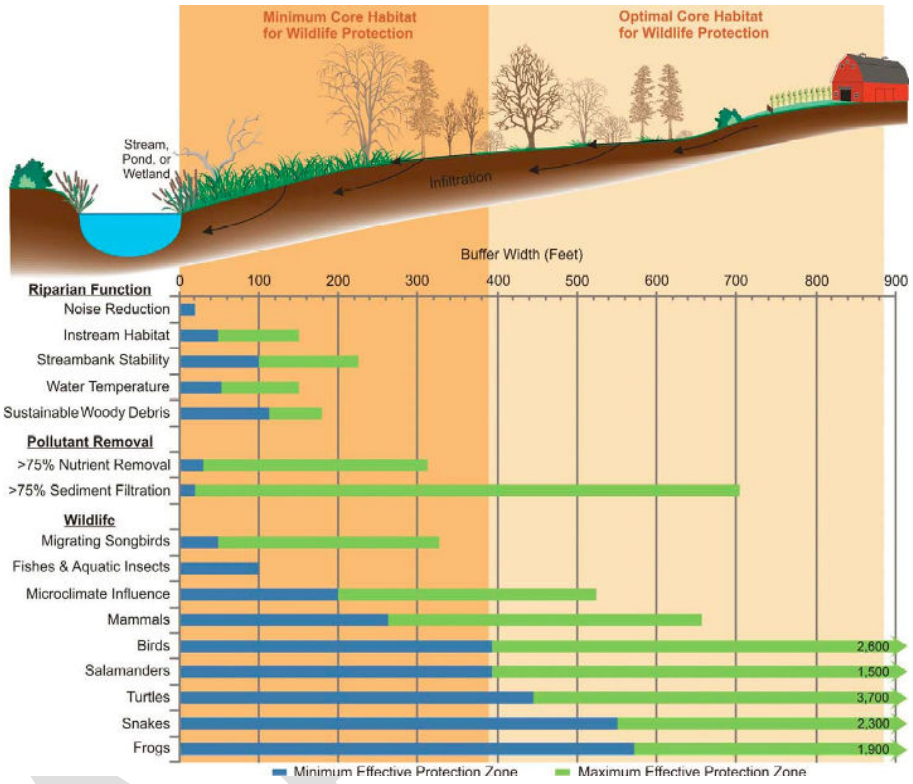


Figure 7. Riparian function, pollutant removal, and wildlife benefits for various buffer widths (Source: SEWRPC) 2010).

Stream & Riparian Area Recommendations

There are many opportunities to implement stream and riparian area restoration in the watershed, as identified in the Site-Specific Action Plan. The Lake County Stormwater Management Commission (LCSMC) is a leader in the Chicagoland area when it comes to managing stormwater and has developed an excellent guide for riparian owners called "Riparian Area Management: A Citizen's Guide." This short flyer can be found on Lake County's website and is intended to educate landowners about debris removal and riparian landscaping. It is also important to note that not all debris in streams is harmful. The American Fisheries Society has created a short document called "Stream Obstruction Removal Guidelines" which is meant to clarify the appropriate ways to maintain obstructions in streams to preserve fish habitat.

5.1.12 Septic System Maintenance (new)

Septic systems and private sewage disposal systems are common in the portions of Spring Creek watershed that fall outside municipal boundaries and in the Barrington Area in general. Septic systems or private sewage disposal systems in Cook County are regulated by the Cook County Department of Health (CCDPH). CCDPH reviews and approves all private sewage disposal systems throughout Cook County; except in incorporated Barrington Hills, Inverness, Palos Park, and South Barrington, which have their own IDPH-approved septic ordinances. Septic systems in McHenry County are regulated under the McHenry County Public Health Ordinance, Article X: An Article Regulating Wastewater & Sewage Treatment and Disposal. Septic systems in Kane County are regulated under the Kane County Septic Ordinance. In Lake County, septic systems are governed under Lake County's Code of Ordinances Chapter 171, Onsite Wastewater Treatment Systems and managed by the Lake County Health Department & Community Health Center. When septic systems are not maintained and fail, they can contribute high levels of nutrients and bacteria to the surrounding environment. When septic systems are not maintained and subsequently fail, they can contribute high levels of nutrients and bacteria to the surrounding environment. The failure rate of septic systems in the watershed is unknown. However, national literature sources indicate a failure rate of approximately 20% (Brown, 1998; Mancl, 1984; Stout, 2003; UKCE, 2012).

Septic System Recommendations

To request a private sewage disposal system review by CCDPH, visit https://cookcountypublichealth.org/environmental-health/water-and-sewage/septic/. Septic owners in McHenry County should contact the McHenry County Department of Health to schedule a septic system inspection to ensure that they are designed and operating properly. More information

and resources are available online at https://www.mchenrycountyil.gov/county-government/departments-a-i/health-department/environmental-health/onsite-wastewater-treatment. Septic owners in Kane County should contact the Kane County Health Department to schedule a septic system inspection to ensure that they are designed and operating properly. More information and resources are available online at https://kanehealth.com/Pages/Water-Waste.aspx. Septic owners in Lake County should visit https://www.lakecountyil.gov/818/Onsite-Wastewater-Treatment-System for more information. In addition, the United States Environmental Protection Agency (USEPA) provides an excellent guide for septic system owners called "A Homeowner's Guide to Septic Systems (USEPA, 2005)." The guide explains how septic systems work, why and how they should be maintained, and what makes a system fail.

5.1.13 Downspout Disconnection/Rainwater Harvesting & Re-use (new)

Downspout disconnection and rain barrel programs help reduce the amount of clean water that is used as well as reduce the amount of wastewater discharged to streams. Water harvesting and re-use via rain barrels and cisterns are important options to decrease the amount of stormwater runoff in a watershed. It is a simple, economical solution that can be done by any homeowner or business. On most homes and buildings, the water from roofs flows into downspouts and then onto streets, parking areas, or into storm sewers. Disconnecting downspouts and using either rain barrels or cisterns for re-use later can reduce the flood levels in local streams.

Rain barrel adjacent to residential home

Water re-use differs based on the type of storage and water treatment. A rain barrel is typically attached to a downspout and collects water for later use, such as irrigation purposes. In many areas, irrigation can account for almost 50 percent of residential water consumption. Re-using water collected in a rain barrel is a great way of minimizing water consumption and reduce water bills. A cistern also stores water from rooftop runoff to be used later. However, a cistern is often larger, sealed, and the water can be filtered for a wider variety of uses. Cistern water can be used many outdoor uses such as lawn and garden watering, irrigation, car washing, and window cleaning. The primary purpose of rain barrels and cisterns is water storage. Rain barrels typically store 55 gallons each. Cisterns can store greater amounts. Rain barrels and cisterns also reduce outdoor water demand in summer months by reducing the potable water used for irrigation or other outdoor household uses.

Rainwater Harvesting & Reuse Recommendations

Education programs in the watershed should focus on teaching residents and businesses the beneficial uses of downspout disconnection, rain barrels and cisterns. Local governments should aim to install demonstration projects as a way for the public to better engage in their water use and re-use around residential homes and businesses. Local governments and conservation organizations should sponsor programs where residents and businesses can purchase rain barrels.

5.1.14 Conservation Design & Low Impact Development (new)

Conservation design facilitates development density needs while preserving the most valuable natural features and ecological functions of a site. It does this by reducing lot size, especially lot width, while increasing the available land area to allow for open space and natural resources (Figures 8 - 10). The open space is typically preserved or restored as natural areas that are integrated with newer natural Stormwater Treatment Train features and recreational trails and serve as an amenity to the entire development. The open space allows the residents to feel like they have larger or more private lots because most of the lots adjoin the open space system.

Such flexibility is intended to retain or increase the development rights of the property owner and the number of occupancy units permitted by the underlying zoning designation, while encouraging environmentally responsible development. Conservation design is most appropriate in areas having natural and open space resources to be protected and preserved such as floodplains, groundwater recharge areas, wetlands, woodlands, streams, wildlife habitat, etc. It can also be used to preserve and integrate agricultural uses into the land pattern. The approach first considers the natural

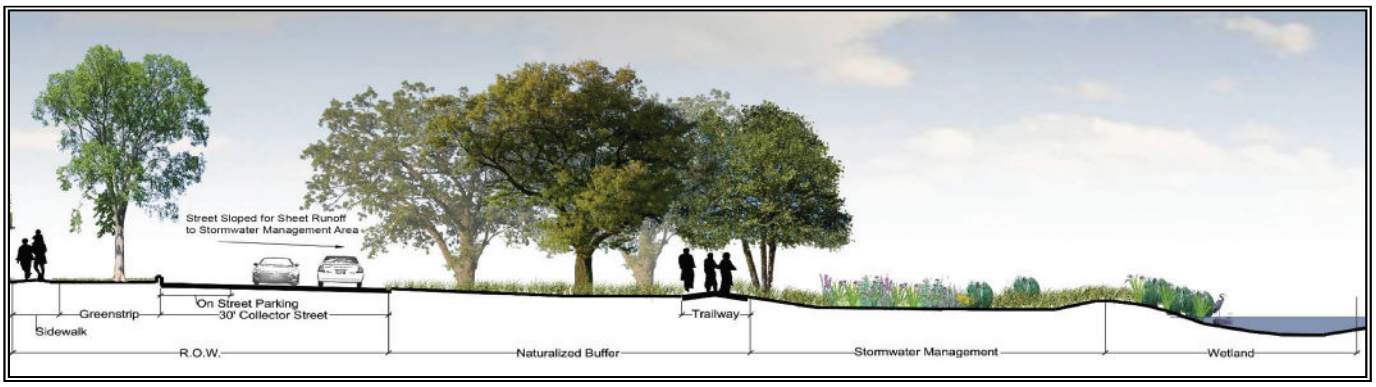


Figure 8. Stormwater Treatment Train within Conservation Development.

landscape and ecology of a development site rather than determining design features on the basis of pre-established density criteria. The general steps included below are generally followed when designing the layout of a development site:

Step 1: Identify natural resources, conservation areas, open space areas, physical features, and scenic areas and preserve and protect these areas from any negative impacts generated as a result of the development.

Step 2: Locate building sites to take advantage of open space and scenic views by requiring smaller lot sizes or cluster housing as well as to protect the development rights of the property owner and the number of occupancy units permitted by the underlying zoning of the property.

Step 3: Design the transportation system to provide access to building sites and to allow movement throughout the site and onto adjoining lands; roads should not traverse sensitive natural areas.

Step 4: Prepare engineering plans which indicate how each building can be served by essential public utilities.

Figure 9. Traditional vs. Conservation Development Design (Elkhorn, WI).

Low Impact Development (LID)

Low impact development (LID) focuses on the hydrologic impact of development and tries to maintain pre-development hydrologic systems, treating water as close to the source as possible (see Figure 10). LID principles can be incorporated into development or stormwater ordinances and used in new development or retrofitting existing developments. Green infrastructure systems are created to mimic natural processes that promote water infiltration, native plant evapotranspiration, and stormwater reuse. Low impact development seeks to keep stormwater out of pipes and instead keep the entire infrastructure more natural and above ground. Solutions start at the lot scale such as rain gardens and overflows to swales adjacent to roads. Larger impervious areas, such as a commercial development may utilize constructed wetlands for stormwater storage while adding value to the area by enhancing aesthetics, site interest and the ecology.

Figure 10. Example of Conservation Design or LID.

Economics of Conservation Design and Low Impact Development

Conservation design and low impact development (LID) are environmentally sound choices and economical ones for both developers and municipalities. Conservation design can produce some of its biggest cost savings in infrastructure costs such as site preparation, stormwater management, site paving, and sidewalks (Conservation Research Institute, 2005). According to a study conducted by Applied Ecological Services the average savings created by choosing conservation development over more traditional footprints is 24% (Table 6) (AES, 2007). Not only do lots in conservation developments typically cost less to install, but they also "carry a price premium … and sell more quickly than lots in conventional subdivisions (Mohamed, 2006)." Another study conducted in Concord, Massachusetts found that over an eight-year period, a cluster development with protected open space had a 2.6% higher annual appreciation rate over "residential properties with significantly larger private yards, but without the associated open space (Lacy, 1990)."

Figure 11. Greener Streetscape using LID practices. Source: *"Greening the Code"* Washington County, OR

While low impact development covers a range of stormwater practices, it has some of the same cost benefits as conservation design. Typically LID practices "can cost less to install, have lower operations and maintenance costs, and provide more cost-effective stormwater management and water-quality services than conventional stormwater controls (ECONorthwest, 2007)." Similar to conservation design, cost savings from utilizing LID practices can be found as a reduction in the amount of drainage infrastructure and land disturbance required; additionally, property values can be increased by 12 - 16% (UNH Stormwater Center, 2011). There is also evidence that combining both conservation and low impact development practices through holistic site design can create deeper cost savings for developers as well as increased ecosystem benefits – particularly by combining clustered site designing and naturalized stormwater management systems (Conservation Research Institute, 2005). Not only do conservation and low impact development practices provide a more economical possibility for developers and municipalities, but they can improve water quality, habitat, and property values in the watershed.

Table 6. Savings of Conservation Development over Traditional Subdivision Design for ten Midwestern conservation development projects.

Positive numbers are savings of Conservation Development over Traditional.
Negative numbers are costs of Conservation Development over Traditional.

Project:	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	Average
ITEM											
Grading	-$214,740	$257,832	$1,813,726	$2,215,025	$1,856,206	$1,862,988	$796,705	$291,957	$302,497	$2,852,312	51.00%
Roadway	$84,702	$18,754	-$16,477	-$130,230	$1,464,599	$1,187,386	$205,168	$9,231	-$9,963	$801,484	18.00%
Storm Sewer	$181,611	$31,220	$6,648	$89,676	$974,689	$547,184	$210,289	$65,501	$110,021	$678,302	40.00%
Sanitary Sewer	$41,614	-$4,365	$0	-$203,064	$850,962	$224,776	$72,436	-$15,502	$5,960	$423,458	6.00%
Water	$44,483	-$4,671	-$63,680	-$215,881	$905,157	$240,064	$76,815	-$16,257	$5,973	$451,084	5.00%
Ecological	-$56,500	-$74,857	-$277,472	-$400,321	-$407,131	-$625,084	-$160,341	-$93,954	-$264,513	-$380,992	-154.00%
Amenities	$17,572	-$16,202	-$94,399	-$226,216	$552,667	$221,666	$7,825	-$15,749	-$39,274	$266,982	6.00%
Contingencies	$132,055	$51,928	$342,087	$282,247	$1,549,287	$914,745	$302,225	$56,307	$27,675	$1,273,157	24.00%
Total Savings	$660,277	$259,639	$1,710,433	$1,411,235	$7,746,436	$4,573,725	$1,511,124	$281,534	$138,377	$6,365,787	
Total Percent Savings	19.00%	20.00%	33.00%	15.00%	43.00%	32.00%	25.00%	15.00%	4.00%	37.00%	24.30%*
Cost Savings Per Lot	$8,725.00	$6,978.00	$147,012.00	$29,012.00	$7,904.00	$20,077.00	$7,346.00	$4,078.00	$4,959.00	$67,676.00	$30,376.70

* Total Savings Percentage is *not* the percentage savings of all individual Items added together, because dollar-values of Items are different.
Visit www.appliedeco.com for more detailed info.

5.1.15 Green Infrastructure Network Planning (new)

A green infrastructure network provides communities with a tool to identify and prioritize open space land use or conservation opportunities and plan development that benefits both people and nature by providing a framework for future growth. It identifies areas not suitable for development, areas suitable for development but that should incorporate conservation or low impact design standards, and areas that do not affect green infrastructure. Park Districts, Forest Preserve Districts, IDNR, and watershed stakeholders can use green infrastructure plans for trail routing, open space linkages, and natural area restoration decisions. Residents can use green infrastructure recommendations to reduce runoff from their properties and to see how their properties fit into the larger network. A Green Infrastructure Network for the watershed was developed in Section 3.10.

Green Infrastructure Recommendations

A Green Infrastructure Network can only be realized by coordinated planning efforts of local municipalities, park districts, developers, and private landowners. Stakeholders should follow the recommended process below to initiate and implement the Green Infrastructure Network for the Spring Creek watershed.

1. Identify important unprotected green infrastructure parcels then protect and implement long term management where practicable.
2. Work with private landowners along stream corridors to manage their land for green infrastructure benefits.
3. Use the Green Infrastructure Network to identify new trails and trail connections.

Local governments should support, leverage, and follow guidance set forth by the Barrington Greenway Initiative and their strategic partners: Citizens for Conservation, Lake County Forest Preserves, Forest Preserves of Cook County, Audubon Great Lakes, Friends of the Forest Preserves, McHenry County Conservation District, and Bobolink Foundation.

Any property owner can improve green infrastructure too. Stakeholders can create a safe place for wildlife by providing a few simple things such as food, water, cover, and a place for wildlife to raise their young. The National Wildlife Federation's Certified Wildlife Habitat® and the Conservation Foundation's Conservation@Home programs can help get you started. Creating a rain garden, or a small, vegetated depression to capture water is another way of promoting infiltration while beautifying your yard and providing additional habitat. Disconnecting your roof downspouts and capturing that runoff in rain barrels not only reduces the amount of runoff entering streams, but also serves as a great source of water for irrigating your yard. If a portion of a stream runs through your backyard, here are some tips to help properly manage your piece of the green infrastructure network:

1. *A natural, meandering stream is a happy stream* - Work with experts to restore degraded streams.
2. *Remove non-native species* - Identify and remove plants that are out of place.
3. *Plant native buffers* - Plants adapted to the Midwest climate can help control erosion by stabilizing banks, while buffers protect the health of streams.
4. *No dumping* - Avoid dumping yard waste and clear heavy debris jams.
5. *Manage chemical use* - Avoid over fertilizing lawns or spilling/dumping chemicals near waterways.

For more detailed information, check out the Lake County Stormwater Management Commission's booklet, "Riparian Area Management: A Citizen's Guide," at www.lakecountyil.gov/stormwater.

5.1.16 Water Quality Trading & Adaptive Management (new)

While Illinois has not yet set up policies or a system to implement water quality trading or adaptive management, nearby Wisconsin has developed policies and a number of resources for both and their guidance could be used as a model or example to follow in Illinois. The following information is cited directly from a Wisconsin Department of Natural Resources (WDNR) document entitled "A Water Quality Trading How to Manual" (WDNR, 2013).

Water Quality Trading presents a way for municipal and industrial NPDES permit holders to demonstrate compliance with water quality-based effluent limitations. Generally, trading involves a point source facing relatively high pollutant reduction costs compensating another party to achieve less costly pollutant reduction with the same or greater water quality benefit. In other words, trading provides point sources with the flexibility to acquire pollutant reductions from other sources in the watershed to offset their point source load so that they will comply with their own permit requirements, while simultaneously helping to fund water quality improvements nearby. Trading is not a mandatory program or regulatory requirement, but rather a market-based option that may enable some industrial and municipal

facilities within the watershed to meet regulatory requirements more cost-effectively. With ever-tightening water quality standards and restrictions going into effect, trading may become economically preferable to other compliance options.

There are many benefits to trading:
1. Permit compliance through trading may be economically preferable to other compliance options.
2. New and expanding point source discharges can utilize trading to develop new economic opportunities in a region, while still meeting water quality goals.
3. Permittees, and the point and nonpoint sources that work cooperatively with them, can demonstrate their commitment to the community and to the environment by working together to protect and restore local water resources.

Adaptive management is sometimes confused with trading, since both options allow permittees to work with nonpoint or other point sources of phosphorus in a watershed to reduce the overall phosphorus load to a given waterbody. In Wisconsin, which has developed a numeric phosphorus criterion, adaptive management is solely focused on phosphorus compliance and improving water quality so that the applicable phosphorus criterion is met. Trading is not limited to phosphorus and may be used to meet limits for any pollutant for which a criterion has been established. Trading focuses on compliance with a discharge *limit* while adaptive management focuses on compliance with phosphorus *criteria*.

Figure 12. Water quality trading components (source: WDNR).

Water quality trading has seven components: pollutant, trading participants, pollution reduction credit, credit threshold, trade ratio, location, and timing (Figure 57). Each of these components must be adequately addressed in a trading strategy. The "pollutant" is simply the contaminant being traded. The "trading participants" are entities involved in the trade. "Credit" is the amount of a given pollutant that is available for trading. "Credit Threshold" is the amount of pollutant reduction that needs to be achieved before credits are generated. "Trade ratios" are put in place due to uncertainty margins. "Location" refers to the fact that the credit user and generator must discharge to the same waterbody. "Timing" is important because credits must be generated before they can be used to offsite the pollution. For more information and guidance on water quality trading and adaptive management, see Wisconsin Department of Natural Resources (WDNR) document entitled "A Water Quality Trading How to Manual" (WDNR, 2013).

5.2 Site-Specific Measures Action Plan updates

Approximately 250 Site Specific Management Measures (Best Management Practices) were assessed and listed by jurisdiction, with recommendations section of the report are backed by findings from the 2012 watershed field inventory. The overall watershed characteristics assessment, and input from watershed stakeholders are little changed. In general, the recommendations address sites where watershed problems and opportunities can best be addressed to achieve watershed goals and objectives. The Site-Specific Measures Action Plan is organized by jurisdiction with significant detail and estimated pollutant reduction and cost. This makes it easy for users to identify project sites and valuable supporting details. Some recommendations have been started, many not. None has been completed since maintenance will be required for an indefinite period. No new Site-Specific Management Measures were proposed during stakeholder meetings for the plan update.

The Village of South Barrington and the Forest Preserve District of Cook County provide outstanding examples of efforts to implement site-specific projects. South Barrington, in partnership with residents, restoration contractors and homeowner associations, has initiated work on 40 of the 66 projects identified in the 2012 plan. The village reviews building permits for streambank and shoreline buffers using native plants and supports an array of efforts to maintain green infrastructure on public and private land and protect the watersheds that drain the community. The Cook County

Forest Preserves acquired two parcels totaling more than 800 acres since 2012 and conducts habitat restoration work in the Spring Creek Nature Preserve and supports the efforts of the Spring Creek Stewards and Barrington Greenway Initiative (BGI). In all, 14 of the 25 site-specific projects in Spring Creek Forest Preserve are underway.

Water quality in the Spring Creek watershed could be significantly improved by completing more site-specific projects. Based on the Pollutant Reduction Efficiency estimates in the 2012 plan, the following pollutants could be removed annually from Spring Creek by completing the top 10 projects. Refer to Figure 13.

Top 10 Spring Creek Site-Specific Projects

Project #/ location	Suspended solids (tons)	Total N (lbs.)	Total P (lbs.)
OTHER3 – FPDCC	240	480	240
SPCR3 – Barrington Hills	172	343	172
TRD1 – FPDCC	151	278	107
WL28 – FPDCC	142	1375	289
PP3 – FPDCC	140	1756	350
TRH2 – Barrington Hills	124	250	124
PP6 – Barrington Hills	103	1025	234
TRJ2, 3 – Fox River Grove	78	132	66
DB3 – Hoffman Estates	76	1388	134
PP2 – FPDCC	75	944	188
Total	**1,301 tons**	**7,971 lbs.**	**1,904 lbs.**

Figure 13. Estimated pollutant reduction estimates (Source: Spring Creek Watershed Plan, 2012).

FC/SCWP will use these assessments and estimates to promote ongoing efforts through the Barrington Greenway Initiative, Barrington Area Conservation Trust, forest preserve districts and other agencies to promote existing and new land preservation, habitat and stream restoration projects.

6.0 Information & Education Plan updates

A review of the "Report Cards" in Section 8 serves as a roadmap pointing out what has worked and where FCSCWP should focus additional efforts in the future. The Spring Creek Watershed Partners were listed as a lead organization for virtually all of the actions in the matrix merged with the Flint Creek Watershed Partnership soon after plan publication. Thus, singular focus on the Spring Creek plan was lost. On the other hand, the combined watershed group brings together stakeholders and programs that operate across both watersheds. The Information & Education (I&E) Objectives are nearly identical for the two watersheds and should be merged into a single plan going forward.

There are too many organizations and sources of good water-related information, and they change too frequently to be cited in a watershed plan. Some leading information sources include:

- Federal, state, and local governmental agencies, e.g., US and Illinois EPA, US Geological Survey, FEMA, US Fish & Wildlife Service, etc.
- County storm water management agencies and soil and water conservation districts.
- Governmental consortiums, e.g., BACOG, CMAP, Northwest Water Alliance, Metropolitan Mayors Caucus, etc.
- Not-for-profit watershed protection organizations, e.g., Center for Watershed Protection, Fox River Study Group, Fox River Ecosystem Partnership, FCSCWP, etc.
- Colleges and universities, including University of Illinois Extension

Local organizations regularly present programs, send out newsletters, post on social media and generate other messaging on water and natural resource issues, including the following organizations: FCSCWP, Chicago Living Corridors, Wild Ones, BACOG, Friends of the Fox River, Illinois RiverWatch, and Sierra Club groups. Municipalities help by passing this information along to residents via web sites, e-newsletters and their own social media. In addition, CFC and the Barrington Area Community Trust conduct programs for grade and high school students.

With all the available information, the challenge is often to winnow down the flood and promote simple changes in behavior that will reach a large audience and make a difference. I&E strategies will need to be continuously refined to meet this challenge.

Revised milestones related to I&E plan are also included in Section 8.2.

7.4 Additional Investigations (new)

Over the course of the planning process a number of instances were identified that were beyond the scope of the initial planning process where additional research or discovery in the future might further plan goals and implementation. Additional potential watershed investigations that the FCSCWP could pursue in the future include, but are not limited to, the following:

- Updated Comprehensive Plan from the Village of Carpentersville or other communities as appropriate
- Augmenting or modifying the Water Quality Monitoring Plan to reflect any pollutants of concern
- Review of FEMA's updated regulatory floodplain maps and how changes might affect Spring Creek watershed

These additional investigations are considered High Priority/Critical Areas for future funding should the FCSCWP decide to pursue them in the future.

7.5 Plan Amendments (new)

Data, research, and methodologies are continuously updating and evolving. In order to accommodate new and updated information, FCSCWP may decide to update the plan by way of Amendment as often as yearly, if necessary. The process for updating the plan will be led by FCSCWP and include amendments as agreed to and documented during meetings and attached to the final watershed-based plan as an Amendment. Amendments should be written as stand-alone documents that reference the plan and appropriate plan sections. The process is outlined as follows:

- FCSCWP research and documents Amendment
- FCSCWP approves Amendment
- FCSCWP sends Amendment to IEPA for review and approval
- IEPA and FCSCWP agree to and make edits as necessary
- FCSCWP publishes Amendment

Amendments might include additional projects that were not identified during the planning process; new practices, methodologies, or programs that will improve implementation our watershed outcomes; the results or outcomes of any additional investigations (as identified in Section 7.4); updated Illinois State Water Survey groundwater research; or any similar findings that FCSCWP and IEPA agree to.

FCSCWP will house a link to the approved watershed-based plan and any approved amendments on its website, currently available at https://flintcreekspringcreekwatersheds.org/spring-creek.

8.1 Water Quality Monitoring Plan & Evaluation Criteria updates

While good water quality data for Spring Creek remain scarce, FCSCWP is gradually expanding its surface water quality monitoring program to increase the number of stations and establish consistent parameters for all testing locations. The program is also being adapted to engage volunteers, students, and summer interns.

FCSCWP monitored stream flow and water chemistry at six stations in 2015, 2020 and 2021. Starting in 2022, FCSCWP will conduct in-stream work with staff and volunteers to eliminate the expense of using contract labor. That will enable allow the scope of sampling to be expanded by:

- Adding a new station in Hoffman Estates to monitor the headwaters,
- Adding analytes (test parameters) so that we have a consistent data set across all testing locations, and
- Using the program to build capabilities, partnerships, and educational opportunities. For example, CFC and BACT summer interns will experience flow measurement and field chemistry and grab sample protocols.

FCSCWP also supports residents who want to monitor their lakes, using finds that were provided by a grant from the Barrington Area Community Foundation. Several groups have been given training and Secchi discs. The program also pays for testing of samples at a certified lab operated by the Lake County Health Department.

FCSCWP operates a network of stream gage installations in the Flint Creek watershed, in partnership with BACOG. Some of the gages are equipped with sondes to collect hourly water chemistry data in addition to stream flow. FSCSCWP and BACOG hope to install one or more gages along Spring Creek.

8.2 Goal Milestones/Progress Evaluation "Report Cards" updates

As part of the update process, the original report cards of the plan were reviewed and progress towards milestones. In some cases, it was determined that some of the milestones needed to be reworded to align with revised objectives and/or current policies and practices. A summary of milestone progress and any suggested revisions to report cards follows, by report card.

Goal A, Report Card: ***Definite progress has been made on 7 of the 11 milestones outlined, or 63%, resulting in a B.***

Milestone summary, years 1-10:

1-3) No Critical Area restoration projects, nor concept plans have been completed in the first 10 years since the plan was completed. Most of the restoration recommendations in the plan fall on private property and it has been very difficult to find landowners willing to pursue such recommendations.

4) Natural stormwater designs have been followed for new development, particularly within South Barrington where the most development has occurred since the plan was completed. While these plans were not necessarily all reviewed by an Ecological Consultant, they definitely follow ecological design principles and have helped ensure water quality improvements are considered with new development.

5) While true alternatives to road salts don't entirely exist as a replacement to road salts, multiple local communities have followed best management practices for snow/ice control as outlined by both BACOG and McHenry County.

6) Shortly after completion of the original plan, Illinois put in place a ban on commercial phosphorus application. BACOG, FCSCWP, and other partners have conducted numerous outreach programs to homeowners in the watershed about proper phosphorus application and additional bans were determined unnecessary.

7) The use of drain tiles to control water levels on fields was successfully completed under a project by the Army Corps in Spring Creek Preserve. No additional work was done to see whether this type of drain tile manipulation should or could be implemented by farmers and we suggest that farmers should follow more applicable NRCS programs rather than drain tile manipulation in order to achieve improved water quality.

8) There is no clear evidence that Barrington Hills pursued Best Equestrian Practices.

9) Each county is responsible for tracking septic systems within their jurisdiction, including whether these systems are being maintained and are up to code.

10) FCSCWP implemented a water quality monitoring program for monitoring surface waters in Spring Creek and ISWS, BACOG, and McHenry County have all implemented groundwater monitoring programs within Spring Creek watershed.

11) None of the Priority Protection Areas identified in the original plan have been developed.

Suggested revisions to milestones for years 10+:

- Milestone 4 should be revised to read "All natural stormwater designs in new development should be reviewed by an Ecological Consultant or by municipal representatives following ecological principles of design."
- Milestone 5 should be revised to "At least 25% of farmers utilized NRCS programs to improve water quality on their lands."
- Milestone 6 should be revised to read "At least three local communities implement Best Management Practices for snow/ice control."
- Additionally, remedial efforts should include targeted outreach to private landowners about Critical Area restoration projects.

Goal B, Report Card: ***Definite progress has been made on 4 of the 6 milestones outlined, or 67%, resulting in a B.***
Milestone summary, years 1-10:
1) While communities in the watershed have adopted the Spring Creek WBP, they have not separately adopted the Green Infrastructure Plan into comprehensive plans. However, CFC has implemented the Barrington Greenways Initiative within Spring Creek which shares the same greenways and goals.
2-3) No additional lands have been identified for additional protection or acquisition, nor have any appropriate parcels become available within the last 10 years. Extensive high quality natural areas, that likely harbor threatened and endangered species habitat, are already protected and being restored across the various forest preserve properties.
4) None of the Priority Protection Areas identified in the original plan have been developed.
5) Conservation design and low impact development have been followed for new development, particularly within South Barrington where the most development has occurred since the plan was completed.
6) No new Green Infrastructure Plan implementation (meaning additional acquisitions or protections of land) have occurred over the last 10 years.
Suggested revisions to milestones for years 10+:

- Remedial efforts should include synthesizing the Green Infrastructure Plan identified within the Spring Creek WBP and the Barrington Greenway Initiative to accomplish the same ends.

Goal C, Report Card: ***Definite progress has been made on 3 of the 4 milestones outlined, or 75%, resulting in a B.***
Milestone summary, years 1-10:
1) There are no undeveloped parcels currently in the 100-year floodplain that need additional protection or conservation easements. Watershed partners in Cook and Kane Counties, where FEMA Floodplain updates are underway will need to review if this is still the case once the updates are completed.
2) No Critical Area restoration projects, nor concept plans have been completed in the first 10 years since the plan was completed. Most of the restoration recommendations in the plan fall on private property and it has been very difficult to find landowners willing to pursue such recommendations.
3) None of the flood problem areas within Spring Creek require structural remediation. Generally speaking, Spring Creek is relatively unaffected by flooding issues, with only temporary inundation seen during flood events.
4) Conservation design and low impact development have been followed for new development, particularly within South Barrington where the most development has occurred since the plan was completed.
Suggested revisions to milestones for years 10+:

- Watershed partners in Cook and Kane Counties, where FEMA Floodplain updates are underway, will need to track how changes in the floodplain might affect parcels needing protection or conservation easements or whether additional structural flood problem areas occur.
- Additional remedial efforts should include targeted outreach to private landowners about Critical Area restoration projects.

Goal D, Report Card: ***Definite progress has been made on 5 of the 7 milestones outlined, or 71%, resulting in a B.***
Milestone summary, years 1-10:
1) No Critical Area restoration projects, nor concept plans have been completed in the first 10 years since the plan was completed. Most of the restoration recommendations in the plan fall on private property and it has been very difficult to find landowners willing to pursue such recommendations.
2) Somewhere between 400-500 acres of habitat are being restored or actively managed within Spring Creek Valley Forest Preserve alone and long-term management is being implemented there as well as at Helm Woods Forest Preserves.
3) Management plans have been developed and implemented at Spring Creek Valley Forest Preserve and Helm Woods Forest Preserve.
4) No new development has occurred within Priority Protection Areas and the development that has occurred within the Green Infrastructure Network took place in South Barrington and followed low impact development standards – these areas did not call for additional preservation of lands as there were no natural areas that needed to be protected on site.
5) No Critical Area restoration projects, nor concept plans have been completed in the first 10 years since the plan was completed. Most of the restoration recommendations in the plan fall on private property and it has been very difficult to find landowners willing to pursue such recommendations.
6) All local ordinances allow for the use of native plants in projects.

7) Trash clean-up within riparian corridors has continued over the last 10 years.

Suggested revisions to milestones for years 10+:

- Additional remedial efforts should include targeted outreach to private landowners about Critical Area restoration projects.

Goal E, Report Card: ***Definite progress has been made on 3 of the 4 milestones outlined, or 75%, resulting in a B.***

Milestone summary, years 1-10:

1) All municipalities with a significant land area in the watershed have adopted the Spring Creek Watershed-Based Plan except for Fox River Grove and Hoffman Estates. Both communities have participated in the plan update, so adoption is expected. Levels of implementation vary from one municipality to the next, but the plan is generally supported by municipalities.
2) The Spring Creek Watershed Partnership originally began work implementing the plan and was later combined with the Flint Creek group to form the Flint Creek Spring Creek Watershed Partnership which holds meetings and promotes implementation of both plans together since they share a boundary and many of the same partners.
3) A number of "champions" from the various municipalities and partner organizations all regularly participate in the FCSCWP meetings, including representatives from most of the municipalities, CFC, BACOG, Barrington Area Conservation Trust, the various Counties and forest preserve districts.
4) FCSCWP has presented at least once per year since the plan was completed in 2012, and usually much more often than that, on plan implementation that is geared towards stakeholders.

Suggested revisions to milestones for years 10+:

- Additional remedial efforts should focus on encouraging local municipalities, particularly those with more land within Spring Creek watershed, to increase their efforts at implementing all parts of the watershed-based plan.

Goal F, Report Card: ***Definite progress has been made on all 7 milestones outlined, resulting in an A.***

Milestone summary, years 1-10:

1) Far more than the number (5) of programs specified in the I&E Plan have been conducted for school groups and the public by local organizations, including FCSCWP, Citizens for Conservation, Chicago Living Corridors, BACT, Wild Ones and Ancient Oaks.
2) Local conservation groups have recruited dozens of new volunteers for projects related to habitat restoration at Spring Creek Forest Preserve and other preserves. Spring Creek Stewards alone are restoring 365 acres, with additional acres under "active management" through haying and prescribed burning.
3) There is new interpretive signage at Horizon Farm, which was opened to the public in 2021. Otherwise, the preserves feature trails and recreation without a lot of signage.
4) Fourth Grade in the Prairie, a joint program of Citizens for Conservation and District 220, features guided nature walks as part of the curriculum. Stillman Nature Center offers bird and wildflower walks, and treks around the grounds.
5) The Boys and Girls Clubs of Dundee Township has developed outdoor education programs for one school with a large proportion of disadvantaged students and is partnering with the Friends of the Fox River for a watershed component. A grant was recently awarded by the Barrington Area Community Foundation to enhance the program.
6) Average attendance at programs varies on either side of the target number of 25. For instance, recent FCSCWP meetings have ranges from 20-40 attendees.
7) Watershed events get publicity through the active conservation groups and their partners. CFC, BACT, FCSCWP, Chicago Living Corridors and Ancient Oaks Foundation all have web sites, social media, and newsletters to promote programs and events.

Suggested revisions to milestones for years 10+:

- More should be done to improve collaboration, coordinate scheduling and cross-promotion of events. Since the Spring Creek and Flint Creek watershed groups merged, FCSCWP tries to maintain a consistent I&E program, with a few differences by watershed. Since BGI encompass both watersheds and many partners, collaboration and coordination will likely increase as BGI becomes more active in the Spring Creek Watershed.

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Appendix F – List of Funding Programs and Opportunities (updated)

Education/Outreach

1. Illinois Department of Natural Resources

   Biodiversity Field Trip Grant

   - Take your students on a field trip to study some aspect of Illinois' biodiversity.
   - Application Deadline: January 31, 2021
   - Grant application details not yet available.
   - For more details visit: https://www2.illinois.gov/dnr/education/Pages/GrantsIBFTG.aspx

   Illinois Schoolyard Habitat Action Grant

   - Involve your students in hands-on natural resources stewardship.
   - Application Deadline: November 30, 2020
   - Schoolyard Wildlife Habitat Action Grant applicants must use native Illinois plants in their wildlife habitat area. If you are unsure of which plants are native to the state and where to purchase them, you can find information on the IDNR and other Web sites and through publications offered by the IDNR and other agencies.
   - For more information and applications visit: https://www2.illinois.gov/dnr/education/Pages/GrantsSHAG.aspx

2. Illinois Environmental Protection Agency

   Lake Education Assistance Program

   - LEAP funds are available to all school children whether they attend public or private schools, and for grades from kindergarten through graduate school. Funds are also available to not-for-profit organizations, such as lake associations, scouting groups, parks, and communities.
   - Eligible projects include educational programs on inland lakes and lake watersheds.
   - Maximum funding of $500 is reimbursed after completion. Deadlines are September 30 and January 31.
   - Contact IEPA at 217-782-3397.

3. U.S. Environmental Protection Agency

   Environmental Education Grants

   - Applicants must represent one of the following types of organizations to be eligible for an environmental education grant: local education agency, state education or environmental agency, college or university, non-profit organization as described in section 501(c)(3) of the Internal Revenue Code, noncommercial educational broadcasting entity, tribal education agency.
   - EE grants are required to have a non-federal match of 25% of the total cost of the project. Additionally, 25% of EPA funding must be used for subgrants, with each subgrant having a value of $5,000 or less.
   - Typical application window is October- January. For more information visit: https://www.epa.gov/education/grants

   Five-Star Restoration Challenge Grant Program

   - The Five Star and Urban Waters Restoration Program brings together students, conservation corps, other youth groups, citizen groups, corporations, landowners and government agencies to provide environmental education and training through projects that restore wetlands and streams. The program provides challenge grants, technical support and opportunities for information exchange to enable community-based restoration projects.
   - Funding priorities for this program include: on-the-ground wetland, riparian, in-stream and/or coastal habitat restoration; meaningful education and training activities, either through community outreach, participation and/or integration with K-12 environmental curriculum; measurable ecological, educational and community benefits; and partnerships: Five Star projects should engage a diverse group of community partners to achieve ecological and educational outcomes.
   - Funding levels from $10,000 to $40,000, with $20,000 as the average amount awarded per project.
   - Public and private entities may apply for grants averaging $10,000/project.
   - Program Coordinator: Carrie Clingan (Carrie.Clingan@nfwf.org), National Fish and Wildlife Foundation: 202-857-0166

- For more information visit: https://www.epa.gov/wetlands/5-star-wetland-and-urban-waters-restoration-grants.

Flood Control/Management

1. Illinois Emergency Management/Federal Emergency Management Agency

Flood Mitigation Assistance Program

- FMA grants are available to implement measures to reduce or eliminate risk of severe repetitive and repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP).
- Program will prioritize proposals that address community flood risk and seek to fund two types of community flood mitigation activities: Advance Assistance for flood mitigation design and development of community flood mitigation projects that will subsequently reduce flood claims and Mitigation projects that address community flood risk for the purpose of reducing NFIP flood claim payments.
- For more information visit https://www2.illinois.gov/iema/Mitigation/Pages/FEMA_Funding_Opp.aspx

Hazard Mitigation Grant program

- FMA grants are available to implement measures to reduce or eliminate risk of severe repetitive and repetitive flood damage to buildings insured by the National Flood Insurance Program (NFIP).
- The PDM grant program aims to reduce overall risk to the population and structures through mitigation, while at the same time reducing reliance on federal funding from Stafford Act disaster declarations.
- For more information visit https://www2.illinois.gov/iema/Mitigation/Pages/FEMA_Funding_Opp.aspx

2. U.S. Army Corps of Engineers

Small Flood Control Projects (Section 205)

- Section 205 gives the Corps authority to develop and construct small flood control projects.
- The types of studies and/or projects are tailored to be site specific. Typical flood risk management projects may include levees, floodwalls, impoundments, pumping stations, and channel modifications as well as non-structural measures. Non-structural measures reduce flood damages by changing the use of floodplains or by accommodating existing uses to the flood hazard. Examples include flood proofing, relocation of structures, and flood warning and preparedness systems.
- Before the Federal Government can participate in implementing a flood risk management project, a planning study must be conducted to determine if the project is economically justified (benefits exceed the costs), technically feasible, and environmentally acceptable. Planning studies are typically conducted in two phases - reconnaissance and feasibility.
- Initial study is 100% federally funded up to $100,000. The remainder of the project is cost shared 65% Federal and 35% non-Federal. The sponsor must contribute 35 percent (minimum 5 percent cash) of the total project implementation cost as cash or Lands, Easements, Rights-of-way, Relocations, and Disposal areas (LERRDs). If the value of the LERRDs plus the cash contribution does not equal or exceed 35 percent of the project cost, the sponsor must pay the additional amount necessary so that the sponsor's total contribution equals 35 percent of the project cost.
- More information can be found at: https://www.mvr.usace.army.mil/Business-With-Us/Outreach-Customer-Service/Flood-Risk-Management/Section-205/
- Project requests should be directed to (309) 794-5690.

Restoration

1. River Network

Business of Water Stewardship Project Bank

- The BWS Project Bank offers an opportunity for organizations to represent their watershed restoration projects on a national platform. BEF uses the Project Bank to share and learn about organizations and restoration projects and to represent specific projects to corporations seeking opportunities to support environmental water stewardship. Where there is a match between corporate interest and restoration projects, companies may elect to provide funding to support those efforts. In a few very instances, BEF may have corporate funds available for immediate investment.
- Eligible for River Network Organizational Members only.

- Eligible project types include flow restoration transaction, agricultural water use efficiency, public awareness and water efficiency, restoration of natural hydrology, barrier and impoundment removal, and pollution reduction and filtration.
- Contact April Ingle, River Network's Science and Policy Associate at aingle@rivernetwork.org.
- For more information visit: https://www.rivernetwork.org/resource/business-water-stewardship-project-bank/

2. U.S. Army Corps of Engineers

Continuing Authorities Program (Section 206 Water Resources Development Act)

- Section 206 gives the Corps authority to carry out an aquatic ecosystem restoration and protection project if the project will improve the quality of the environment, is in the public interest and is cost effective.
- Federal funds may be used for feasibility studies, planning, engineering, construction, supervision and administration.
- The Corps of Engineers provides the first $100,000 of feasibility study costs. A non-federal sponsor must contribute 50 percent of the cost of the feasibility study after the first $100,000 of expenditures, 35 percent of the cost of design and construction, 50 percent of the cost of recreational features and 100 percent of the cost of operation and maintenance.
- Federal project limit of $10 million.
- For more information visit: https://www.mvr.usace.army.mil/Business-With-Us/Outreach-Customer-Service/Ecosystem-Restoration/Section-206/
- Section 206 project requests should be directed to (309) 794-5704 or email customeroutreach@usace.army.mil

Project Modifications for Improvement of the Environment (Section 1135)

- Section 1135 of the Water Resources Development Act of 1986, as amended, authorizes the U.S. Army Corps of Engineers to make modifications to operations or structures of civil works projects previously constructed by USACE, for the purpose of improving the quality of the environment. In most cases, it must be demonstrated that the operation or construction of a civil works project has degraded the quality of the environment. The primary objective of Section 1135 is to modify existing USACE projects to restore ecosystem habitats.
- Cost share 75% federal, 25% non-federal.
- Federal project limit of $10 million.
- For more information visit: https://www.mvr.usace.army.mil/Business-With-Us/Outreach-Customer-Service/Ecosystem-Restoration/Section-1135/
- Section 1135 project requests should be directed to (309) 794-5853 or email cemvr-outreach-web@usace.army.mil

3. U.S. Fish and Wildlife Service

North American Wetlands Conservation Act

- The Small Grants Program is a competitive, matching grants program that supports public-private partnerships carrying out projects in the United States that further the goals of the North American Wetlands Conservation Act.
- Projects must involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats for the benefit of all wetlands-associated migratory birds.
- Grant requests may not exceed $100,000, and funding priority is given to grantees or partners new to the Act's Grants Program.
- For general program information, contact the Small Grants Program Coordinator, Rodecia McKnight (rodecia_mcknight@fws.gov), (703) 358-2266 or Anya Rushing (anya_rushing@fws.gov), (703) 358-2032.
- For more information visit: https://www.fws.gov/birds/grants/north-american-wetland-conservation-act/small-grants.php

4. U.S. Department of Agriculture (Natural Resource Conservation Service)

Wetland Reserve Enhancement Partnership (WREP)

- WREP provides financial and technical assistance to restore, protect, and enhance wetlands through the purchase of a wetland reserve easement. Under the Agricultural Land Easements component, NRCS helps state and local governments, Indian tribes, and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance wetlands that have been altered for agriculture.
- Land eligible for wetland reserve easements includes farmed or converted wetland that can be successfully and cost-effectively restored. NRCS will prioritize applications based the easement's potential for protecting and enhancing habitat for migratory birds and other wildlife.
- For more information visit: https://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/programs/easements/acep/?cid=nrcseprd1459249

5. U.S.D.A. Forest Service

IDNR Urban and Community Forestry Program

- Administered by The Morton Arboretum
- The goal of this funding is to assist Communities in Illinois to develop tree inventories and management plans.
- Deadline for submittal in December, contracts in January/February.
- Contact Emily Okallau, Community Outreach Coordinator, Chicago Region Trees Initiative, eokallau@mortonarb.org or cell: 630-754-6116.

Restoration/Education

1. U.S. Environmental Protection Agency

Environmental Education Grants

- Applicants must represent one of the following types of organizations to be eligible for an environmental education grant: local education agency, state education or environmental agency, college or university, non-profit organization as described in section 501(c)(3) of the Internal Revenue Code, noncommercial educational broadcasting entity, tribal education agency.
- EE grants are required to have a non-federal match of 25% of the total cost of the project. Additionally, 25% of EPA funding must be used for subgrants, with each subgrant having a value of $5,000 or less.
- Typical application window is October- January. For more information visit: https://www.epa.gov/education/grants

Five-Star Restoration Challenge Grant Program

- The Five Star and Urban Waters Restoration Program brings together students, conservation corps, other youth groups, citizen groups, corporations, landowners and government agencies to provide environmental education and training through projects that restore wetlands and streams. The program provides challenge grants, technical support and opportunities for information exchange to enable community-based restoration projects.
- Funding priorities for this program include: on-the-ground wetland, riparian, in-stream and/or coastal habitat restoration; meaningful education and training activities, either through community outreach, participation and/or integration with K-12 environmental curriculum; measurable ecological, educational and community benefits; and partnerships: Five Star projects should engage a diverse group of community partners to achieve ecological and educational outcomes.
- Funding levels from $10,000 to $40,000, with $20,000 as the average amount awarded per project.
- Public and private entities may apply for grants averaging $10,000/project.
- Program Coordinator: Carrie Clingan (Carrie.Clingan@nfwf.org), National Fish and Wildlife Foundation: 202-857-0166
- For more information visit: https://www.epa.gov/wetlands/5-star-wetland-and-urban-waters-restoration-grants

2. U.S. Fish and Wildlife Service

North American Wetlands Conservation Act

- The Small Grants Program is a competitive, matching grants program that supports public-private partnerships carrying out projects in the United States that further the goals of the North American Wetlands Conservation Act.
- Projects must involve long-term protection, restoration, and/or enhancement of wetlands and associated uplands habitats for the benefit of all wetlands-associated migratory birds.
- Grant requests may not exceed $100,000, and funding priority is given to grantees or partners new to the Act's Grants Program.
- For general program information, contact the Small Grants Program Coordinator, Rodecia McKnight (rodecia_mcknight@fws.gov), (703) 358-2266 or Anya Rushing (anya_rushing@fws.gov), (703) 358-2032.
- For more information visit: https://www.fws.gov/birds/grants/north-american-wetland-conservation-act/small-grants.php

Restoration/Water Quality

1. Illinois Environmental Protection Agency

Streambank Cleanup and Lakeshore Enhancement (SCALE)

- The Streambank Cleanup and Lakeshore Enhancement (SCALE) program provides funds to assist groups that have established a recurring stream or lakeshore cleanup.
- SCALE is limited to organizations that have an established, recurring streambank or lakeshore litter cleanup. Projects are selected for funding based on their event's proximity to Illinois EPA's priority waters, the number of people participating in past events, and the size of the event area.
- Currently the program is undergoing changes and is not available.
- For more information visit: https://www2.illinois.gov/epa/topics/water-quality/surface-water/scale/Pages/default.aspx

Open Space Preservation/Management/Acquisition

1. Illinois Department of Natural Resources

Open Space Lands Acquisition and Development Program (OSLAD)

- The Open Space Lands Acquisition and Development (OSLAD) Program is a state-financed grant program that provides funding assistance to local government agencies for acquisition and/or development of land for public parks and open space.
- Eligible projects include acquisition of land for new park sites or park expansion, water frontage, nature study, and natural resource preservation.
- Also includes development/renovation of: picnic and playground facilities; outdoor nature interpretive facilities; sports courts and play fields; swimming pools, beaches and bathhouses; campgrounds and fishing piers; winter sports facilities; park roads and paths, parking, utilities and restrooms; and architectural/engineering (A/E) services necessary for proper design and construction of approved project components.
- Initial proposals typically due in March, with additional rounds by invitation extending through July.
- Funding up to 50% of project costs (90% for distressed communities); $750,000 maximum for acquisition projects; $400,000 maximum for development/renovation projects.
- More information available at https://www2.illinois.gov/dnr/grants/Pages/OpenSpaceLandsAquisitionDevelopment-Grant.aspx
- Contact IDNR Region 1 Jennifer Weisenberger, 217-782-7607, Jennifer.weisenberger@illinois.gov.

2. The Conservation Fund

Eastman Kodak American Greenways Awards Program

- The Kodak American Greenways Awards Program, a partnership project of the Eastman Kodak Company, the Conservation Fund and the National Geographic Society, provides small grants to stimulate the planning and design of greenways in communities throughout America.
- The organization is interested in funding activities such as mapping, eco-logical assessments, surveying, conferences and design activities; developing brochures, interpretative displays, audio-visual productions or public opinion surveys; hiring consultants; incorporating land trusts; and/or building footbridges, planning bike paths or other creative projects.
- Grants range from $500-2,500.
- Requirements and limitations: Awards will be given primarily to local, regional or statewide nonprofit organizations. Although public agencies may also apply, community organizations will receive preference. Grants may not be used for academic research, general institutional support, lobbying or political activities.
- Grants will be awarded based on the following criteria: Importance of the project to local greenway development efforts; Demonstrated community support for the project; Extent to which the grant will result in matching funds or other support; Likelihood of tangible results; and Capacity of the organization to complete the project.
- Applications may be submitted from March 1 through June 1 of each calendar year.
- For more information visit: https://rlch.org/funding/kodak-american-greenways-grants

3. U.S. Department of Agriculture (Natural Resource Conservation Service)

Agricultural Conservation Easement Program (ACEP)

- ACEP provides financial and technical assistance to help conserve agricultural lands and restore wetlands. Under the Agricultural Land Easements component, NRCS helps state and local governments, Indian tribes, and non-governmental organizations protect working agricultural lands and limit non-agricultural uses of the land. Under the Wetlands Reserve Easements component, NRCS helps to restore, protect and enhance wetlands that have been altered for agriculture.
- For more information visit: https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/easements/acep/

Conservation Stewardship Program (CSP)

- Helps owners and operators of agricultural lands maintain conservation stewardship and implement and maintain additional needed conservation practices. The conservation benefits gained will keep farms and ranches more sustainable and profitable and increase the benefits provided to all Americans through improved natural resources.
- Applications for CSP are accepted on a continuous basis; however, Illinois NRCS has established an application deadline typically in May for each funding year.
- For more information visit: https://www.nrcs.usda.gov/wps/portal/nrcs/il/programs/financial/csp/conservation+stewardship+program+%28csp%29/

Environmental Quality Incentives Program (EQIP)

- The Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural producers in order to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation or improved or created wildlife habitat.
- Agricultural producers and owners of non-industrial private forestland and Tribes are eligible to apply for EQIP. Eligible land includes cropland, rangeland, pastureland, non-industrial private forestland and other farm or ranch lands
- Applications for EQIP are accepted on a continuous basis; however, Illinois NRCS has established two EQIP application deadlines typically in March and April for each funding year.
- For more information visit: https://www.nrcs.usda.gov/wps/portal/nrcs/il/programs/financial/eqip/

Illinois Working Lands, Water and Wildlife Conservation Partnership Projects

- The USDA Natural Resources Conservation Service (NRCS) has awarded more than $8 million in federal funds for the Illinois Working Lands, Water and Wildlife Conservation Partnership to protect working farmland, improve water quality, and increase and enhance wildlife habitat in rural Illinois.
- Includes The Conservation Fund in planning and coordinating the projects that will be funded through the NRCS Regional Conservation Partnership Program (RCPP).
- Focused on key conservation priority areas in Illinois, the partnership intends to build protected habitat corridors along targeted stream segments through use of permanent conservation easements on working farmland.
- Conservation practices will be implemented that connect farmland with protected natural lands, prevent runoff and improve water quality, advance agricultural practices that improve soil health, and support farmers and landowner partners.
- In addition, IDNR will implement soil health practices on IDNR-owned and managed lands that are leased for agricultural production.
- Contact Rachel Torbert: 217-785-3953.

Regional Conservation Partnership Program (RCPP)

- The Regional Conservation Partnership Program (RCPP) promotes coordination between NRCS and its partners to deliver conservation assistance to producers and landowners. NRCS provides assistance to producers through partnership agreements and through program contracts or easement agreements.
- RCPP encourages partners to join in efforts with producers to increase the restoration and sustainable use of soil, water, wildlife and related natural resources on regional or watershed scales.
- Eligible Participants - Under RCPP, eligible producers and landowners of agricultural land and non-industrial private forestland may enter into conservation program contracts or easement agreements under the framework of a partnership agreement.
- For more information visit: https://www.nrcs.usda.gov/wps/portal/nrcs/il/programs/farmbill/rcpp/

2. U.S. Environmental Protection Agency

Wetlands Program Development Grant (WPDG)

- WPDGs provide eligible applicants an opportunity to conduct projects that promote the coordination and acceleration of research, investigations, experiments, training, demonstrations, surveys and studies relating to the causes, effects, extent, prevention, reduction and elimination of water pollution.
- Requests for Proposals (RFPs) are typically put out in the springtime.
- Region 5 Contact: Dertera Collins (collins.dertera@epa.gov), EPA Region 5, Phone: 312-353-6291

3. U.S. Forest Service

Urban and Community Forestry

- Provides technical assistance to state forestry agencies, local and tribal governments and the private sector improve natural resource management of trees, forested lands, and open spaces in urban areas and community settings.
- Grants range from $1,000 to $25,000 and require a 50–50 match (total project cost range is $2,000 to $50,000).
- The project sponsor must initially fund 100 percent of project costs with cash, in-kind contributions and/or donations. Upon completion, the project sponsor requests reimbursement for 50 percent of eligible costs (501[c][3] nonprofit organizations may request an advance when a grant is awarded).
- Application deadline is October 1 for projects to be completed between January 1 and December 31 of the coming year.
- Contact: Michael Brunk 217-558-2517 | Michael.Brunk@illinois.gov
- For more information visit: https://www2.illinois.gov/dnr/Pages/default.aspx

Recreation

1. Illinois Department of Natural Resources

   Recreational Grants-in-Aid Programs

   - Provides grants for capital improvements to create and/or enhance recreational amenities. These include OSLAD/federal LWCF, Boating Access, PARC, and Trails Programs including Bikeway, Snowmobile, Off-Highway Vehicle, and federal Recreational Trails Program.
   - Additional details can be found at https://www2.illinois.gov/dnr/AEG/Pages/Grant-Administration.aspx
   - Contact DNR.Grants@illinois.gov for more information.

2. Illinois Department of Transportation

   TEA-21 Enhancement Program

   - Eligible projects include Pedestrian/Bicycle Facilities, Streetscapes, Conversion of Abandoned Railroad Corridors to Trails, Historic Preservation and Rehabilitation of Historic Transportation Facilities, Vegetation Management in Transportation Rights-of-Way, Archaeological Activities Relating to Impacts from Implementation of a Transportation Project, Storm Water Management, Control and Water Pollution Prevention or Abatement Related to Highway Construction or Due to Highway Runoff, Reduce Vehicle-Caused Wildlife Mortality or Restore and Maintain Connectivity Among Terrestrial or Aquatic Habitats, and Construction of Turnouts, Overlooks, and Viewing Areas.
   - Program currently postponed.
   - For more information visit: http://www.idot.illinois.gov/transportation-system/local-transportation-partners/county-engineers-and-local-public-agencies/funding-opportunities/ITEP

3. National Park Service

   Rivers, Trails, and Conservation Assistance Program

   - The National Park Service Rivers, Trails, and Conservation Assistance program supports community-led natural resource conservation and outdoor recreation projects across the nation.
   - Project applicants may be state and local agencies, tribes, nonprofit organizations, or citizen groups. National Parks and other Federal agencies may apply in partnership with other local organizations.
   - June 30 application deadline.
   - For more information visit: https://www.nps.gov/orgs/rtca/apply.htm

Water Quality

Illinois Environmental Protection Agency

Green Infrastructure Grant Opportunities (GIGO)

- The Green Infrastructure Grant Opportunities (GIGO) Program funds projects to construct green infrastructure best management practices (BMPs) that prevent, eliminate, or reduce water quality impairments by decreasing stormwater runoff into Illinois' rivers, streams, and lakes. Projects that implement treatment trains (multiple BMPs in a series) and/or multiple BMPs within the same watershed may be more effective and efficient than a single large green infrastructure BMP.
- Application deadline is August 21
- Eligible projects will provide water quality improvement through the construction of BMPs to decrease stormwater runoff prior to release into rivers, streams, and lakes, and include:
  - Reconnection of a stream with its floodplain (e.g., two-stage ditch, daylighting);
  - Treatment and flow control of stormwater runoff at sites directly upstream or downstream of an impervious area that currently impacts river, stream, or lake water quality through stormwater runoff discharge; and/or
  - Treatment and flow control of water generated from impervious surfaces associated with urban development (such as roads and buildings).

- Example project types include bio-infiltration, retention/infiltration, detention pond creation/retrofit, wetland creation/modification, floodplain reconnection, watershed-wide projects, rainwater harvesting, downspout disconnections, and BMP design and construction, among others.
- GIGO has a set maximum total grant award of $2,500,000 with a minimum grant award of $75,000. No more than 50 percent of the program total, per funding cycle, shall be allocated to any one applicant or project.
- GIGO may provide up to 75 percent of the approved project costs, except for those applicants that propose projects within a defined disadvantaged area1 which may be eligible for up to 85 percent GIGO assistance.2 The remaining 25 percent (15 percent for approved disadvantaged areas) is the responsibility of the grantee and constitutes the match.
- For more information visit: https://www2.illinois.gov/epa/topics/grants-loans/water-financial-assistance/Pages/gigo.aspx

Non-point Source Management Program (Section 319 Grants)

- Eligible projects include controlling or eliminating non-point pollution sources.
- Application deadline is August 1.
- Requires 40% non-federal matching funds or in-kind services.
- Program period is two years.
- Will provide up to 60% reimbursement of project cost.
- Contact Illinois Environmental Protection Agency (IEPA) at 217-782-3362, or visit https://www2.illinois.gov/epa/topics/water-quality/watershed-management/nonpoint-sources/Pages/grants.aspx

Wastewater/Stormwater and Drinking Water Loans

- Two programs that provide low interest loans to units of local government for the construction of wastewater or community water supply facilities.
- Funding cycle is July 1 through June 30th, deadline is March 31.
- Visit https://www2.illinois.gov/epa/topics/grants-loans/state-revolving-fund/Pages/default.aspx for more information.

U.S. Environmental Protection Agency

Water Quality Cooperative Agreement

- Administered by the U.S. Environmental Protection Agency (EPA), these grants are designed to help states, Indian tribes, interstate agencies, and other public or nonprofit organizations address water pollution. Grant recipients develop, implement, and demonstrate innovative approaches relating to the causes, effects, extent, reduction, and elimination of water pollution.
- The grants' funding priorities include, but are not limited to: watershed approaches for solutions to wet weather activities (i.e., combined sewer overflow, sanitary sewer overflows, and storm water discharge); pretreatment and biosolids (sludge) program activities, decentralized systems; and alternative ways to enhance or measure the effectiveness of point source programs. Trading, water efficiency, asset management, and sustainable infrastructure are also areas of consideration.
- For more information for EPA Region 5 visit: https://www.adaptationclearinghouse.org/resources/epa-region-5-water-quality-cooperative-agreements-66-463-grants.html

Wildlife

1. Illinois Department of Natural Resources

Special Wildlife Funds Grant Program (Illinois Habitat Fund, State Pheasant Fund, State Furbearer Fund and the Migratory Waterfowl Stamp Fund)

- Provides grants to protect, acquire, enhance and/or manage wildlife habitat through the Illinois Habitat Fund, State Pheasant Fund, State Furbearer Fund and the Migratory Waterfowl Stamp Fund.

- Together, these programs are designed to protect, acquire, enhance or manage wildlife habitat and to support limited research and educational programs to further advance this mission.
- Various deadlines.
- For more information visit https://www2.illinois.gov/dnr/grants/Pages/Special-Wildlife-Funds-Grant-Program.aspx

2. National Fish and Wildlife Foundation

Challenge Grants

- Projects that promote fish, wildlife, and habitat conservation; work proactively to involve other conservation and community interests; leverage NFW funding; and evaluate project outcomes.
- Large-scale ecosystem restoration is a high priority, especially to maintain and restore populations and habitat of at-risk, threatened or endangered species.
- Grant size: $10,000 to $150,000
- Federal, state, and local governments, educational institutions and nonprofit organizations are eligible to apply.
- A one-to-one match is required, but a two-to-one match or better is preferred.
- To be eligible, challenge funds (cash or contributed goods or services) must be non-federal in origin; raised and dedicated specifically for the project; and voluntary in nature.
- Pre-proposals must be received by April 4 or September 1. Full proposals are due June 1 or November 1.
- For more information visit: http://www.rlch.org/funding/national-fish-and-wildlife-foundation-nfwf-challenge-grants

Wildlife Links

- Cooperative program that funds cutting edge research, management and education projects that will help golf courses become an important part of the conservation landscape. Areas of interest include: management and design techniques for increasing biodiversity on golf courses; management guidelines for specific species; research to determine habitat characteristics that serve as corridors or barriers on golf courses; monitoring research to determine habitat characteristics that serve as corridors or barriers on golf courses, monitoring wildlife habitat conservation programs on golf courses; effects of golfer and maintenance activities on wildlife. The United States Golf Association provides $200,000 annually to fund these grants.
- Proposals should indicate that golf courses will be formal partners.
- Maximum request $25,000/year multi-year proposals accepted.
- Pre-proposal deadline is April 1 and September 1.
- Contact Katie Distler NFWF 202 857-0166