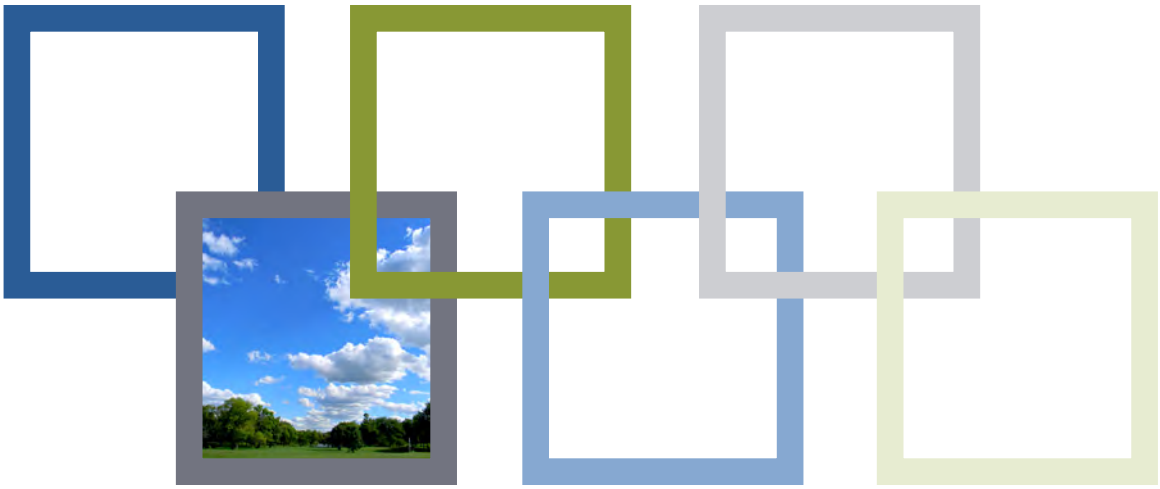


6.0 MANAGEMENT MEASURES ACTION PLAN

Earlier sections of this plan summarized Long Run Creek watershed's characteristics and identified causes and sources of watershed impairment. This section includes an "Action Plan" developed to provide stakeholders with recommended "Management Measures" (Best Management Practices) to specifically address plan goals at general and site specific scales. The Action Plan is divided into two subsections:

- *Programmatic Measures*: general remedial, preventive, and policy watershed-wide Management Measures that can be applied across the watershed by various stakeholders.
- *Site Specific Measures*: actual locations where Management Measure projects can be implemented to improve surface and groundwater quality, green infrastructure, and flooding.

The recommended programmatic and site specific Management Measures provide a solid foundation for protecting and improving watershed conditions but should be updated as projects are completed or other opportunities arise. Lead implementation stakeholders are encouraged to organize partnerships with key stakeholders and develop various funding arrangements to help delegate and implement the recommended actions. The key stakeholders in the watershed are listed in Table 37. Detailed descriptions and responsibilities of each stakeholder are found in Appendix E. **Note: all recommendations in this Section are for guidance only and not required by any federal, state, or local agency.**

Table 37. Key Long Run Creek watershed stakeholders/partners.

Key Watershed Stakeholder/Partner	Acronym/Abbreviation
City of Lockport	Lockport
Commonwealth Edison Company	ComEd
Enbridge, Inc.	Enbridge
Forest Preserve District of Cook County	FPDCC
Forest Preserve District of Will County	FPDWC
Lower Des Plaines Ecosystem Partnership	LDPEP
Golf Courses	GC
Hanson Material Service	HMS
Homer Township Highway Department	Homer Twp
Illinois, Cook County, and Will County Dept. of Transportation	DOTs
Illinois Department of Natural Resources	IDNR
Illinois Nature Preserves Commission	INPC
Illinois Environmental Protection Agency	Illinois EPA
Lemont Township & Highway Department	Lemont Twp
Long Run Creek Watershed Planning Committee	LRCWPC
US Fish & Wildlife Service	USFWS
Village of Homer Glen	Homer Glen
Village of Lemont	Lemont
Village of Orland Park	Orland Park
Village of Palos Park	Palos Park
Will County Planning & Zoning Commission	WCPZC
Will County Stormwater Management Planning Committee	WCSMPC
Will-South Cook Soil and Water Conservation District	SWCD

6.1 PROGRAMMATIC MANAGEMENT MEASURES ACTION PLAN

Numerous types of programmatic Management Measures are recommended to address watershed objectives for each plan goal. The following pages include recommended measures that are applicable throughout the watershed and information needed to facilitate implementation of specific actions. A brief summary of the general programmatic measure types is included below:

Policy: Local, state, and federal government can help prevent watershed impairments in various ways through policy but specifically by adopting and/or supporting (via a resolution) the Long Run Creek watershed plan, implementing green infrastructure policy, requiring conservation developments, protecting groundwater, reducing road salt usage and lawn fertilizers, requiring natural detention basins, and allowing use of native vegetation/landscaping.

Non-Structural: This includes a broad group of practices that prevent impairment through maintenance and management of Management Measures or programs that are ongoing in nature and designed to control pollutants at their source. Such programs include the Audubon Cooperative Sanctuary Program (ACSP) for golf courses, many of the agricultural programs available to farmers, and street sweeping.

Structural: This includes a broad group of practices that prevent impairment via installation of in-the-ground measures. This plan focuses on implementation of naturalized stormwater measures/retrofits, permeable paving, vegetated filter strips/buffers, natural area restoration, wetland restoration, wastewater treatment plant upgrades, and use of rainwater harvesting devices.

Educational: Outreach is important to educate

the public related to environmental impacts of daily activities and to build support for watershed planning and projects. Topics typically addressed include land management, pet waste management, lawn fertilizer use, good housekeeping, etc.

6.1.1 POLICY RECOMMENDATIONS

Various recommendations are made throughout this report related to how local governments can improve the condition of Long Run 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. To be successful, the Long Run Creek Watershed-Based Plan would need to be adopted and/or supported by local communities. The process of creating and implementing policy changes can be complex and time consuming. And, although there are numerous possible policy recommendations for the watershed, the following policy recommendations are considered the most important and highest priority for implementation.

Plan Adoption and/or Support & Implementation Policy Recommendations

- Watershed Partners adopt and/or support (via a resolution) the Long Run Creek Watershed-Based Plan and incorporate plan goals, objectives, and recommended actions into comprehensive plans and ordinances.

Green Infrastructure Network Policy Recommendations

- Each municipality consider incorporating the identified Green Infrastructure Network (GIN) into comprehensive plans and development review maps.
- Utilize tools such as protection overlays, setbacks, open space zoning, conservation easements, conservation and/or low impact development, etc. in municipal comprehensive plans and zoning ordinances to protect environmentally sensitive areas on identified Green Infrastructure Network parcels.
- Utilize tools such as Development Impact Fees, Stormwater Utility Taxes, Special Service Area (SSA) Taxes, etc. to help fund future management of green infrastructure components where new and redevelopment occurs.
- Encourage developers to protect sensitive natural areas, restore degraded natural areas and streams, then donate all natural areas and naturalized stormwater management systems to a public agency or conservation organization for long term management with dedicated funding such as Development Impact Fees, Stormwater Utility Taxes, Special Service Area (SSA) Taxes, etc. In general, it is not recommended that these features be turned over to HOA's to manage.
- Establish incentives for developers who propose sustainable or innovative approaches to preserving green infrastructure and using naturalized stormwater treatment trains.
- Consider limiting mitigation for all wetlands lost to development to occur within the watershed.

Groundwater Policy Recommendations

- Encourage extensive stormwater management practices that clean and infiltrate water in all new and redevelopment occurring within the Class III Groundwater Contribution Area (GCA) to Long Run Seep Nature Preserve.
- Limit future mitigation dollars from impacts to Hine's Emerald Dragonfly (HED) habitat such as mining, chemical spills, etc. to managing and restoring HED habitat or to fund projects that support groundwater recharge within the Class III GCA to Long Run Seep Nature Preserve.
- Limit impervious cover within new and redevelopments occurring within Subwatershed Management Units 1, 8, 18, and 20 which are ranked as highly vulnerable to future impervious cover.

Road Salt Policy Recommendations

- Each municipality/township consider supplementing existing programs with deicing best management practices 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, and educating/ training deicing employees.

Lawn Fertilizer Policy Recommendations

- Municipalities/townships extend phosphorus regulation to all non-

commercial applicators, consider soil testing pre-application, or ban out-right.

Stormwater Management Facility Policy Recommendations

- Allow new development and redevelopment to use stormwater management facilities that serve multiple functions including storage, water quality benefits, infiltration, and wildlife habitat.
- Consider reduced runoff volume from new and retrofitted detention basins.

Native Landscaping/Natural Area Restoration

- 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.

6.1.2 DRY & WET BOTTOM DETENTION BASIN DESIGN/RETROFITS, ESTABLISHMENT, & MAINTENANCE

Detention basins are best described as human made depressions for the temporary storage of stormwater runoff with controlled release following a rain event. There are over 185 detention basins in Long Run Creek watershed and most are associated with residential and commercial development. Many of the existing dry bottom basins are designed with low flow concrete channels, outlets that sit flush with the basin bottom, and are planted with turf grass. Most existing wet bottom basins are essentially ponds planted with turf grass along the slopes. These attributes do not promote good infiltration, water quality improvement, 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 75%, total phosphorus by 65%, and total nitrogen by 60%. Wet bottom basins designed to have wetland characteristics reduce total suspended solids (sediment) by 77.5%, total phosphorus by 44% and total nitrogen by 20%.

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 a large number of 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. Policy should also be considered for using properly designed basins affecting groundwater recharge to critical Hine's Emerald Dragonfly habitat. Location, design, establishment, and long term maintenance recommendations for naturalized detention basins are included below. Note: requirements of the Will and Cook County Stormwater Ordinances

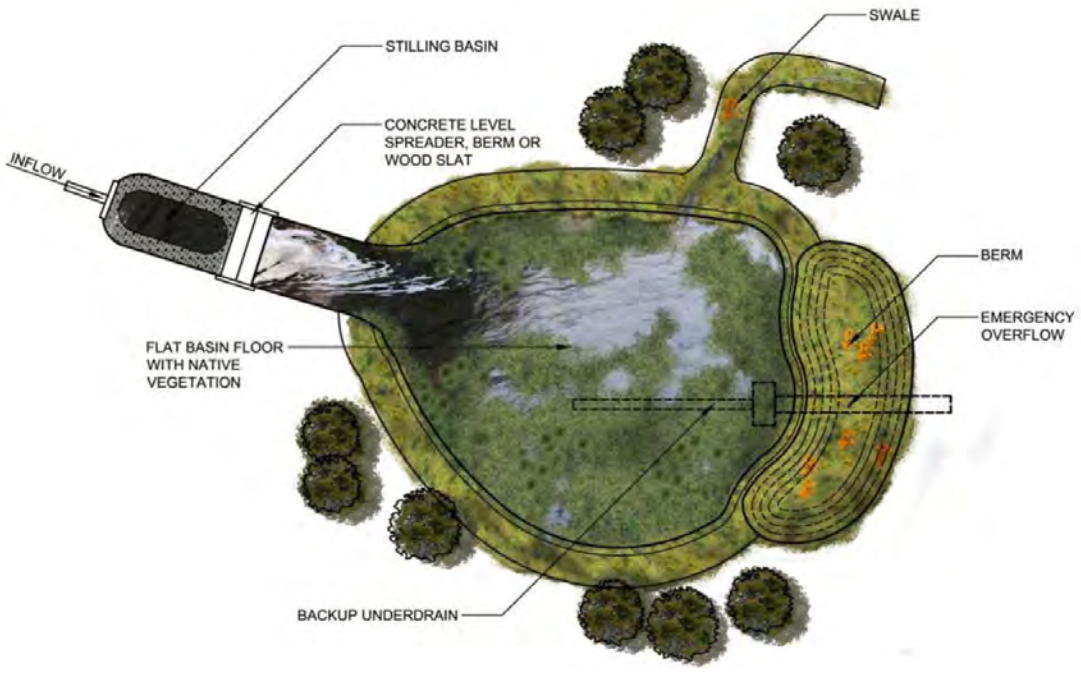


Figure 52. Naturalized dry bottom infiltration basin design.

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 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.

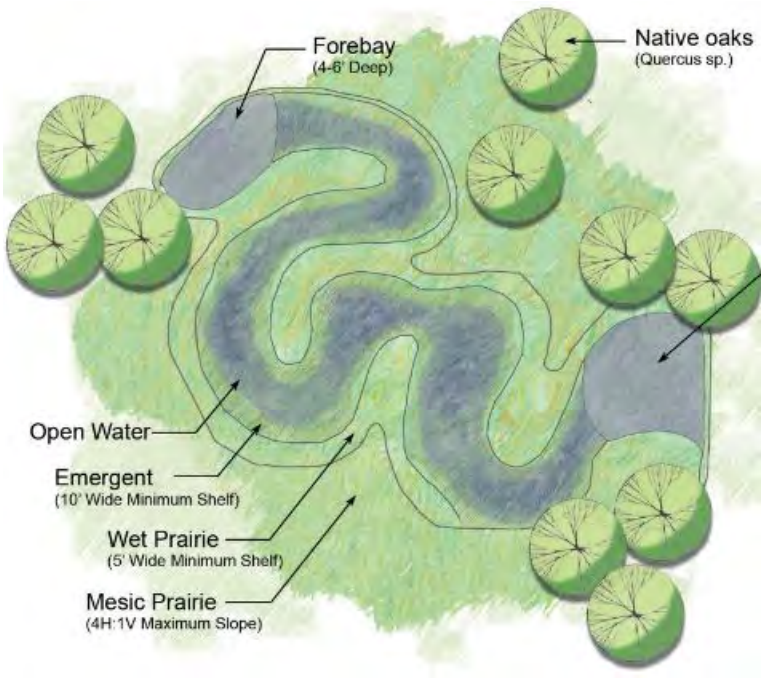


Figure 53. Naturalized wet bottom detention basin design.

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 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.

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. Generally speaking, 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 38 includes a three year schedule appropriate to establish native plantings around naturalized detention basins.

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 39 includes a cyclical long term schedule appropriate to maintain native vegetation around detention basins.

Table 38. 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 all emerging woody saplings.
Check for clogging and erosion control at inlet and outlet structures during every site visit.
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 all 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 every site visit.
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 all emerging woody saplings.
Check for clogging and erosion control at inlet and outlet structures during every site visit.

Table 39. Three year cyclical long term maintenance schedule for naturalized detention basins.

Year 1 of 3 Year 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 every site visit.
Year 2 of 3 Year 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 every site visit.
Year 3 of 3 Year Maintenance Cycle
Spot herbicide problematic non-native/invasive species in August. Specifically target thistle, reed canary grass, common reed, and emerging woody saplings. Cutting & herbiciding stumps of some woody saplings may also be needed.
Check for clogging and erosion control at inlet and outlet structures during every site visit.

6.1.3 RAIN GARDENS

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, they also provide food and shelter for many birds, butterflies, and insects.

Rain garden adjacent to single family home

Rain Garden Recommendations

Education programs in the watershed should focus on teaching residents and businesses the beneficial uses of rain gardens. Local governments in the watershed should also install demonstration rain gardens as a way for the general public to better understand their application. Local governments and Will-South Cook Soil and Water Conservation District (SWCD) could hold rain garden training seminars and potentially provide partial funding to residents and businesses that install rain gardens.

6.1.4 VEGETATED SWALES (BIOSWALES)

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.

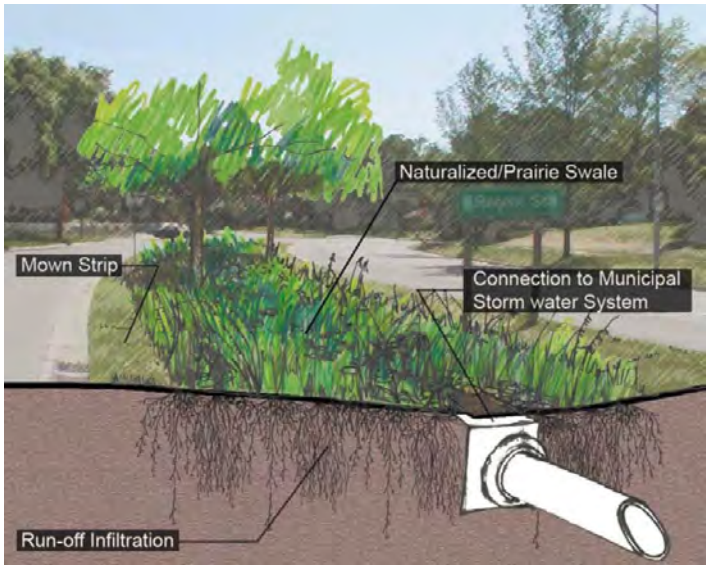
Swales can be designed as either wet or dry swales. Dry swales include an underdrain system that allows filtered water to move quickly through the stormwater treatment train. Wet swales retain water in small wetland like basins along the swale. Wet swales act as shallow, narrow wetland treatment systems 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%.

Vegetated Swale Recommendations

Vegetated swales should be used to replace 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.



Dry vegetated swale rendering

6.1.5 PERVIOUS PAVEMENT

Pervious pavement is also referred to as porous or permeable pavement. Areas that are paved with pervious pavement produce less stormwater runoff than conventionally paved areas. These areas allow for infiltration of the water by allowing water that falls on the surface to flow to a storage gallery through holes in the pavement.

Traditionally, the quantity and quality of water running off pavement surfaces, together with buildings, are the primary reason for stormwater treatment. Pervious pavements reduce runoff rates and volumes and can be used in almost every capacity in which traditional asphalt, concrete, or pavers are used.

Pervious pavement captures first flush rainfall events and allows water to percolate into the ground. Pervious pavement treats 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%.

Pervious Pavement Recommendations

Future development and redevelopment in Long Run Creek watershed should consider the use of pervious pavement. Policy recommendations should also be considered for using these products in groundwater recharge areas to critical Hine's Emerald Dragonfly habitat. Permeable pavement can be used in a variety of settings including parking lots, parking aprons, private roads, fire lanes, residential driveways, sidewalks, and bike paths. It is important to note that there are limitations to using pervious pavement based on subsoil composition and they do require annual maintenance to remain effective over time.

Permeable pavement use at "Transformation Prairie"

6.1.6 VEGETATED FILTER STRIPS

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 is not recommended 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%.

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

6.1.7 NATURAL AREA RESTORATION & NATIVE LANDSCAPING

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), Forest Preserve District of Will County (FPDWC), Forest Preserve District of Cook County (FPDCC), South Cook-Will County Soil and Water Conservation District (SWCD), U.S. Department of Agriculture (USDA) Natural Resource Conservation Program (NRCS), National Wildlife Federation (NWF), and Conservation Foundation (CF).

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

Native landscaping near residential home ©MIKE HALVERSON

ecological consulting company. Backyard habitats can be certified through the National Wildlife Federation's Certified Wildlife Habitat program or Conservation Foundation's Conservation@Home program.

There are seven golf courses in the watershed that comprise over 700 acres. Several courses are situated in unique and sensitive areas along Long Run Creek or its tributaries within the identified Green Infrastructure Network. However, most courses could improve their function as green infrastructure by implementing natural area restoration into existing designs. The Audubon Cooperative Sanctuary Program (ACSP) is an education and certification program that helps golf courses protect the environment by providing guidance for outreach and education, resource management, water quality and conservation, and wildlife habitat management. A golf course becomes certified under the program when implementing and documenting recommended environmental management practices. Annual program membership fees are $200.

6.1.8 WETLAND RESTORATION

Over 2,000 acres or 64% of the historic wetlands in Long Run Creek watershed have been lost to farming and other development practices since European settlement in the 1830s. 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.

Over 500 acres of drained wetland was discovered in areas of the watershed where wetland restoration might be possible but many of these areas are located on land that is currently in agricultural production and slated for future residential development. 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%.

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

Wetland Restoration Recommendations

Municipalities should strongly 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." The Site Specific Action Plan section of this report identified sites where wetland restoration might be feasible.

6.1.9 STREET SWEEPING

Street sweeping is often overlooked as a Management Measure option to reduce pollutant loading in watersheds. With over 900 acres of roads accounting for about 5% of the watershed, municipal street sweeping programs could significantly reduce non-point source pollutants from urban areas in Long Run 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 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. This is equivalent to removing about 147 tons/year sediment and 88 lbs/yr phosphorus and nitrogen from the 900 acres of roads in the watershed.

Street Sweeping Recommendations

It is likely that several if not all of 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 annual (12 month) bi-weekly sweeping is cited as being sufficient in most cases.

Routine street sweeping is an effective Management Measure. Source: USGS.

6.1.10 STREAM & RIPARIAN AREA RESTORATION & MAINTENANCE

Streambank erosion and channelization is a leading problem in Long Run Creek watershed. Stream surveys reveal that about 20% (34,920 linear feet) of stream length in the watershed is highly eroded and 19% (32,624 linear feet) is highly channelized. Pollutant modeling indicates that nearly 7,900 tons/yr of sediment or 82% of sediment loading comes from eroded streambanks. In addition, riparian areas adjacent to streams are suffering as 37% are in poor ecological condition.

Stream and riparian area restoration is one of the best Management Measures that can be implemented to improve degraded stream and riparian area conditions. 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 reports 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 Long Run 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.

Stream & Riparian Area Recommendations

There are many opportunities to implement stream and riparian area restoration in the watershed. These opportunities are identified in the Site Specific Action Plan. As far as stream maintenance goes, the Lake County Stormwater Management Commission (LCSMC) is a leader in the Chicago land 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.

Stream restoration project in Barrington IL

6.1.11 SEPTIC SYSTEM MAINTENANCE

Septic systems are common in older residential developments and many unincorporated areas of Long Run Creek watershed. When septic systems are not maintained and fail they can contribute high levels of nutrients and bacteria to the surrounding environment. Literature sources from USEPA indicate a general septic system failure rate of between 2% and 5%.

Septic System Recommendations

Septic owners in Will County should become compliant with the Will County sewage treatment and disposal ordinance and have routine inspections and sampling completed at least every six months. Septic owners in Cook County should contact the Cook County Department of Public Health who will inspect septic systems to ensure that they are designed and operating properly. 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.

6.1.12 AGRICULTURAL MANAGEMENT PRACTICES

Long Run Creek watershed experienced rapid urban growth in the 1990s & 2000s as agricultural areas were converted to residential developments and businesses. Despite this growth, agricultural land still comprises over 2,000 acres or about 12% of the watershed. Pollutant loading estimates using USEPA's STEPL model point to agricultural land as a contributor of nutrients and sediment in runoff. Fortunately, there are numerous agricultural measures and funding sources that can be used by farmers. Many recommended programs are offered through the South Cook-Will County Soil and Water Conservation District (SWCD), U.S. Department of Agriculture (USDA) Natural Resource Conservation Program (NRCS), and Farm Service Agency (FSA).

Mr. Scott Ristau (Illinois EPA Bureau of Water) requested on April 17, 2013 that Applied Ecological Services, Inc. (AES) complete a site specific inventory of agricultural Best Management Practices (BMPs) that have been implemented over the past five years in Long Run Creek watershed in association with NRCS and Farm Service Agency (FSA) funding programs. In response, AES filed a FOIA request to Ms. Phyllis Wade (Program Management Specialist-Business Service Division of NRCS) by e-mail on June 7, 2013. AES was instructed by Ms. Wade to redirect the request to Mr. Deryl Richardson (National FOIA/PA Officer-NRCS). AES submitted a FOIA request letter to Mr. Richardson on July 29, 2013. Since submitting the letter, AES has not received any official response. AES last followed up on the FOIA request on September 16, 2013.

Environmental Quality Incentive Program (EQIP)

The NRCS's Environmental Quality Incentive Program (EQIP) is a voluntary conservation program that provides financial assistance to individuals/entities to address soil, water, air, plant, animal and other related natural resource concerns on their land. EQIP offers financial and technical help to assist participants to install or implement structural and management practices on eligible agricultural land.

"Conservation Tillage" (no till) is a land management option within the EQIP program and is the leading recommendation for farmers in Long Run Creek watershed (see Site Specific Action Plan). With conservation tillage, the land is left undisturbed from harvest through planting, preserving a canopy of crop residue on the surface to protect the soil from erosion. Along with soil conservation benefits, high fuel prices are driving a switch to conservation tillage for many farmers. Eliminating tillage passes reduces both fuel and labor expenses. $15/ac is offered to farmers through the NRCS's EQIP program.

Wetland Reserve Program (WRP)

The Wetlands Reserve Program (WRP) is a voluntary program offering farmers the opportunity to protect, restore, enhance, and protect wetlands on their property. The NRCS provides technical and financial support to help landowners with their wetland restoration efforts. The goal of NRCS is to achieve the greatest wetland functions and values, along with optimum wildlife habitat, on every acre enrolled in the program. This program offers landowners an opportunity to establish long-term conservation and wildlife practices and protection.

Conservation Tillage (no till) farming. Source: farmprogress.com.

Landowners who choose to participate in WRP may sell a conservation easement or enter into a cost-share restoration agreement with NRCS to restore and protect wetlands. The program offers landowners three options: permanent easements, 30-year easements, and restoration cost-share agreements with a minimum of 10-years duration. Landowners and NRCS then develop a plan for the restoration and maintenance of the wetland. As a requirement of the program, landowners voluntarily limit future use of the land, yet retain private ownership.

Grass waterway on highly erodible agricultural land. Source: NRCS.

Grassland Reserve Program (GRP)

The Grassland Reserve Program (GRP) is a voluntary conservation program that emphasizes support for working grazing operations, enhancement of plant and animal biodiversity, and protection of grassland under threat of conversion to other uses. Participating farmers voluntarily limit future development and cropping uses of the land while retaining the right to conduct common grazing practices and operations related to the production of forage and seeding, subject to certain restrictions during nesting seasons of bird species that are in significant decline or are protected under Federal or State law. A grazing management plan is required for participants.

Conservation Reserve Program (CRP)

The Conservation Reserve Program (CRP) is a land conservation program administered by the Farm Service Agency (FSA). In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species such as native prairie grasses that will improve environmental health and quality. Contracts for land enrolled in CRP are 10-15 years in length. The long-term goal of the program is to re-establish valuable land cover to help improve

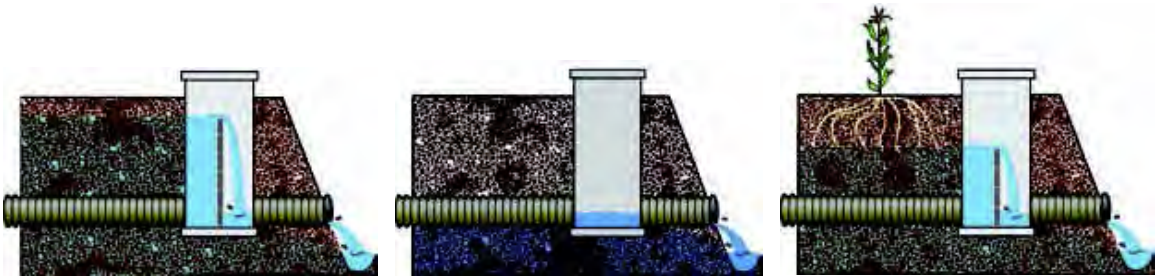


Figure 54. Use of tile control to raise water table after harvest (left), drawdown prior to seeding (middle), and raised again in midsummer (right) (Source: Purdue University)

water quality, prevent soil erosion, and reduce loss of wildlife habitat.

Wildlife Habitat Incentive Program (WHIP)

The Wildlife Habitat Incentive Program (WHIP) is a voluntary program for landowners who want to develop and improve wildlife habitat primarily on private lands. It provides both technical assistance and cost share payments to help native fish and wildlife species, reduce impacts of invasive species, and improve aquatic wildlife habitat.

Participants work with NRCS to prepare a wildlife habitat development plan in consultation with the local conservation district. The plan describes the participant's goals for improving wildlife habitat, includes a list of practices and a schedule for installing them, and details the steps necessary to maintain the habitat for the life of the agreement. NRCS and the participant enter into a cost-share agreement for wildlife habitat development that lasts from 5 to 10 years.

Subsurface (Tile) Drainage Best Management Practices

Subsurface drain tiles are a commonly used practice by farmers to help lower the water table of poorly drained fields and/or wet areas within fields. Unfortunately, nitrogen and phosphorus often find their way into tiles through cracks and macropores in the soil. The tiles then carry these nutrients to local streams. Management of the water table through control structures at drain tile outlets is a promising approach to reduce the amount of nutrients that exit the tile lines. This is accomplished by adjusting the control structure so that the water table rises after harvest to limit drainage during the off-season. The water table can then be lowered a few weeks prior to planting in spring. The water table can also be raised in midsummer to store water for crops.

Waste (Manure) Management

Livestock production within the agricultural industry is a producer of waste materials that need management. These wastes include primarily manure from livestock. The NRCS has produced the "Agricultural Waste Management Field Handbook (AWMFH)" to provide specific guidance for planning, designing, and managing systems where agricultural wastes are involved. It can help assist agricultural producers in organizing a comprehensive plan that results in the integration of waste management into overall farm operations. Material in this handbook covers a wide range of activities from incorporating available manure nutrients into crop nutrient budgets to proper disposal of waste materials that do not lend themselves to resource recycling.

6.1.13 RAINWATER HARVESTING & RE-USE

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 stormsewers. Disconnecting the 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.
Source: Rainbarrelsource.com.

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 irrigation purposes. In many areas, residential irrigation can account for almost 50 percent of residential water consumption. Re-using water is a great way of minimizing water use and lowering 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. With appropriate sanitation treatments, water from cisterns can even be reused for toilets, housecleaning, showers, hand washing, and dish washing. Cistern water, without any sanitation, can be used for 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 water demand in the summer months by reducing the potable water used for irrigation or other household uses.

Rainwater Harvesting & Reuse Recommendations

Education programs in the watershed should focus on teaching residents and businesses the beneficial uses of rain barrels and cisterns. Local governments in the watershed should aim to install demonstration rain barrels as a way for the public to better engage in their use around residential homes. Local governments and conservation organizations such as the Lower Des Plaines Ecosystem Partnership (LDPEP), Long Run Creek Watershed Planning Committee (LRCWPC), and Will-South Cook Soil and Water Conservation District (SWCD) should sponsor programs where residents and businesses can purchase rain barrels.

6.1.14 CONSERVATION & LOW IMPACT DEVELOPMENT

"Conservation or Low Impact 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 thereby reducing the amount of roads and infrastructure (Figure 55). The open space is typically preserved or restored natural

Figure 55. Conservation/Low Impact development design

areas that are integrated with newer natural stormwater features and recreational trails. The open space allows the residents to feel like they have larger lots because most of the lots adjoin the open space system. "Conservation/ Low Impact Design" is also known as cluster or open space design.

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/Low Impact 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 takes into account the natural landscape and ecology of a development site rather than determining design features on the basis of pre-established density criteria.

Conservation /Low Impact Development Recommendations

There are several opportunities to implement "Conservation/Low Impact Design" into future development sites in the watershed. These opportunities are identified in the Site Specific Action Plan. The steps included below are generally followed when designing the layout of a development site using conservation or low impact design:

Figure 56. Stormwater Treatment Train within Conservation Development.

Step 1: Identify all 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 site can be served by essential public utilities

6.1.15 GREEN INFRASTRUCTURE PLANNING

A green infrastructure network provides communities with a tool to identify and prioritize 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, and IDNR 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 3.11.

Green Infrastructure Network *implementation* has several actions:

- Protect specific unprotected green infrastructure parcels through acquisition, regulation, and/or incentives.
- Incorporate conservation or low impact design standards on green infrastructure parcels where development is planned.
- Limit future subdivision of green infrastructure parcels.
- Implement long term management of green infrastructure.

Green Infrastructure Recommendations

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

1. Include all green infrastructure parcels in updated community comprehensive plans and development review maps.
2. Utilize tools such as protection overlays, setbacks, open space zoning, conservation easements, conservation and/or low impact development, etc. on all green infrastructure parcels.
3. Utilize tools such as Development Impact Fees, Stormwater Utility Taxes, Special Service Area (SSA) Taxes, etc. to help fund future management of green infrastructure components where new and redevelopment occurs.
4. Identify important unprotected green infrastructure parcels not suited for development then protect and implement long term management.
5. Work with private land owners along stream/tributary corridors to manage their land for green infrastructure benefits.
6. Use the Green Infrastructure Network to identify new trails and trail connections.

6.1.16 GROUNDWATER MODELING

It is likely that future groundwater wells will be proposed in the watershed and the only way to determine the impacts of the pumping on Hine's Emerald Dragonfly critical habitat within Long Run Seep Nature Preserve would be via a groundwater model. It is recommended that a groundwater model be used prior to installing new wells to test proposed pumping impacts and propose alternatives if needed to minimize impacts.

6.2 SITE SPECIFIC MANAGEMENT MEASURES ACTION PLAN

Site Specific Management Measure (Best Management Practice [BMP]) recommendations made in this section of the report are backed by findings from the watershed field inventory, overall watershed resource inventory, and input from stakeholders. In general, the recommendations address sites where watershed problems and opportunities can best be addressed to achieve watershed goals and objectives. The Site Specific Management Measures Action Plan is organized by the jurisdiction in which recommendations are located making it easy for users to identify the location of project sites and corresponding project details. It is important to note that project implementation is voluntary and there is no penalty or reduction in future grant opportunities for not following recommendations. Site Specific Management Measures were identified within the following jurisdictional boundaries and are included in the Action Plan:

- Du Page Township
- FPDCC
- Homer Glen
- Homer Township
- IDNR
- Lemont
- Lemont Township
- Lockport
- Lockport Township
- Orland Park
- Orland Township
- Palos Park
- Palos Township

Management Measure categories in the Site Specific Management Measures Action Plan include:

- Detention Basin Retrofits & Maintenance
- Wetland Restoration
- Streambank & Channel Restoration
- Riparian Area & Lake Buffer Restoration & Maintenance
- Green Infrastructure Protection Areas
- Agricultural Management Practices
- Wastewater Treatment Plant Upgrades
- Other Management Measures

Descriptions and location maps for each Management Measure category follow. Table 42 includes useful project details such as site ID#, Location, Units (size/length), Owner, Existing Condition, Management Measure Recommendation, Pollutant Load Reduction Efficiency, Priority, Responsible Entity, Sources of Technical Assistance, Cost Estimate, and Implementation Schedule.

Project importance, technical and financial needs, cost, feasibility, and ownership type were taken into consideration when prioritizing and scheduling Management Measures for implementation. High, Medium, or Low Priority was assigned to each recommendation. "Critical Areas" as discussed in Section 5.2 are all High Priority and highlighted in red on project category maps and the Action Plan table. For this watershed plan a "Critical Area" is best described as a location in the watershed where existing or potential future causes and sources of an impairment or existing function are significantly worse than other areas of the watershed. Implementation schedule varies greatly with each project but is generally based on the short term (1-10 years) for High Priority/ Critical Area projects and 10-20+ years for medium and low priority projects. Maintenance projects are ongoing.

The Site Specific Management Measures Action Plan is designed to be used in one of two ways.

Method 1: The user should find the respective jurisdictional boundary (listed alphabetically in Table 42) then identify the Management Measure category of interest within that boundary. A Site ID# can be found in the first column under each recommendation that corresponds to the Site ID# on a map (Figures 57-63) associated with each category.

Method 2: The user should go to the page(s) summarizing the Management Measure category of interest then locate the corresponding map and Site ID# of the site specific recommendations for that category. Next, the user should go to Table 42 and locate the jurisdiction where the project is located, then go to the project category and Site ID# for details about the project.

Pollutant Load Reduction Estimates

Where applicable, pollutant load reductions and/or estimates for total suspended solids (TSS), nitrogen (TN), and phosphorus (TP) were evaluated for each recommended Management Measure based on efficiency calculations developed for the USEPA's Region 5 Model. This model uses "Pollutants Controlled Calculation and Documentation for Section 319 Watersheds Training Manual" (MDEQ, 1999) to provide estimates of sediment and nutrient load reductions from the implementation of *agricultural* Measures. Estimate of sediment and nutrient load reduction from implementation of *urban* Measures is based on efficiency calculations developed by Illinois EPA.

Estimates of pollutant load reduction using the Region 5 Model are measured in weight/year (tons/yr for total suspended solids and lbs/yr for nitrogen and phosphorus). The model was generally used to calculate weight of pollutant reductions for all recommended High Priority-Critical Areas where calculation of such data is applicable. In summary, pollutant reductions were calculated for 20 detention basin retrofit, creation, & maintenance projects, 13 wetland restoration projects, 6 streambank & channel restoration projects, 5 riparian area & lake buffer restoration & maintenance projects, 15 agricultural management projects, and 2 wastewater treatment plant upgrade projects. Spreadsheets used to determine pollutant load reductions can be found in Appendix D.

Estimated *percent* removal of total suspended solids, nitrogen, and phosphorus are included in the Action Plan table for most medium and low priority projects and those projects where calculation of pollutant weight reduction is beyond the scope of this project. The percent removal efficiencies were based on various Management Measures included in the Region 5 Model as shown in Table 40.

Watershed-Wide Summary of Action Recommendations

All Site Specific Management Measures, Education Plan (Section 7.0), and Monitoring Plan (Section 9.1) recommendation information is condensed by Category in Table 41. This information provides a watershed-wide summary of the "Total Units" (size/length), "Total Cost," and "Total Estimate of Pollutant Load Reduction" if all the recommendations in the Site Specific Management Measures Action Plan, Education Plan, and Monitoring Plan are implemented. Key points include:

- 6,636 acres of ecological restoration with a total cost of $31,734,000.
- 121,478 linear feet of streambank restoration and riparian/lake buffer restoration costing $4,868,000.
- 179 acres of yearly maintenance related to detention basins and streams costing $250,250/year.
- 5,561 tons/year of total suspended solids (TSS) would potentially be reduced each year and be within 360 tons (4%) of the Reduction Target identified in Section 5.3.
- 128,841 pounds/year of nitrogen (TN) would potentially be reduced each year exceeding 119,923 pounds/year Reduction Target identified in Section 5.3
- 23,727 pounds/year of phosphorus (TP) would potentially be reduced each year, exceeding the 22,455 pounds/year Reduction Target indentified in Section 5.3.
- Education programs will cost more than $35,000 to implement (see Section 7.0).
- A monitoring plan will cost $60,000 every five years to implement (see Section 9.1).

Table 40. Region 5 Model percent pollutant removal efficiencies for various Management Measures.

Management Measures	TSS	TN	TP
Vegetated Filter Strips	73%	40%	45%
Wet Pond/Detention	60%	35%	45%
Wetland Detention	77.5%	20%	44%
Dry Detention	57.5%	30%	26%
Infiltration Basin	75%	60%	65%
Streambank/Lake Shoreline Stabilization	90%	90%	90%
Weekly Street Sweeping	16%	6%	6%
Porous Pavement	90%	85%	65%
Manure Waste Management	na	80%	90%

Table 41. Watershed-wide summary of Management Measures recommended for implementation.

Management Measure Category	Total Units (size/length)	Total Cost	Estimated Load Reduction*		
			TSS (t/yr)	TN (lbs/yr)	TP (lbs/yr)
Detention Basin Retrofits & Maintenance*					
Retrofits (prairie buffers, emergent plantings, etc.)	149.9 acres	$2,167,000	548	6,201	721
Maintenance (burning, mowing, invasives, brushing)	178.75 acres	$168,250/yr	na	na	na
Wetland Restoration*	495 acres	$5,998,000	153	1,292	310
Streambank & Channel Restoration*	57,382 lf	$4,212,000	2,778	5,581	2,778
Riparian & Lake Buffer Restoration & Maintenance*					
Riparian Areas	54,446 lf (62 ac)	$546,000	28.5	589	95
Lake Buffers	9,650 lf (6.6 ac)	$110,000	0.5	4	3
Maintenance (burning, invasive control, brushing)	64,069 lf	$67,000/yr	na	na	na
Green Infrastructure Protection Areas**	2,686 acres	na	na	na	na
Agricultural Management Practices**					
Conservation Tillage (no till) Farming	1,282 acres	na	2,030	5,828	2,979
Waste (manure) Management	24 acres	$5,000/yr	na	399	49
Wastewater Treatment Plant Upgrades	12 acres	$23,569,000	na	108,737	16,763
Other Management Measures**					
2 Bioswales	4 acres	$183,000	na	na	na
2 Rain Gardens	2,250 sq. ft.	$10,000	na	na	na
1 Stormwater Storage	2 acres	$75,000	na	na	na
Rough Area Retrofits at 4 Golf Courses	155 acres	$440,000	na	na	na
Natural Area work at Homer Glen site	40 acres	$120,000	na	na	na
Vegetation Management at Long Run Seep Nature Preserve	89 acres	$10,000/yr	na	na	na
Management Plan for John J. Duffy Forest Preserve	1,614 acres	$25,000	na	na	na
Management Plan for Arbor Lake Preserve	60 acres	$10,000	na	na	na
Naturalized detention basin at Homer Tree Service mulch site	50 acres	$75,000	23	210	29
Information & Education Plan	Entire Plan	>$35,000	na	na	na
Water Quality Monitoring Plan	Entire Plan	60K/5 Years	na	na	na
TOTALS	**6,636 acres**	**$31,734,000**	**5,561 tons/yr**	**128,841 lbs/yr**	**23,727 lbs/yr**
	179 ac, 64,069 lf maintenance	**$250,250/yr**			
	121,478 lf	**$4,868,000**			
	Other	**$938,000**			
	Education	**>$35,000**			
	Monitoring	**$60,000/5yr**			

* Pollutant load reduction calculated for applicable High Priority-Critical projects only.
* * Pollutant load reductions were not or could not be calculated using STEPL or other modeling.

6.2.1 DETENTION BASIN RETROFITS & MAINTENANCE RECOMMENDATIONS

A vast number of detention basin retrofit projects were identified in Long Run Creek watershed because much of the watershed is already developed and detention basins are currently in place. However, most detention basins provide little in the way of water quality improvement, infiltration capability, and wildlife habitat. In the future it is recommended that new standards for detention basins be implemented in local and county development ordinances (see Section 6.1.2). Applied Ecological Services, Inc. (AES) conducted an inventory of 185 detention basins in fall of 2012. The results of the detention basin inventory are summarized in Section 3.13. Detailed field investigation datasheets and maps can be found in Appendix B.

The condition of detention basins in the watershed varies. Seventy seven (77) dry bottom turf grass, 79 wet or wetland bottom w/turf grass slopes, 3 naturalized dry bottom, and 26 naturalized wet or wetland bottom basins were assessed. Of the 185 basins, only 20 (11%) likely provide "Good" ecological and water quality benefits while 40 basins (22%) likely provide "Average" benefits. The remaining 125 basins (69%) are likely "Poor" at providing ecological and water quality benefits.

The majority of dry bottom detention basins are located within the municipalities of Lemont and Homer Glen. Of the 80 dry bottom basins in the watershed 77 are planted with turf grass. In addition, many of the dry bottom basins are constructed with either concrete low flow channels that run directly from the inlet to the outlet or have outlet drains flush with the bottom of the basin. Many wet and wetland bottom basins are found in Homer Glen and Orland Park. Many of the dry, wet, and wetland bottom basins in the watershed present excellent retrofit opportunities. Most would be relatively easy to naturalize with native plantings and concrete structures and drains in dry basins can be manipulated to store and infiltrate water as desired.

All recommended detention basin retrofits and/or maintenance recommendations are shown on Figure 57 by priority and Site ID# which correspond with the ID# used in the field investigation. Details about each recommendation can be found in the Action Plan Table (Table 42) within the appropriate jurisdictional boundary. All of the High priority recommendations are considered "Critical Areas." Many of these are publicly owned basins and other private basins with significant problems or good opportunities; funding and implementation are usually easier on public land or where major problems/opportunities exist. Low or Medium priority is generally assigned to smaller private basins and those with fewer problems or maintenance needs. In addition, there are many detention basins with no retrofit or maintenance recommendations. In some cases, basins are assigned higher priority based on location and/or ability to treat polluted stormwater runoff in the Tampier Lake TMDL subwatershed or other pollutant hotspot.

Critical Area detention basin retrofit opportunity at Culver Memorial Park

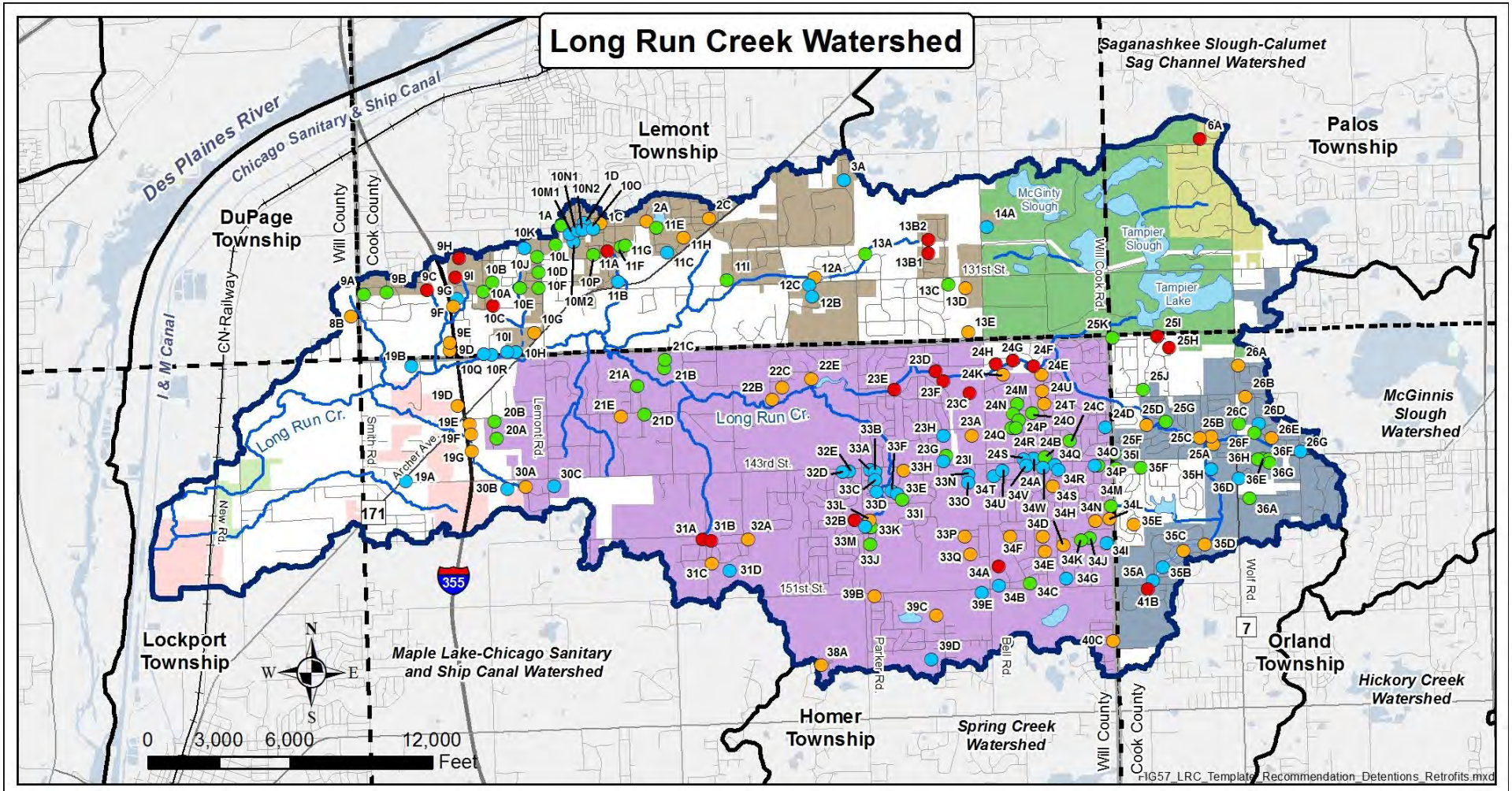


Figure 57

Applied Ecological Services, Inc.™

Fig. 57: Detention Basin Retrofit & Maintenance Recommendations

Legend

- Roads
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Recommendation Priority

- High Priority - Critical Area
- Medium Priority
- Low Priority
- No Recommendation

Jurisdiction

Municipality

- Homer Glen
- Lemont
- Lockport
- Orland Park
- Palos Park
- Township Boundary
- John J Duffy Preserve (FPDCC)
- Long Run Seep (IDNR)

Data Sources:
IDNR
FPDCC
U.S. Census

6.2.2 WETLAND RESTORATION RECOMMENDATIONS

Wetland restoration is the process of bringing back historic wetlands in areas where they have been drained. This section does not include enhancement and maintenance for existing wetlands. Restoration can be important for mitigation purposes or done simply to benefit basic environmental functions that historic wetlands once served. Improvement in water quality is the greatest benefit provided by wetland restoration. Other benefits include reducing flood volumes/rates and improved habitat to increase plant and wildlife biodiversity. The wetland restoration process is generally the same for all sites. First a study must be completed to determine if restoration at the site is actually feasible. If it is, a design plan is developed, permits obtained, then the project is implemented by breaking existing drain tiles and/or regrading soils to attain proper hydrology to support wetland vegetation. Planting with native wetland species is the next step followed by short and long term maintenance and monitoring to ensure establishment.

Wetland restoration sites were identified in Section 3.13.5 using a GIS exercise and specific criteria determined to be essential for restoration of a functional and beneficial wetland. The initial analysis resulted in 116 sites meeting these criteria. However, only 23 of these sites were determined to be "potentially feasible" and 7 are considered to have only "limited feasibility" based on careful review of each site using recent aerial photography, open space inventory results, existing land use, and field inspections where appropriate.

Figure 58 includes the location of all "potentially feasible" wetland restoration sites by site priority and site ID#. The site ID#s match those used in Section 3.13.5. Wetland restoration sites that were determined to have only "limited feasibility" are not included in the Action Plan. Details about each recommendation can be found in the Action Plan Table (Table 42) within the appropriate jurisdictional boundary. In general, large sites on agricultural land, sites on public land, and sites within the identified Green Infrastructure Network are higher priority than smaller sites and those on private land. In addition, sites within the Tampier Lake TMDL subwatershed are all High priority.

Example wetland restoration at AES wetland mitigation site

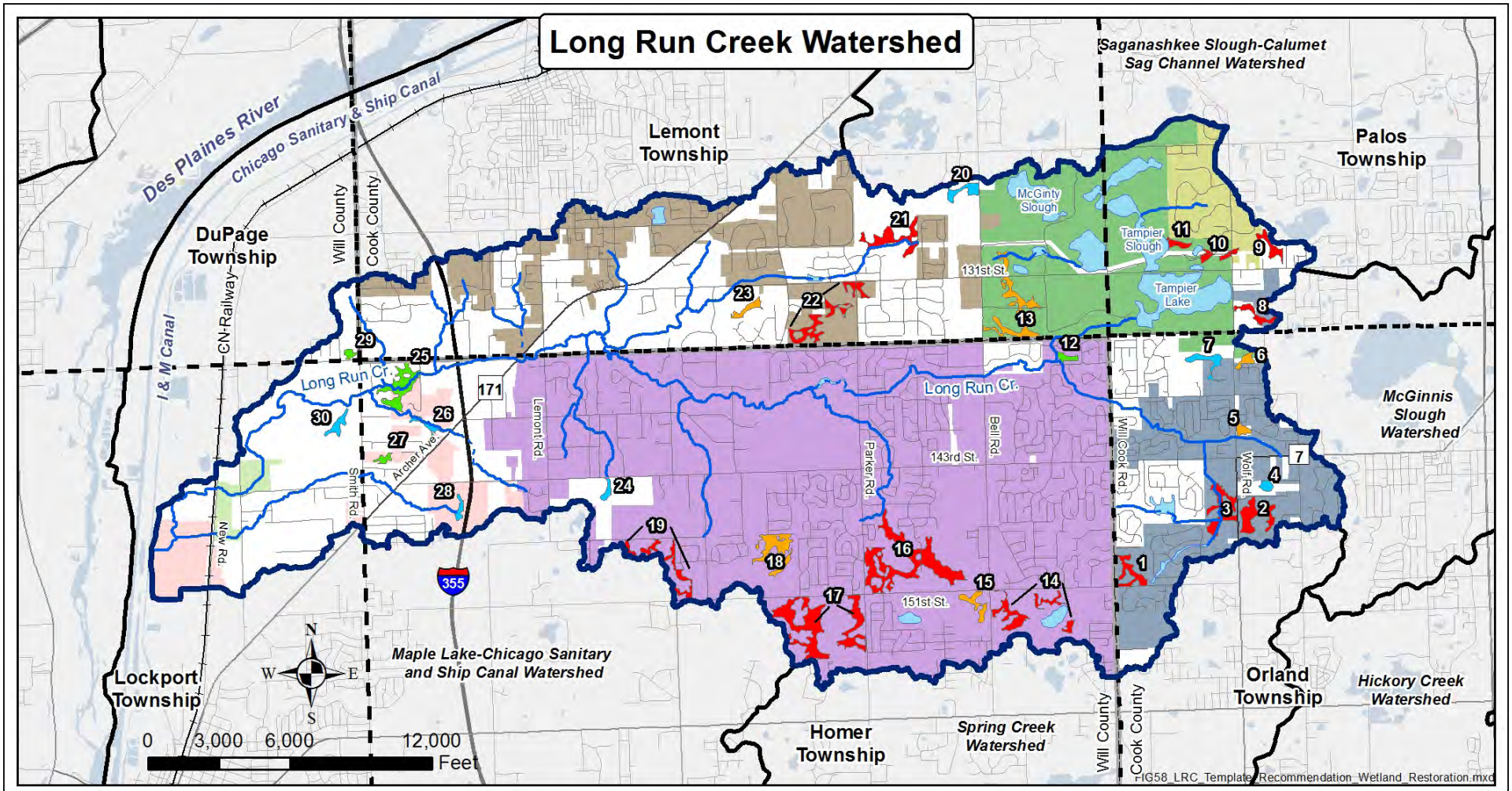


Figure 58

Applied Ecological Services, Inc.™

Fig. 58: Wetland Restoration Recommendations

Legend

- Roads
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Recommendation Priority

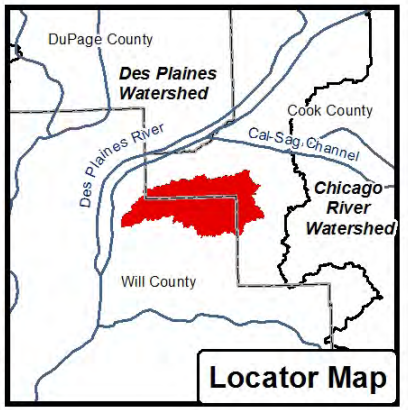
- High Priority - Critical Area
- Medium Priority
- Low Priority
- No Recommendation

Jurisdiction

Municipality

- Homer Glen
- Lemont
- Lockport
- Orland Park
- Palos Park
- Township Boundary
- John J Duffy Preserve (FPDCC)
- Long Run Seep (IDNR)

Data Sources:
IDNR
FPDCC
U.S. Census



TOP: Example AES stream restoration in Barrington Illinois. BOTTOM: Potential stream project at Big Run Golf Course.

6.2.3 STREAMBANK & CHANNEL RESTORATION RECOMMENDATIONS

Applied Ecological Services, Inc. (AES) completed a general inventory of Long Run Creek and its tributaries in fall of 2012. All streams and tributaries were assessed based on divisions into "Stream Reaches". Forty two (42) stream reaches were assessed accounting for 172,510 linear feet or 32.7 linear miles. Detailed notes were recorded for each stream reach related to potential Management Measure recommendations such as improving streambank and channel conditions and maintaining these reaches long term. The results of the stream inventory are summarized in Section 3.13; detailed field investigation datasheets can be found in Appendix B.

The condition of stream reaches in the watershed varies. According to the stream inventory, 67% of stream and tributary length is naturally meandering; 14% is moderately channelized; 19% is highly channelized. Approximately 35% of stream and tributary lengths exhibit no or minimal bank erosion; moderate erosion is occurring along 45% of streambanks; 20% of streambanks are highly eroded.

Most stream restoration projects include at least one of the following three water quality and habitat improvement components; 1) removal of existing invasive vegetation including trees and shrubs from the streambanks followed by; 2) stabilized streambanks using bioengineering, regrading of banks, and installation of native vegetation; and 3) restored riffles/grade controls in the stream channel to simulate conditions found in naturally meandering streams.

Figure 59 shows the location of all potential streambank/channel restoration projects by reach ID# and priority while Table 42 lists project details about each recommendation within the appropriate jurisdictional boundary. Potential streambank and channel restoration projects on public land and reaches exhibiting severe problems on private land are generally assigned as higher priority for implementation. Medium and Low priority was generally assigned to stream reaches exhibiting only minor problems. Recommendations are not made for stream reaches where restoration is not needed.

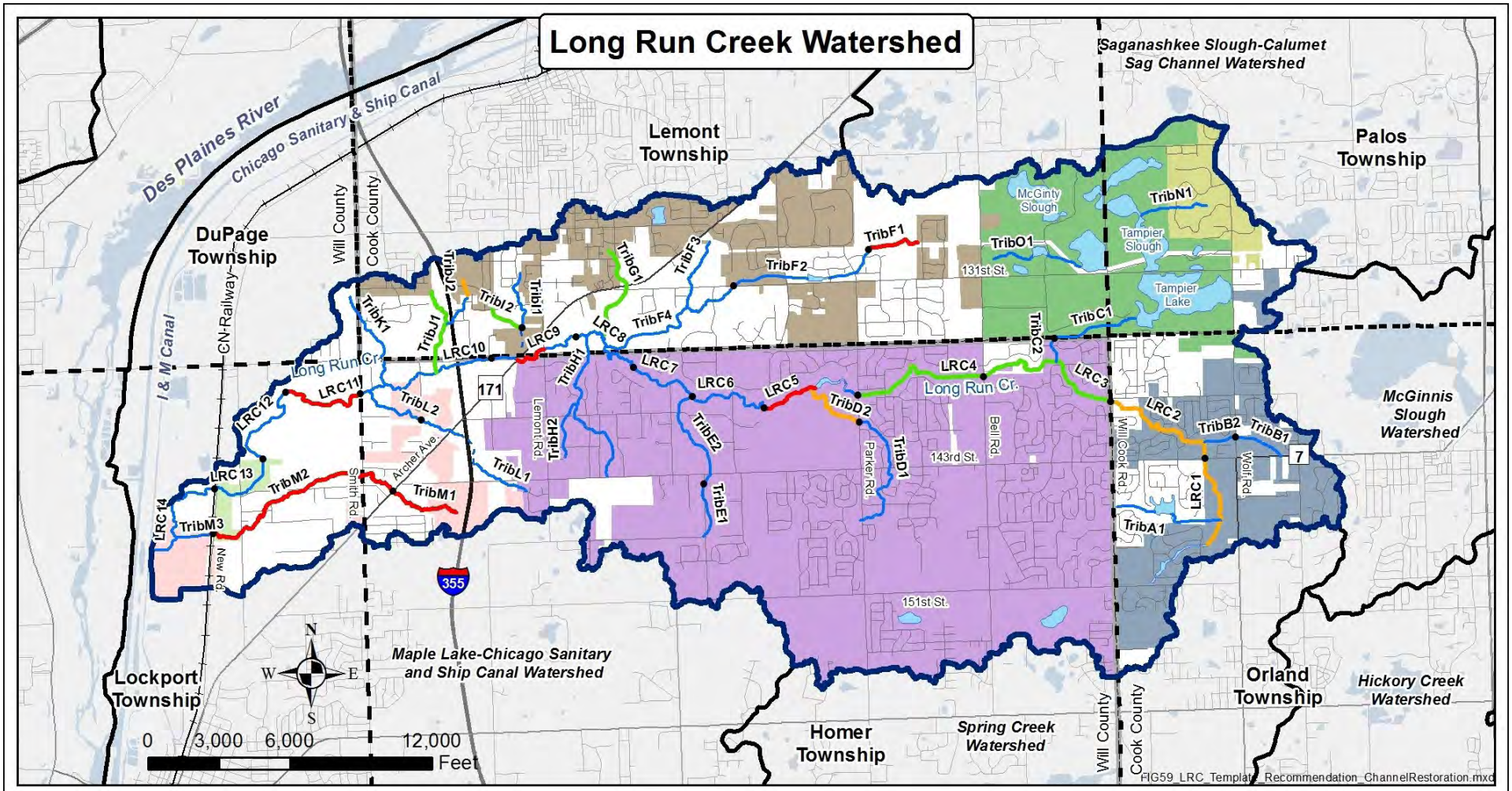


Figure 59

Applied Ecological Services, Inc.™

Fig. 59: Streambank & Channel Restoration Recommendations

Legend

- Roads
- Stream Reach End Point
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Recommendation Priority

- High Priority - Critical Area
- Medium Priority
- Low Priority
- No Recommendation

Jurisdiction

Municipality

- Homer Glen
- Lemont
- Lockport
- Orland Park
- Palos Park
- Township Boundary
- John J Duffy Preserve (FPDCC)
- Long Run Seep (IDNR)

Data Sources:
IDNR
FPDCC
U.S. Census

6.2.4 RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE RECOMMENDATIONS

Applied Ecological Services, Inc. (AES) completed a general inventory of the riparian areas along stream and tributary reaches in Long Run Creek watershed as well as the buffer around Tampier Lake in fall of 2012. Riparian and lake buffer areas were assessed by noting the "Condition" as it relates to function and quality of ecological communities present. Field notes also included potential recommendations such as ecological restoration and maintenance. The results of the inventory are summarized in Section 3.13; detailed field investigation datasheets can be found in Appendix B.

Approximately 63% of the riparian areas are at least "Moderate" quality and are found in the western half of the watershed and within John J. Duffy Preserve. The remaining 37% of riparian areas are in "Poor" condition. There are no riparian areas that are in "Good" condition. Invasive species including common reed (*Phragmites australis*), reed canary grass (*Phalaris arundinacea*), common buckthorn (*Rhamnus cathartica*), and box elder (*Acer negundo*) contribute most to degraded conditions. In addition, it was found that over 9,000 linear feet of buffer along Tampier Lake is in poor condition.

Riparian area and lake buffer restoration and/or maintenance projects generally focus on converting degraded ecological communities into higher quality communities that function to store and filter stormwater while also providing excellent wildlife habitat. The restoration process usually includes removal of invasive trees, shrubs, and herbaceous vegetation such as turf grass followed by planting with native vegetation. Short and long term maintenance then follows and is critically important in the development process and to maintain restored conditions.

Figure 60 shows the location of all recommended riparian area and lake buffer restoration and maintenance projects by ID# and priority while Table 42 lists project details related to each recommendation within the appropriate jurisdictional boundary. Large scale projects located on public land are generally assigned as higher priority for implementation whereas smaller privately owned areas are Medium and Low priority. In addition, sites within the Tampier Lake TMDL subwatershed are all High priority.

TOP LEFT: Degraded riparian buffer along Long Run Creek Reach 2 (LRC2). BOTTOM LEFT: Example of AES riparian restoration.

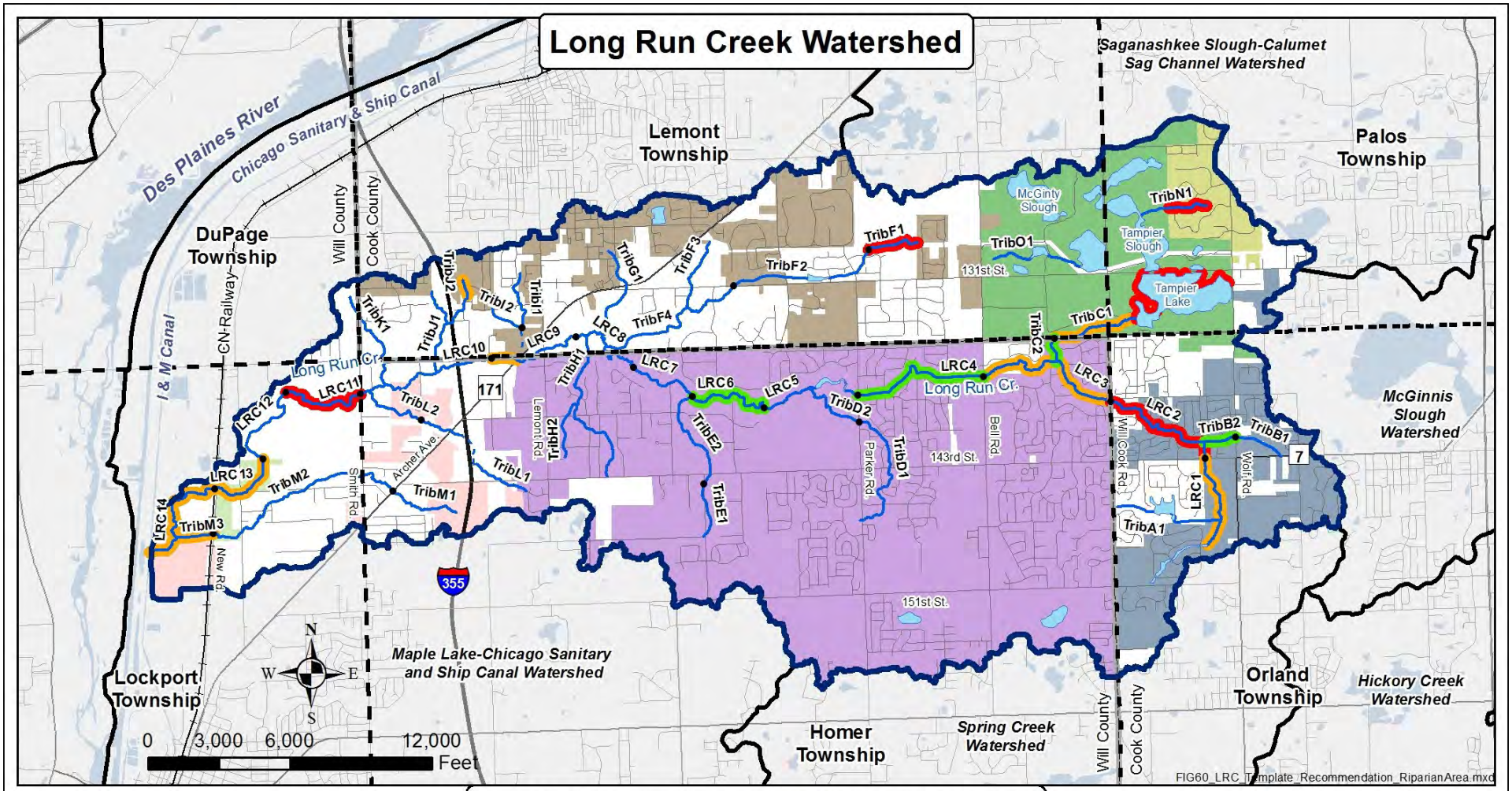


Fig. 60: Riparian Area & Lake Buffer Restoration & Maintenance Recommendations

Figure 60

Applied Ecological Services, Inc.™

Legend

- Roads
- Stream Reach End Point
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Recommendation Priority

- High Priority - Critical Area
- Medium Priority
- Low Priority
- No Recommendation

Jurisdiction

Municipality

- Homer Glen
- Lemont
- Lockport
- Orland Park
- Palos Park
- Township Boundary
- John J Duffy Preserve (FPDCC)
- Long Run Seep (IDNR)

Data Sources:
IDNR
FPDCC
U.S. Census

Aerial of Green Infrastructure Protection Area 4 (left) at headwaters of LRC and Area 17 (right) on HMS property

6.2.5 GREEN INFRASTRUCTURE PROTECTION AREA RECOMMENDATIONS

Green Infrastructure Protection Areas are best described as large, unprotected parcels of land that are currently undeveloped with no plans for future development or similar parcels where future development is planned. The significance is that these parcels are situated in environmentally sensitive or important green infrastructure areas where protecting and restoring or developing using "Conservation Design" or "Low Impact" standards would best benefit watershed conditions. Information obtained from predicted future land use data, location of large undeveloped parcels within the proposed Class III Groundwater Recharge Area, and green infrastructure sections of this plan led to identification of 19 Green Infrastructure Protection Areas totaling 2,686 acres.

Most of the Green Infrastructure Protection Areas in the eastern half of the watershed are undeveloped parcels located on existing agricultural land where future development is predicted. Many of the protection area recommendations in the western half of the watershed occur on parcels that the Forest Preserve District of Will County (FPDWC) has identified in their 1996 Preservation Plan. Hanson Material Service and Chevron also own large natural areas surrounding Long Run Creek near the confluence with the I & M Canal.

Figure 61 shows the location of all 19 Green Infrastructure Protection Areas by site ID# while Table 42 includes action recommendations for each. All 18 sites are considered High Priority-Critical Areas. Cost estimates and schedules for implementing recommendations for these areas is not included due to the difficulty in determining how or if each site will be protected or developed. In addition, pollutant reduction estimates cannot be determined for these areas.

West portion of Green Infrastructure Protection Area 9

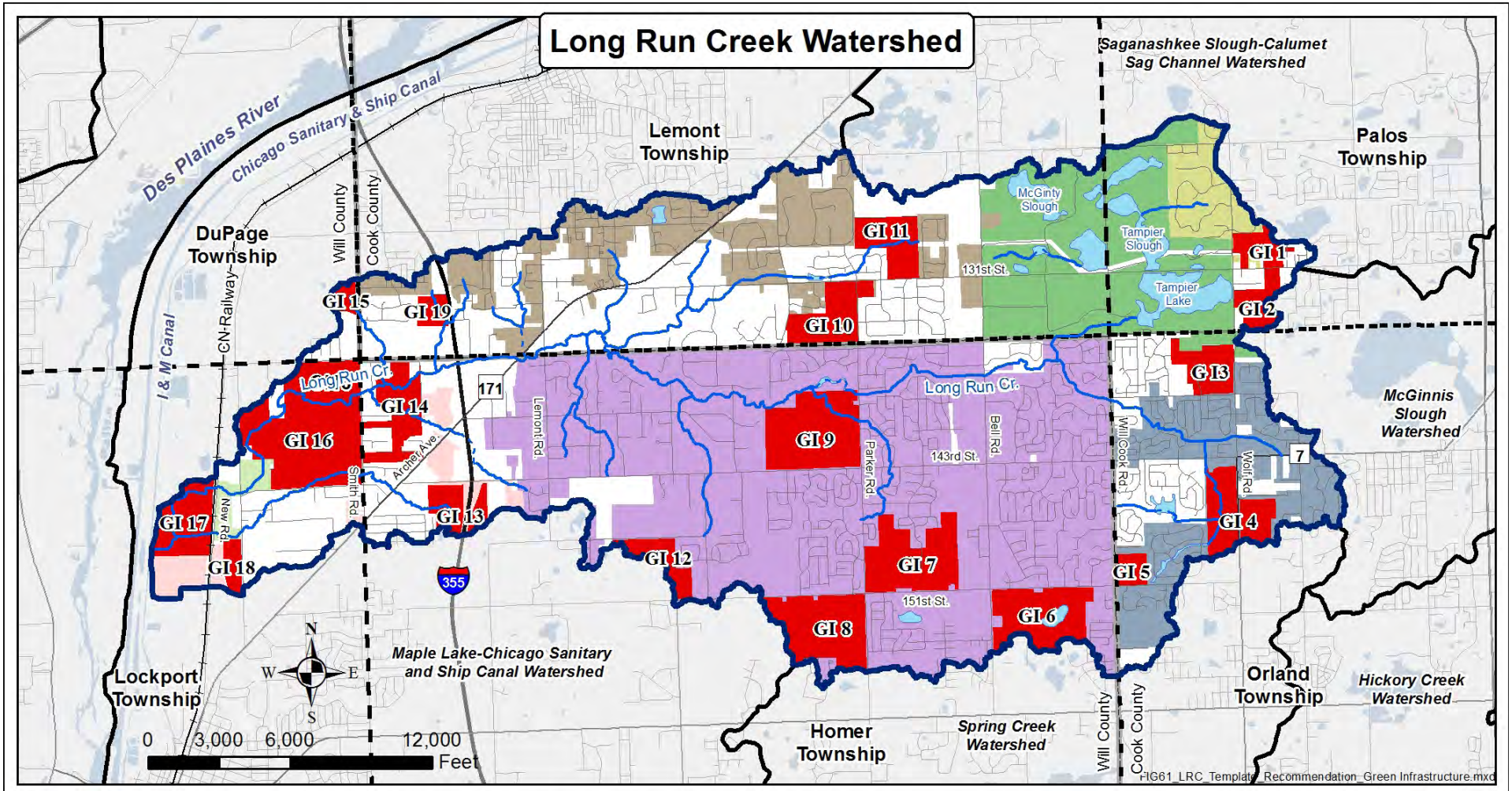


Figure 61

Applied Ecological Services, Inc.™

Fig. 61: Green Infrastructure Protection Area Recommendations

Legend

- Roads
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Recommendation Priority

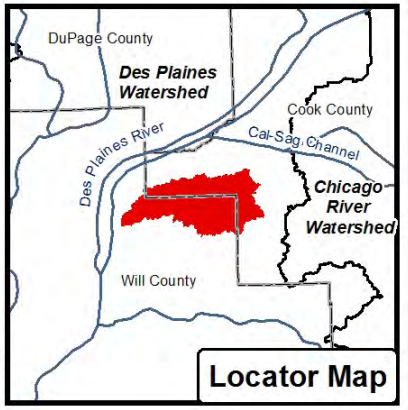
- High Priority - Critical Area

Jurisdiction

Municipality

- Homer Glen
- Lemont
- Lockport
- Orland Park
- Palos Park
- Township Boundary
- John J Duffy Preserve (FPDCC)
- Long Run Seep (IDNR)

Data Sources:
IDNR
FPDCC
U.S. Census



6.2.6 AGRICULTURAL MANAGEMENT PRACTICE RECOMMENDATIONS

Row crop farming and livestock operations were common in Long Run Creek watershed until the 1990s when residential and commercial development increased and replaced much of the agricultural land. By 2012, agricultural row crops/hay operations were reduced to about 2,111 acres or 12% of the watershed. Livestock operations accounted for about 100 acres or less than 1% of the watershed in 2012. Row crop farmland is spread out with the largest tracts remaining in the south central portion of the watershed. Many of these areas are slated for future residential and commercial development.

Agricultural land can be a significant contributor of nutrients and sediment to local streams when practices such as filter strips, grass swales, "Conservation Tillage" (no till) farming, and waste (manure) management are not in place. Observations made during Applied Ecological Service's, field inventory in fall 2012 indicate that practices such as grassed swales are in place but that conservation tillage, filter strips, and manure management are not common practices. Pollutant load modeling estimates show that agricultural land in Long Run Creek watershed contributes between 6% and 8% of the nutrient load and about 10% of the sediment load. Although these pollutant load contributions are not significant, the use of conservation tillage on larger fields and manure management on select livestock operations could potentially reduce phosphorus loading by 3,026 lbs/yr, nitrogen loading by 5,932 lbs/yr, and sediment loading by 2,069 tons/yr.

Thirteen (13) row crop areas and 2 livestock operations totaling 1,306 acres were identified as High Priority-Critical Areas for potential nutrient and sediment reduction based on their size and/or location in the watershed. If agricultural management practices are used in these areas pollutant loading could be reduced. Practices recommended include conservation tillage and filter strips for row crop land and waste (manure) management on livestock operations. Figure 62 shows the location of all 15 sites by ID# while Table 42 includes action recommendations for each. Note: cost estimates for implementing conservation tillage are not included because the costs are largely dependent on a farmer's available equipment.

Examples of conservation tillage (no till) farming (left, Source: NRCS) and manure management at horse farm (inset right, Source: thehorse.com).

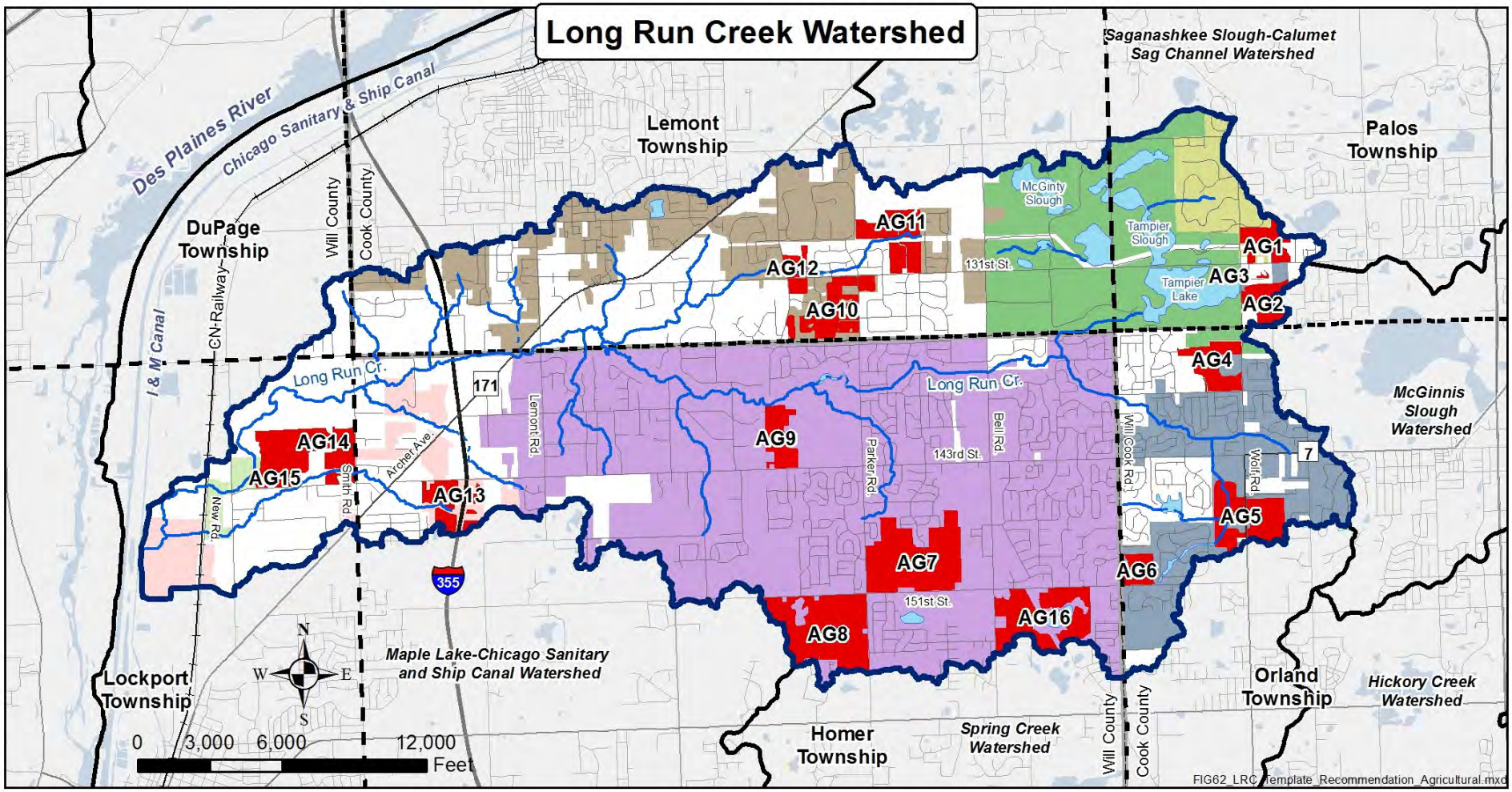


Figure 62

Applied Ecological Services, Inc.™

Fig. 62: Agricultural Mangement Practices Recommendations

Legend

- Roads
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Recommendation Priority

- High Priority - Critical Area

Jurisdiction

Municipality

- Homer Glen
- Lemont
- Lockport
- Orland Park
- Palos Park
- Township Boundary
- John J Duffy Preserve (FPDCC)
- Long Run Seep (IDNR)

Data Sources:
IDNR
FPDCC
U.S. Census

6.2.7 WASTEWATER TREATMENT PLANT UPGRADE RECOMMENDATIONS

There are two National Pollution Discharge Elimination System (NPDES) permitted wastewater treatment plant (WWTP) discharges to Long Run Creek located in Homer Glen. Both plants are owned and operated by Illinois American Water Company. According to water quality sampling and modeling, Chickasaw Hills and Derby Meadows WWTPs contribute the highest nutrient (nitrogen and phosphorus) loading in Long Run Creek watershed. Annual nitrogen and phosphorus loading from Chickasaw Hills WWTP is estimated at 91,960 lbs/yr and 9,550 lbs/yr respectively. Loading from Derby Meadows WWTP is approximately 43,045 lbs/yr for nitrogen and 10,079 lbs/yr for phosphorus. The WWTPs combine to produce 135,005 lbs/yr of nitrogen and 19,629 lbs/yr phosphorus which accounts for about 65% of the total annual load for nitrogen and 56% of the total annual load for phosphorus.

Homer Glen has the opportunity to collaborate with Illinois EPA and create/enforce a nutrient loading ordinance for the two WWTPs if desired. Future WWTP upgrades utilizing nutrient removal technologies are an obvious choice to reduce nutrient loading. Literature suggests that with upgrades, total phosphorus in plant effluent can be reduced to below 1.0 mg/l while total nitrogen can be reduced to less than 5.5 mg/l. These would be significant improvements over the existing phosphorus and nitrogen concentrations currently found in WWTP effluent. It is important to note that beginning in 2009, preliminary discussions and approvals took place for the potential expansion of the Chickasaw Hills WWTP. The plant expansion would include redundancy equipment such as backup pumps, parallel oxidation ditches, and multiple clarifiers, as well as a sludge handling facility. Table 42 includes specific action recommendations for both treatment plants and both are considered High Priority-Critical Areas.

Any future expansion to the Chickasaw Hills or Derby Meadows WWTPs should include phosphorus and nitrogen removal technologies. In addition, there may be an opportunity for WWTPs to participate in water quality trading. The concept is fairly straight forward; the WWTPs could purchase water quality credits from water quality improvement projects built elsewhere in the watershed. This is not a viable option currently but may become necessary in the future if Illinois EPA enforces more strict nutrient loading rates. It might also be an option for WWTPs to fund water quality improvement projects as a way of offsetting nutrient loading and would likely be cheaper in the long run than upgrading facilities.

6.2.8 OTHER MANAGEMENT RECOMMENDATIONS

While completing the general inventory of Long Run Creek watershed, Applied Ecological Services, Inc. (AES) noted potential Management Measure projects that fit under miscellaneous other categories. Detailed field investigation datasheets for these projects can be found in Appendix B. Figure 63 shows the

Site # 1 bioswale opportunity

location of all "Other Management Measure" recommendations by ID# while Table 42 lists details about each recommendation within the appropriate jurisdictional boundary.

Potential projects include:

1. Bioswale retrofit opportunities at Lemont Park District's "The Core" parking lot.
2. Rain garden opportunity at Lemont Park District's "The Core" entrance.
3. Rain garden opportunity at Gooding Grove School.
4. Potential regional stormwater storage area on south side of 127th Street.
5. Roadside bioswale opportunities at residential subdivision in Palos Park.
6. Rough and pond naturalization opportunities at Big Run Golf Club.
7. Rough and pond naturalization opportunities at Old Oak Country Club.
8. Rough and pond naturalization opportunities at Crystal Tree Golf & Country Club.
9. Rough and pond naturalization opportunities at Glen Eagles Country Club.
10. Open space, wetland restoration, pond naturalization opportunities at Homer Glen purchase site (formerly Woodbine Golf Course).
11. Long term vegetation management at Long Run Seep Nature Preserve.
12. Natural Resource Inventory (NRI) and Management Plan for John J. Duffy Preserve.
13. Natural Area Management Plan for Orland Park's "Arbor Lake" preserve.
14. Naturalized detention basin opportunity at Homer Tree Service mulch processing site.

TOP LEFT: Site # 2 rain garden opportunity at Lemont Park District's "The Core." BOTTOM LEFT: Site # 3 potential rain garden at Gooding Grove School.

TOP: Site # 4 potential stormwater storage area S. of 127th. Source: Google Maps.
BOTTOM: Site # 5 roadside bioswale opportunity in Palos Park.

TOP: Site # 6 potential rough restoration at Big Run Golf Club.
BOTTOM Site 10 open space restoration at Homer Glen purchase.

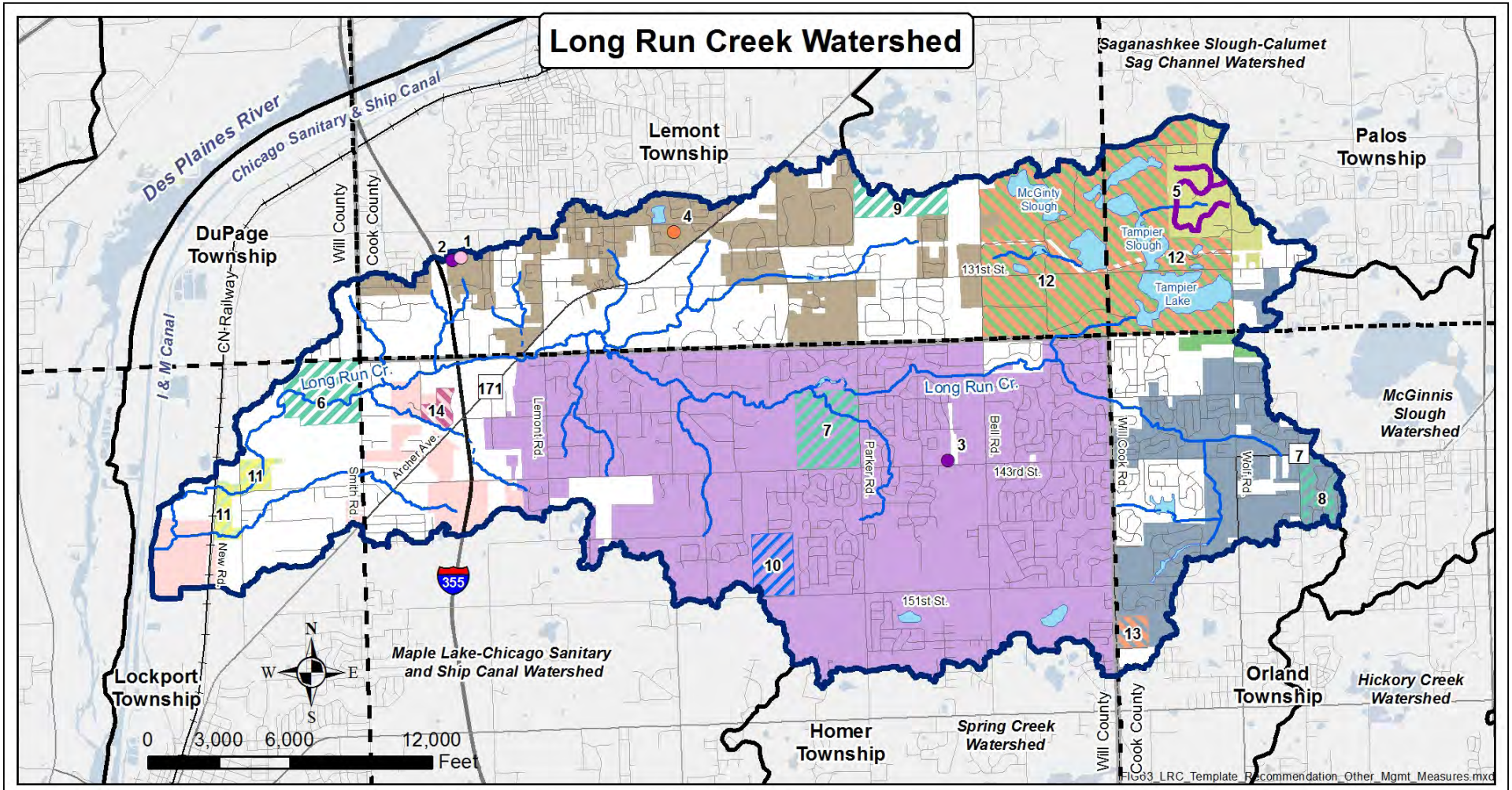


Figure 63

Applied Ecological Services, Inc.™

Fig. 63: Other Management Measure Recommendations

Legend

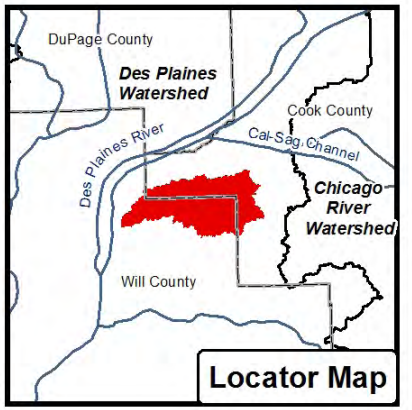
- Roads
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Jurisdiction

Municipality
- Homer Glen
- Lemont
- Lockport
- Orland Park
- Palos Park
- Township Boundary
- John J Duffy Preserve (FPDCC)
- Long Run Seep (IDNR)

Other Measures
- Bioswale
- Rain Garden
- Stormwater Storage
- Golf Course Retrofits
- Natural Area Management
- Natural Area Management Plan
- Naturalized Detention Basin
- Park/Natural Area Design

Data Sources: IDNR FPDCC, U.S. Census



6.2.9 SITE SPECIFIC MANAGEMENT MEASURES ACTION PLAN TABLE

Table 42. Site Specific Management Measures Action Plan.

DU PAGE TOWNSHIP

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
8B	Bambrick Park	2.75 acres	Citgo & Lemont (public)	Existing naturalized dry bottom detention basin in good ecological condition within Bambrick Park.	Implement long term maintenance program to preserve condition of naturalized basin.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Medium	Citgo & Lemont	Ecological Consultant/ Contractor	$2,000/year maintenance	Ongoing
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
29	NW corner of Smith Rd. & 135th St.	3.6 acres	Private agricultural land	3.6-acre drained wetland area on agricultural land north of Big Run Golf Course which floods after heavy rain events.	Restore wetland by breaking drain tiles if necessary and revegetating with native plants. Wetland restoration could reduce flood problems on Big Run Golf Course to south.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Private owner & Big Run Golf Course	USACE; NRCS; Ecological Consultant/ Contractor	$54,000 to design and implement wetland restoration	10-20+ Years
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI15	W of Smith Rd.	30 acres	Private land	30 acres on private open space parcels at headwaters of Tributary K (TribK); parcels are adjacent to Bambrick Park to south.	Village of Lemont acquire and protect parcels as extension of Bambrick Park.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Lemont	Du Page Twp	The cost for acquiring & protecting parcels cannot be determined	If/when parcels become available for purchase

FOREST PRESERVE DISTRICT OF COOK COUNTY

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
6	Tampier Lake Greenway & ComEd Corridor	5.3 acres	FPDCC & ComED (Public & Private)	5.3-acre drained wetland complex located primarily in Tampier Lake Greenway and extending onto ComEd corridor.	Restore hydrology by breaking drain tiles if necessary and revegetate with native vegetation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	FPDCC & ComEd	FPDCC	$53,000 to design and implement wetland restoration	10-20+ Years
10 & 11	John J. Duffy Preserve NE of Tampier Lake	12.7 acres	FPDCC & ComED (Public & Private)	7.5 acres (10) and 5.2 acres (11) of drained wetlands north/northeast of Tampier Lake primarily on FPDCC land and Com Ed. Sites are within Tampier Lake TMDL subwatershed.	Restore hydrology by breaking drain tiles if necessary and revegetate with native vegetation.	TN= 54 lbs/yr TP= 16 lbs/yr TSS= 6 tons/yr	High: Critical Area	FPDCC & ComEd	FPDCC	$175,000 to design and implement wetland restoration	1-10 Years
13	John J. Duffy Preserve W of Tampier Lake	40.7 acres	FPDCC (Public)	40.7 acres of drained wetland on west end of John J. Duffy Preserve.	Restore hydrology by breaking drain tiles if necessary and revegetate with native vegetation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	FPDCC	FPDCC	$407,000 to design and implement wetland restoration	10-20+ Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
TribC1: Tributary C Reach 1	Tampier Lake to South end of FPDCC property	3,714 linear feet	FPDCC (Public)	3,714-lf reach with a degraded riparian buffer dominated by invasive shrubs and trees.	Restore buffer along stream reach by removing invasive woody species and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	FPDCC	FPDCC	$60,000 to restore riparian buffer; $3,000/yr maintenance	10-20+ Years
Tampier Lake	Along Tampier Lake	9,650 linear feet	FPDCC (Public)	9,650 lf along the west and north portions of Tampier Lake with poor buffer consisting mostly of mown turf grass. Note: Tampier Lake is a TMDL waterbody.	Install 30 foot wide (minimum) native plant buffer & emergent plants along 9,650 lf to filter pollutants and discourage waterfowl use along shoreline.	Filter Strip: TN=4 lbs/yr TP= 3 lbs/yr TSS= 0.5 tons/yr	High: Critical Area	FPDCC	FPDCC	$110,000 to restore lake buffer; $3,000/yr maintenance	1-10 Years
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
12	John J. Duffy Preserve	1,614 acres	FPDCC (Public)	Large preserve with variety of upland and wetland ecological communities in varying degrees of health. FPDCC staff indicate that very little ecological management is occurring at the preserve.	Complete a Natural Resource Inventory (NRI) and Ecological Management Plan for the preserve.	na	Medium	FPDCC	Ecological Consultant	$25,000 to complete NRI/ Management Plan	1-10 Years

HOMER GLEN

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
20A, 20B	Along Cokes Rd.	1.3 acres	Residential HOA (private)	Two existing dry bottom detention basins with mown turf grass within small subdivision along Cokes Rd. Swales drain to basins.	Design and implement project to remove turf grass and revegetate with native vegetation then maintain indefinitely.		Low	Residential HOA	Ecological Consultant/ Contractor	$14,000 to design and install prairie vegetation; $2,000/ year maintenance	10-20+ Years
21A	Skender Rd.	0.9 acres	Residential HOA (private)	Existing partially wetland bottom detention basin with mown turf grass slopes. Wetland area is dominated by cattail and invasive common reed grass (Phragmites australis).	Design and implement project to remove turf grass and revegetate with native vegetation, eradicate invasive common reed grass then maintain indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Ecological Consultant/ Contractor	$10,000 to design and install prairie vegetation; $1,000/ year maintenance	10-20+ Years
21B, 21C	Long Run Estates Subdivision	1.0 acres	Developer/ Residential HOA (private)	Two existing naturalized wetland bottom detention basins that appear incomplete within residential subdivision.	Reseed basins and maintain indefinitely when construction resumes at subdivision.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Developer/ Residential HOA	General Contractor & Ecological Contractor	$10,000 to reseed with prairie vegetation; $1,000/ year maintenance	When development resumes
21D	Christina Ln.	0.7 acres	Resident (private)	Existing partially wetland bottom detention basin with population of invasive common reed grass (Phragmites australis). Basin is also being used as chicken coup.	Control invasive common reed grass via herbicide treatments and remove chickens from basin.	na	Low	Resident	none	$500/year maintenance	na
21E	Chicory Trl.	0.4 acres	Residential HOA (private)	Existing naturalized wetland bottom detention basin servicing subdivision. The basin is overgrown and does not appear to be maintained. Basin is also located at headwaters of small unnamed tributary.	Implement management to improve condition of basin.	na	Medium	Residential HOA	Ecological Contractor	$500/year maintenance	Ongoing
22B, 22C, 22E	Erin Hills Subdivision	4.3 acres	Residential HOA (private)	Three existing naturalized wet and wetland bottom detention basins servicing Erin Hills Subdivision. All are generally in good condition.	Implement management program to maintain existing condition.	na	Medium	Residential HOA	Ecological Contractor	$3,000/year maintenance	Ongoing
23A	Homer Town Square	1.1 acres	Business Association (private)	Existing dry bottom detention basin with mown turf grass; several outlet structures are located flush with basin bottom.	Design and implement project to raise elevation of outlets and naturalize basin with native vegetation to create a wetland bottom basin.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Business Association	Ecological Consultant/ Contractor	$20,000 to design and install wetland bottom & raise outlets; $2,000/yr maintenance	10-20+ Years
23C	Menards	3.0 acres	Business Association (private)	Existing large wet bottom turf grass-lined detention basin servicing Menards.	Design and implement project to retrofit slopes and emergent zones with native vegetation to create wetland detention and to create green infrastructure along ComEd Utility corridor.	Wetland Det.: TN= 336 lbs/yr TP= 46 lbs/yr TSS= 37 tons/ yr	High: Critical Area	Business Association	Ecological Consultant/ Contractor	$45,000 to design and install native vegetation; $2,000/ year maintenance	1-10 Years
23D, 23E, 23F	Beaver Lake Dr. & Creek Side Dr.	11.6 acres	Individual Residents (private)	Existing dry bottom turf grass detention in three separate areas within floodplain along Long Run Creek Reach 3 (LRC3). Note: the Village will reconstruct outlets and clean low flow gutters for two areas in spring 2014.	Design, permit, and implement project to selectively break berms along stream and naturalize detention areas with native vegetation. Maintain indefinitely. Note: This project may not be feasible due to platting and flood concerns.	Wetland Det.: TN= 1,780 lbs/ yr TP= 168 lbs/yr TSS=169 tons/ yr	High: Critical Area	Homeowners, Homer Glen	USACE; Homer Glen; Engineer; Ecological Consultant	$30,000 to design and permit; $132,000 to implement; $5,000/ year maintenance	10-20+ Years
23G	St. Bernard's Parish	0.9 acres	Church (private)	Existing wet bottom basin servicing church. Site slopes are mown turf.	Design and implement project to retrofit slopes and emergent zones with native vegetation to create wetland detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Church	Ecological Consultant/ Contractor	$15,000 to design and install native vegetation; $1,000/ year maintenance	10-20+ Years
24B	Goodings Grove Unit 3 (W of Pheasant)	2.2 acres	Goodings Grove Unit 3 (private)	Large existing wet bottom detention basin with mown turf grass side slopes.	Design and implement project to retrofit slopes and emergent zones with native vegetation to create wetland detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Goodings Grove Unit 3 Residential HOA	Ecological Consultant/ Contractor	$33,000 to design and install native vegetation; $2,000/ year maintenance	10-20+ Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
24C	Langcaster West	0.3 acres	Residential HOA (private)	Small dry bottom turf grass detention with on outlet that sits flush with basin bottom.	Design and implement project to raise outlet and create naturalized detention basin using native vegetation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Ecological Consultant/ Contractor	$6,000 to raise outlet and install native vegetation; $500/ year maintenance	10-20+ Years
24E, 24K, 24T, 24U	Goodings Grove Units 4 & 5	8.2 acres	Goodings Grove Units 4 & 5 (private)	Four existing naturalized wet and wetland bottom detention basins in good ecological condition.	Implement management program to maintain current condition.	na	Medium	Goodings Grove Units 4 & 5 Business Association(s)	Ecological Consultant/ Contractor	$5,000/year maintenance	Ongoing
24O, 24P, 24R	Goodings Grove Unit 2 (E of Greystone Dr.)	3.8 acres	Goodings Grove Unit 2 (private)	Three existing wet bottom detention basins lined with mown turf grass; invasive willow lines several basins; geese are an obvious problem.	Install native vegetation buffers and maintain/control willow along basin edges.	Wet Pond Det.: TSS = 60% TN = 35% TP = 45%	Low	Goodings Grove Unit 2 Business Association	Ecological Consultant/ Contractor	$40,000 to install native vegetation buffers; $3,000/year maintenance	10-20+ Years
24M, 24N, 24Q	Goodings Grove Unit 1 (E of Greystone Dr.)	5.6 acres	Goodings Grove Unit 1 (private)	Three existing wet bottom detentions servicing Home Depot & future development. Basins have mown turf grass slopes and invasive common reed grass (Phragmites australis) and willow along edge. Geese appear to be a problem.	Install native vegetation buffers and maintain/control willow and common reed along basin edges.	Wet Pond Det.: TSS = 60% TN = 35% TP = 45%	Low	Goodings Grove Unit 1 Business Association	Ecological Consultant/ Contractor	$60,000 to install native vegetation buffers; $4,000/year maintenance	10-20+ Years
31A	Stadtler Ridge Subdivision	0.4 acres	Residential HOA (private)	Existing dry bottom detention basin with mown turf grass and a concrete low flow channel between the inlet and outlet. Basin is also at headwaters of Tributary E.	Design and implement project to break/ disrupt concrete channel and install native prairie vegetation throughout basin.	Wetland Det.: TN= 47 lbs/yr TP= 5 lbs/yr TSS= 2.5 tons/ yr	High: Critical Area	Residential HOA	Engineer; Ecological Consultant/ Contractor	$18,000 to design, disrupt channel, & install native vegetation; $1,000/ year maintenance	1-10 Years
31B	Woodbine West Estates	1.9 acres	Residential HOA (private)	Existing large wet bottom detention basin with mown turf grass slopes servicing Woodbine Estates Subdivision. Basin is also at headwaters of Tributary E.	Design and implement project to retrofit side slopes and emergent zone with native vegetation to create wetland detention thereby improving water quality released into Tributary E.	Wetland Det.: TN= 90 lbs/yr TP= 11 lbs/yr TSS= 4.5 tons/ yr	High: Critical Area	Residential HOA	Ecological Consultant/ Contractor	$30,000 to design and install native vegetation; $2,000/ year maintenance	1-10 Years
31C, 32A	Woodbine West Estates	4.4 acres	Residential HOA (private)	Two existing large wet bottom detention basins with mown turf grass slopes servicing Woodbine Estates Subdivision.	Design and implement project to retrofit side slopes and emergent zones with native vegetation to create wetland detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$66,000 to design and install native vegetation; $3,000/ year maintenance	1-10 Years
33H	Cedar Creek Ct.	0.4 acres	unknown	Existing dry bottom basin with mown turf and concrete channel between inlet and outlet.	Design and implement project to remove concrete channel and replace with wetland swale; install native prairie vegetation throughout remainder of basin.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Unknown	Engineer; Ecological Consultant/ Contractor	$20,000 to design and install project; $1,000/year maintenance	10-20+ Years
33I	Oakwood Dr.	0.4 acres	unknown	Existing dry bottom basin with mown turf and narrow/eroded channel between inlet and outlet.	Design and implement project to stabilize eroded swale; install native prairie vegetation throughout remainder of basin.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Unknown	Engineer; Ecological Consultant/ Contractor	$15,000 to design and install project; $1,000/year maintenance	10-20+ Years
33J	ATT Office Building (private)	0.6 acres	ATT	Existing dry bottom basin with mown turf grass.	Retrofit basin with native vegetation to improve water quality and infiltration.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	ATT	Ecological Consultant/ Contractor	$7,000 to install native vegetation; $1,000/year maintenance	10-20+ Years
33K	Amberfield Subdivision (S of Clover Ln.)	1.4 acres	Residential HOA (private)	Existing dry bottom detention basin with mown old field vegetation.	Revegetate basin with native prairie vegetation and maintain indefinitely.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor	$15,000 to install native prairie vegetation; $2,000/ year maintenance	10-20+ Years
33L	Amberfield Subdivision (N of Clover Ln.)	1.3 acres	Residential HOA (private)	Existing wetland bottom detention basin that is generally in good ecological condition.	Implement management program to maintain current condition.	na	Medium	Residential HOA	Ecological Consultant/ Contractor	$1,000/year maintenance	Ongoing

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33P, 33Q	Founders Crossing	4.1 acres	Homer Glen (public)	Two existing wet bottom detention basins with mown turf grass slopes and lined by cattail along the emergent edge. Both basins back up to ComEd utility corridor.	Design and implement project to naturalize basin side slopes and emergent zone with native vegetation to increase water quality and connect green infrastructure along utility corridor.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Homer Glen	Homer Glen; Ecological Consultant/ Contractor	$61,500 to design and install native vegetation; $3,000/year maintenance	10-20+ Years
34A	Kingston Hills	4.5 acres	Residential HOA (private)	Existing large wet bottom turf grass lined detention basin in common area of development and adjacent to ComEd utility corridor.	Excellent large scale demonstration opportunity to retrofit slopes and emergent zones with native vegetation to create wetland detention; create fishing access; incorporate design into surrounding open space and trails; then maintain indefinitely.	Wetland Det.: TN= 240 lbs/yr TP= 26 lbs/yr TSS=15.5 tons/yr	High: Critical Area	Residential HOA	Homer Glen; ComEd; Ecological Consultant/ Contractor	$120,000 to design and install native vegetation, fishing access, and trails; $3,000/year maintenance	1-10 Years
34C	Kingston Hills	2.0 acres	Residential HOA (private)	Existing wet bottom detention basin with mown turf slopes; algae was abundant during site visit.	Design and implement project to naturalize basin with native vegetation along the side slopes and emergent zone and maintain indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Ecological Consultant/ Contractor	$21,000 to design and install native vegetation; $2,000/year maintenance	10-20+ Years
34D, 34E	Pheasant Ln.	3.5 acres	Residential HOA/ Builder (private)	Two existing dry bottom detention basins with mown turf slopes located in unfinished portion of development. Basins abut green infrastructure to the east and south.	Retrofit basins using native vegetation as development resumes in subdivision as a means to improve water quality and extend green infrastructure.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Medium	Builder	Ecological Consultant/ Contractor	$37,000 to retrofit basins with native vegetation; $3,000/year maintenance	When development resumes
34F	Kingston Hills	1.5 acres	Residential HOA (private)	Existing dry bottom detention basin with mown turf grass and series of low flow concrete channels between inlets and outlet.	Design and implement project to break/ disrupt concrete channels and install native vegetation to create wetland detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$30,000 to design and install; $2,000/year maintenance	10-20+ Years
34H	Woodcrest Ave.	2.0 acres	Residential HOA (private)	Existing wet bottom detention basin with mown turf grass on west side; east side abuts green infrastructure. Some shoreline erosion is also present.	Design and implement project to regrade eroded portions of shoreline, then convert turf grass portion of basin buffer to native vegetation to improve water quality and connect green infrastructure.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$40,000 to regrade and install native vegetation; $2,000/year maintenance	10-20+ Years
34J, 34K	Rambling Rd.	1.2 acres	Residential HOA (private)	Two wet bottom turf grass lined detention basins in older residential subdivision.	Retrofit basins by installing native vegetation along side slopes and emergent zones to create wetland detention for water quality and wildlife purposes.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Ecological Consultant/ Contractor	$18,000 to install native vegetation; $2,000/year maintenance	10-20+ Years
34L, 34N	Annunciation of the Mother of God Byzantine Catholic Parish	2.7 acres	Church	Series of naturalized (native vegetation) detention basins in good ecological condition. Detention west of church is known as “Transformation Prairie”.	Implement maintenance program to keep invasive herbaceous and woody species under control and to maintain quality of native vegetation.	na	Medium	Church	Ecological Consultant/ Contractor	$2,000/year maintenance	Ongoing
34M	Pine View Hills	0.2 acres	Residential HOA (private)	Small dry bottom detention basin with mown turf grass and low flow concrete channel between inlet and outlet.	Design and implement project to break/ disrupt concrete channel then naturalize basin with native vegetation to create wetland detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Engineer; Ecological Consultant/ Contractor	$10,000 to disrupt concrete channel and plant native vegetation; $500/year maintenance	10-20+ Years
34P	N. of Glen Dr. East	0.7 acres	Residential HOA (private)	Dry bottom detention basin with mown turf; cobble channel runs from inlet to outlet.	Remove cobble channel and plant basin with native vegetation to become wetland bottom basin.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Engineer; Ecological Consultant/ Contractor	$12,000 to remove cobble channel and install native vegetation; $500/year maintenance	10-20+ Years
38A	Marian Village	3.3 acres	Residential HOA (private)	Large wet bottom detention basin with mown turf slopes and rip-rap edge of shoreline; algae was abundant during site visit.	Design and implement project to naturalize the detention buffer and emergent zone with native vegetation; install aerator; maintain indefinitely.	Wet Pond Det.: TSS = 60% TN = 35% TP = 45%	Medium	Residential HOA	Pond Management Company; Ecological Consultant/ Contractor	$52,500 to design and install native vegetation; $3,000 to install aerator, $3,000/ year maintenance	10-20+ Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
39B	Meadowview Estates	2.0 acres	Residential HOA (private)	Existing wetland bottom detention basin dominated by invasive common reed, cottonwood, and willow along the edge; algae was a problem during the site visit; buffer is mown turf grass.	Implement project to eradicate invasive species and naturalize pond buffer with native species; maintain indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Pond Management Company; Ecological Consultant/ Contractor	$40,000 to remove invasives and install native vegetation; $3,000 to install aerator, $2,000/year maintenance	10-20+ Years
39C	Horse Track south of 151st St.	2.0 acres	Private Resident	Existing wet bottom basin/pond surrounded mostly by turf grass; algae was abundant during site visit, geese usage was heavy during site visit.	Design and implement project to naturalize the detention buffer and emergent zone with native vegetation to reduce goose usage; install aerator; maintain indefinitely.	Wet Pond Det.: TSS = 60% TN = 35% TP = 45%	Medium	Private Resident	Pond Management Company; Ecological Consultant/ Contractor	$30,000 to design and install native vegetation; $3,000 to install aerator, $2,000/year maintenance	10-20+ Years
40C	Country Woods	1.7 acres	Residential HOA (private)	Existing wetland bottom detention basin lined with various invasive species; buffer is mowed turf grass.	Eradicate invasive species and retrofit basin buffer with native prairie vegetation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$5,000 to control invasives; $25,500 to install native vegetation; $2,000/ year maintenance	10-20+ Years
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
12	N of Lady Bar Ln.	5.6 acres	Residential HOA (private)	5.6 acre drained wetland located within LRC floodplain at confluence of LRC Reach 3 and Trib. C Reach 2.	Restore wetland/floodplain function of site by restoring hydrology and planting with wetland vegetation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA; Homer Glen	Homer Glen; Engineer; Ecological Consultant	$84,000 to design/ permit/install/ maintain wetland	10-20+ Years
14	SE of Bell Rd. & 151st St.	25.9 acres	Private agricultural land	25.9 acres of drained wetlands surrounding existing wetland area on private agricultural land at headwaters and along Long Run Creek Reach 1 (LRC1); area is slated for future residential and commercial development.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation	Wetland Det.: TN= 42 lbs/yr TP= 15 lbs/yr TSS= 15 tons/yr	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$442,500 to design/ permit/install/ maintain wetland	As new development occurs
15	SW of Bell Rd. & 151st St.	10.1 acres	Private agricultural land & ComEd	10.1 acres of drained wetlands surrounding an existing oak woodland on private agricultural land and ComEd Corridor; area is slated for future office space.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$151,500 to design/ permit/install/ maintain wetland	As new development occurs
16	NE of Parker Rd. & 151st St.	84 acres	Private agricultural land	84 acres of drained wetlands at headwater of Trib. D on private agricultural land; area is slated for future residential development.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation	Wetland Det.: TN= 169 lbs/yr TP= 39 lbs/yr TSS= 19 tons/yr	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$840,000 to design/ permit/install/ maintain wetland	As new development occurs
17	NW of Parker Rd. & 151st St.	74.6 acres	Private agricultural land	74.6 acres of drained wetlands on private agricultural land; area is slated for future residential development.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation	Wetland Det.: TN= 149 lbs/yr TP= 34 lbs/yr TSS= 17 tons/yr	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$746,000 to design/ permit/install/ maintain wetland	As new development occurs
18	N of 151st St (formerly Woodbine GC)	26.7 acres	Homer Glen (Pubic)	Until December 2012, site was Woodbine Golf Course. Homer Glen purchased the site with the intent to convert the golf course to parkland and the club house to the Village Hall.	Incorporate wetland restoration/ existing pond wetland retrofits into future park designs on north portion of parcel with surrounding prairie and trails. Also see “Other Management Measures” #10	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium to High based on how feasible	Homer Glen	$133,500 to design/permit/ install/ maintain wetland	USACE, NRCS/ SWCD; Illinois EPA, Ecological and Park Designers	As new park design and development occurs

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19	NW of 147th St. & Crème Rd.	21.8 acres	Private agricultural land	21.8 acres of drained wetland on private agricultural land at headwaters of Tributary E; area is slated for future residential development.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation	Wetland Det.: TN= 66 lbs/yr TP= 15 lbs/yr TSS= 7.5 tons/yr	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$327,000 to design/permit/ install/ maintain wetland	As new development occurs
STREAMBANK & CHANNEL RESTORATION (See Figure 59)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
LRC 3: Long Run Creek Reach 3	Will-Cook Rd. to Lady Bar Ln.	2,200 linear feet	Mostly private residential lots	Approximately 2,200 lf at upstream end of reach that is highly channelized, moderately eroded with some highly eroded sections, and with poor riffle-pool development. Reach is bordered by mostly residential land. Note: Portions of reach are in Homer Twp.	Design, permit, and implement project to selectively stabilize highly eroded areas using bioengineering techniques and install up to five artificial riffles within the stream channel.	Streambank Stabilization: TN= 90% TP= 90% TSS= 90%	Low	Private Owners	USACE, IDNR, Ecological Consultant/ Contractor	$100,000 to design, permit, and implement stabilization and artificial riffles	10-20+ Years
LRC 4: Long Run Creek Reach 4	Bell Rd. to Parker Rd.	7,031 linear feet	Mostly private residential lots	7,031 lf of stream that is highly channelized, moderately eroded with some highly eroded sections, and with poor riffle-pool development. Reach is bordered by mostly residential land.	Design, permit, and implement project to selectively stabilize highly eroded areas using bioengineering techniques and install up to fifteen artificial riffles within the stream channel.	Streambank Stabilization: TN= 90% TP= 90% TSS= 90%	Low	Private Owners	USACE, IDNR, Ecological Consultant/ Contractor	$200,000 to design, permit, and implement stabilization and artificial riffles	10-20+ Years
LRC 5: Long Run Creek Reach 5	Erin Ln. to Dublin Dr.	2,250 linear feet	Homer Twp	2,250-lf section of LRC Reach 5 owned by Homer Township. The stream is moderately channelized, with moderate to highly eroded streambanks, high sediment accumulation, and exhibits poor riffle-pool development. The downcut channel disconnects the stream from the floodplain.	Design, permit, and implement project to restore streambanks using bioengineering techniques and improve channel using riffles; install grade control(s) at downstream end to reconnect stream to adjacent floodplain after heavy rain events.	Streambank Stabilization: TN= 311 lbs/ yr TP= 155 lbs/ yr TSS=155 tons/yr	High: Critical Area	Homer Twp, Homer Glen	Will County; USACE; IDNR; Ecological Consultant/ Contractor	$300,000 to design, permit, and implement stabilization and floodplain connection	1-10 Years
LRC 9: Long Run Creek Reach 9	Lemont Rd. to Archer Rd.	1,000 linear feet	Private residential	1,000-lf section of LRC Reach 9 within residential area that has highly eroded streambanks.	Design, permit, and implement project to restore streambanks using bioengineering techniques.	Streambank Stabilization: TN= 1,067 lbs/yr TP= 534 lbs/ yr TSS=534 tons/yr	High: Critical Area	Private Owners	Will County; USACE; IDNR; Ecological Consultant/ Contractor	$150,000 to design, permit, and implement stabilization	1-10 Years
TribD2: Tributary D Reach 2	Parker Rd. to LRC Reach 5 within Old Oak Country Club	3,216 linear feet	Old Oak Country Club (private)	3,216 lf of stream at Old Oak Country Club that exhibits moderate channelization, highly eroded streambanks and poor riffle-pool development.	Design, permit, and implement project to stabilize highly eroded streambanks using bioengineering techniques and install up to six artificial riffles within the stream channel.	Streambank Stabilization: TN= 90% TP= 90% TSS= 90%	Medium	Old Oak Country Club	Will County; USACE, IDNR; Ecological Consultant/ Contractor	$385,000 to design, permit, and implement stabilization and artificial riffles	10-20+ Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
LRC 3: Long Run Creek Reach 3	Will-Cook Rd. to Lady Bar Ln.	2,200 linear feet	Mostly private residential lots	Approximately 2,200 lf at upstream end of reach with a degraded riparian buffer dominated by invasive shrubs and trees.	Restore buffer along stream reach by removing invasive woody species and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Private Owners	Ecological Consultant/ Contractor	$25,000 to restore riparian buffer; $2,000/yr maintenance	10-20+ Years
LRC 4: Long Run Creek Reach 4	Bell Rd. to Parker Rd.	7,031 linear feet	Mostly private residential lots	Over 7,000 lf of stream reach with a degraded riparian buffer dominated by invasive shrubs and trees.	Restore buffer along stream reach by removing invasive woody species and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Low	Private Owners	Ecological Consultant/ Contractor	$65,000 to restore riparian buffer; $5,000/yr maintenance	10-20+ Years

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LRC 6: Long Run Creek Reach 6	Dublin Dr. to King Rd.	4,220 linear feet	Mostly private residential lots	4,220 lf of stream reach with a degraded riparian buffer dominated by invasive shrubs, trees, and manicured turf grass.	Restore buffer along stream reach by removing invasive woody species and turf grass and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Low	Private Owners	Ecological Consultant/ Contractor	$40,000 to restore riparian buffer; $3,000/yr maintenance	10-20+ Years
LRC 9: Long Run Creek Reach 9	Lemont Rd. to Archer Rd.	1,000 linear feet	Private residential	1,000-lf section of LRC Reach 9 within residential area with a degraded riparian area dominated by invasive trees and shrubs and manicured turf grass.	Restore buffer along stream reach by removing invasive woody species and turf grass and planting native vegetation. Note: project could be combined with High Priority-Critical Area stream bank/channel restoration.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Private Owners	Ecological Consultant/ Contractor	$15,000 to restore riparian buffer; $2,000/yr maintenance	1-10 Years
TribC2: Tributary C Reach 2	FPDCC boundary to Long Run Creek	1,130 linear feet	Private residential lots	1,130 lf of stream bordered primarily by residential lots and degraded buffer of turf grass.	Restore buffer along stream reach by removing turf grass and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Low	Private Owners	Ecological Consultant/ Contractor	$10,000 to restore riparian buffer; $2,000/yr maintenance	10-20+ Years
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI6	SE corner of Bell Rd. & 151st St.	209 acres	Private agricultural land	209 acres on private agriculture parcels that are slated for future residential & commercial development. Area is headwaters of Tributary D.	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
GI7	NE corner of 151st St. & Parker Rd.	231 acres	Private agricultural land	231 acres on private agriculture parcels at headwaters of Tributary D that are slated for future residential and park development.	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
GI8	SW corner of 151st St. & Parker Rd.	238 acres	Private agricultural land	238 acres on private agriculture parcels at headwaters of Tributary D that are slated for future residential development.	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
GI9	Old Oak Country Club & adjacent Ag. parcels	275 acres	Old Oak Country Club & Private ag. land	275 acres encompassing Old Oak Country Club and private agricultural parcels to west along Long Run Creek Reach 5 (LRC5). Note: parcels are included in FPDWC 1996 Preservation Plan.	FPDWC or other entity acquire and protect parcels should they become available for purchase in the future.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	FPDWC	Homer Glen	The cost for acquiring & protecting parcels cannot be determined	If/when parcels become available for purchase
GI12	Between 147th St. & 151st St.; W of Marilyn Ln	71 acres	Private agricultural land	71 acres on private agricultural parcels at headwaters of Tributary E (TribE). Parcels are slated for future residential development.	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Homer Glen	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
AGRICULTURAL MANAGEMENT PRACTICES (See Figure 62)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement farm management practices is relatively low because the NRCS provides much of this information and provides matching funds.											
AG7	NE corner of 151st St. & Parker Rd.	229 acres	Private agricultural land	229 acres of agricultural land in row crop production at headwaters of Tributary D.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 898 lbs/yr TP= 458 lbs/yr TSS=307 tons/yr	High: Critical Area	Existing Farmer	NRCS/SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually

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AG8	SW corner of 151st St. & Parker Rd.	228 acres	Private agricultural land	228 acres of agricultural land in row crop production near the headwaters of Tributary D.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 898 lbs/yr TP= 458 lbs/yr TSS=307 tons/yr	High: Critical Area	Existing Farmer	NRCS/ SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
AG9	NE of Cedar Rd. & 143rd St.	59 acres	Private agricultural land	59 acres of agricultural land in row crop production along the south side of Long Run Creek Reach 5 (LRC5).	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 265 lbs/yr TP= 135 lbs/yr TSS= 94 tons/yr	High: Critical Area	Existing Farmer	NRCS/ SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
WASTEWATER TREATMENT PLANT UPGRADES											
Technical and Financial Assistance Needs: Technical and financial assistance needed to upgrade waste water treatment plants is high due primarily to the technical aspects of engineering design and construction implement costs.											
Derby Meadows WWTP	Derby Dr.	6 acres	Illinois American Water Co. (private)	WWTP facility with effluent measuring 21.44 mg/l (43,045 lbs/ yr) total nitrogen and 5.02 mg/l (10,079 lbs/yr) total phosphorus.	Implement plant upgrades that include nutrient removal technologies for total nitrogen (<5.5 mg/l) and total phosphorus (< 1.0 mg/l (goal = 0.6 mg/l).	Nutrient Tech: TN=33,002lbs/yr TP= 8,874 lbs/yr TSS= na	High: Critical Area	Illinois American Water Co.	Illinois EPA; Homer Glen	$13,569,000 to design and construct based on 2009 preliminary plan/ approval	1-10 Years
Chickasaw Hills WWTP	Parker Rd.	6 acres	Illinois American Water Co. (private)	WWTP facility with effluent measuring 33.22 mg/l (91,960 lbs/ yr) total nitrogen and 3.45 mg/l (9,550 lbs/yr) total phosphorus.	Implement plant upgrades that include nutrient removal technologies for total nitrogen (<5.5 mg/l) and total phosphorus (< 1.0 mg/l (goal = 0.6 mg/l).	Nutrient Tech: TN=76,735lbs/yr TP= 7,889 lbs/yr TSS= na	High: Critical Area	Illinois American Water Co.	Illinois EPA; Homer Glen	$10,000,000 to design and construct	1-10 Years
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
3	Goodings Grove School	2,000 square feet	Gooding Grove School	Existing depressional area south of parking lot with mowed turf grass and manhole outlet.	This would be a good project demonstration area to raise manhole elevations and plant with native vegetation to create a rain garden adjacent to parking lot.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Homer Glen; Ecological Consultant	Engineer; Ecological Consultant	$4,000 to raise outlets and install native vegetation (plugs)	1-10 Years
7	Old Oak Country Club	50 acres	Old Oak Golf Course (private)	Approximately 50 acres on golf course that are currently rough areas and maintained as mowed turf grass.	Opportunity to enroll in Audubon Cooperative Sanctuary Program (ACSP) and establish low stature prairie buffers in roughs and around pond features.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Low	Old Oak Country Club	Ecological Consultant	$150,000 to design and install prairie on 50 acres	10-20+ Years
10	N of 151st St (formerly Woodbine GC)	102 acres	Homer Glen (Pubic)	Until December 2012, site was Woodbine Golf Course. Homer Glen purchased the site with the intent to convert the golf course to parkland and the club house to the Village Hall.	Incorporate natural area restoration with interpretive trails into portions of park's open space. Also see "Wetland Restoration" #18	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium to High based on how feasible	Homer Glen	Ecological and Park Design Consultants	$120,000 to design and install prairie and wetland on 40+ acres	As new park design and development occurs

HOMER TOWNSHIP

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
19D, 19E, 19F, 19G	Along I-355 Corridor	9.8 acres	Illinois DOT (private)	Four existing wetland bottom detention basins along I-355 corridor with populations of highly invasive common reed grass (Phragmites australis).	Control common reed grass populations using herbicide treatments.	na	Medium	Illinois DOT	Ecological Consultant/ Contractor	$10,000/year maintenance	Ongoing
24F, 24G, 24H	Along Brook Dr.	7.0 acres	Individual Residents (private)	Existing dry bottom turf grass detention in three separate areas within floodplain along Long Run Creek Reach 4 (LRC4).	Design, permit, and implement project to selectively break berms along stream and naturalize detention areas with native vegetation. Maintain indefinitely.	Wetland Det.: TN= 2,373 lbs/yr TP= 224 lbs/yr TSS= 225 tons/yr	High: Critical Area	Homeowners, Homer Twp	Homer Twp; Engineer; Ecological Consultant	$20,000 to design and permit; $85,000 to implement; $3,000/year maintenance	1-10 Years
32B	Culver Memorial Park	3.8 acres	Homer Twp (public)	One existing large wet bottom detention basin with mown turf grass slopes. Basin is located at headwaters of Tributary D.	Design and implement project to install native vegetation along side slopes and emergent zone; create walking path with interpretive signage; install fishing access pads; maintain indefinitely. Study potential to install restrictor on outlet.	Wetland Det.: TN= 846 lbs/yr TP= 92 lbs/yr TSS= 46 tons/yr	High: Critical Area	Homer Twp	Engineer; Ecological Consultant/ Contractor	$80,000 to design and install vegetation, trails, fishing access; $3,000/year maintenance	1-10 Years
34S	Goreham Field Park	1.9 acres	Homer Twp (public)	Older dry bottom detention basin with mown turf within park.	Good demonstration area to create wetland detention by regarding, installing new inlet/outlet structures, and planting with native vegetation. Interpretive signage could also be installed.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Homer Twp	Homer Twp; Engineer; Ecological Consultant	$45,000 to design and install wetland detention; $2,000/ year maintenance	1-10 Years
STREAMBANK & CHANNEL RESTORATION (See Figure 59)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
LRC 3: Long Run Creek Reach 3	Lady Bar Ln. to Bell Rd.	2,000 linear feet	Mostly private residential lots	Approximately 2,000 lf at downstream end of reach that is highly channelized, moderately eroded with some highly eroded sections, and with poor riffle-pool development. Reach is bordered by mostly residential land.	Design, permit, and implement project to selectively stabilize highly eroded areas using bioengineering techniques and install up to five artificial riffles within the stream channel.	Streambank Stabilization: TN= 90% TP= 90% TSS= 90%	Low	Private Owners	Homer TWP; USACE, IDNR; Ecological Consultant/ Contractor	$100,000 to design, permit, and implement stabilization and artificial riffles	10-20+ Years
TribM1: Tributary M Reach 1	I-355 to Archer Ave.	3,292 linear feet	Private agricultural land	3,292 lf of stream with highly eroded banks located primarily on private agricultural land.	Design, permit, and implement project to selectively stabilize highly eroded areas using bioengineering techniques.	Streambank Stabilization: TN= 806 lbs/yr TP= 403/yr TSS=403 tons/yr	High: Critical Area	Private Owners	NRCS/SWCD; USACE, IDNR; Ecological Consultant/ Contractor	$350,000 to design, permit, and implement stabilization and artificial riffles	1-10 Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
LRC 3: Long Run Creek Reach 3	Lady Bar Ln. to Bell Rd.	2,000 linear feet	Mostly private residential lots	Approximately 2,000 lf at downstream end of reach with a degraded riparian buffer dominated by invasive shrubs and trees.	Restore buffer along stream reach by removing invasive woody species and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Private Owners	Homer Twp; Ecological Consultant/ Contractor	$23,000 to restore riparian buffer; $2,000/yr maintenance	10-20+ Years
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
14	Homer Tree Service Mulch Processing Area	50 acres	Homer Tree Service (private)	Homer Tree Service mulch processing area that currently does not have stormwater detention.	Create wetland detention basin(s) to store and treat stormwater runoff from mulch processing area.	TN= 210 lbs/yr TP= 29 lbs/yr TSS= 23 tons/yr	High: Critical Area	Homer Tree Service	IEPA; Engineer; Ecological Consultant	$75,000 to design and create detention	1-10 Years

ILLINOIS DEPARTMENT OF NATURAL RESOURCES

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
LRC 13: Long Run Creek Reach 13	Long Run Seep Nature Preserve	3,130 lf	IDNR-NPC (Public)	3,130 lf of high quality stream located within Long Run Seep Nature Preserve. The Nature Preserves Commission has been implementing ongoing riparian area restoration work.	Continue to implement maintenance work along the riparian area.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	IDNR & Nature Preserves Commission	None	$20,000/year maintenance	Ongoing
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
11	Long Run Seep Nature Preserve	89 acres	IDNR	IDNR nature preserve harboring the federally endangered Hine's Emerald Dragonfly, and various ecological communities that are threatened by invasive species.	Implement annual management of natural areas using ecological restoration approaches to ultimately improve habitat requirements for Hine's Emerald Dragonfly.	na	Medium	IDNR-Illinois Nature Preserves Commission	Ecological Consultant	$10,000/year management	Ongoing

LEMONT

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
1A	Silver Crossing Pro. Building; N of 127th Street & E of Hillview Dr	0.2 acres	Business (private)	Existing dry bottom detention basin with mown turf grass adjacent to business parking lot; low drainage area north of parking area.	Design and implement project to remove turf grass and revegetate dry bottom basin with native prairie vegetation; retrofit depression north of lot to a rain garden feature; maintain both indefinitely.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Business Association	NRCS; Ecological Consultant/ Contractor	$6,000 to design and install prairie vegetation & rain garden; $1,000/ year maintenance	10-20+ Years
1C	NW corner of. 127th Street & Covington Drive	0.4 acres	Residential HOA (private)	Existing dry bottom detention basin with mown turf grass north of 127th Street.	Design and implement project to remove turf grass and revegetate with native prairie vegetation then maintain indefinitely. Project would be a good demonstration and highly visible to public.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Medium	Residential HOA	Ecological Consultant/ Contractor; Lemont	$6,000 to design and install prairie vegetation; $1,000/year maintenance	10-20+ Years
2A	Amber Terrace Subdivision; NW corner of 127th Street & Amber Dr.	0.6 acres	Residential HOA (private)	Existing dry bottom detention basin with mown turf grass servicing Amber Terrace Subdivision.	Design and implement project to remove turf grass and revegetate with native prairie vegetation then maintain indefinitely.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Medium	Residential HOA	Ecological Consultant/ Contractor; Lemont	$7,000 to design and install prairie vegetation; $1,000/year maintenance	10-20+ Years
2C	Abby Oaks Subdivision; S of Notre Dame Dr.	1.3 acres	Residential HOA (private)	Existing dry bottom detention basin with mown turf grass servicing Abby Oaks Subdivision.	Design and implement project to remove turf grass and revegetate with native prairie vegetation then maintain indefinitely.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Medium	Residential HOA	Ecological Consultant/ Contractor; Lemont	$12,000 to design and install prairie vegetation; $2,000/year maintenance	10-20+ Years
9A & 9B	9A: SE corner of Pasture Dr. & Smith Rd. 9B: S of Pasture Dr.	4.0 acres	Residential HOA (private)	Two existing dry bottom detention basins with mown turf grass within residential subdivision.	Design and implement project to remove turf grass and revegetate with native prairie vegetation then maintain indefinitely. Alter concrete channel in basin north of road.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor; Lemont	$45,000 to design and install prairie vegetation & alter concrete channel; $3,000/yr maintenance	10-20+ Years
9C	Mayfair Estates Subdivision; SE of Stoneybrook Dr. & Klappa Dr.	1.5 acres	Residential HOA (private)	Existing dry bottom detention basin with mown turf grass. Basin has several outlets flush with basin bottom. Basin is also at headwaters of Trib. J.	Design and implement project to create wetland bottom detention by removing turf grass, raising outlet elevations, and revegetating with native prairie and wetland plants.	Wetland Det.: TN= 36 lbs/yr TP= 11 lbs/yr TSS= 3.5 tons/yr	High: Critical Area	Residential HOA	Ecological Consultant/ Contractor; Lemont	$25,000 to design and install wetland bottom & raise outlets; $2,000/yr maintenance	1-10 Years
9H, 9I	Lemont PD Core Athletic Complex on Timberline Dr.	3.5	Lemont (public)	Two existing dry bottom turf grass detentions servicing Lemont Park District facility at headwaters of Tributary J; eroded channel has formed at outlet of 9I.	Design and implement project to raise bottom outlet elevations and plant with native vegetation to create wetland bottom detentions that also forms green infrastructure connection to Tributary J.	Wetland Det.: TN= 60 lbs/yr TP= 20 lbs/yr TSS=13.5 tons/yr	High: Critical Area	Lemont	Ecological Consultant/ Contractor	$60,000 to design and install wetland bottom & raise outlets; $3,000/yr maintenance	1-10 Years
10A, 10B	S of Deer Ln. & E of Acorn St. in subdivision	0.7 acres	Residential HOA (private)	Two existing dry bottom basins with mown turf grass and concrete channels running from inlets to outlets.	Design and implement project to disconnect concrete channels, remove turf grass, and install native vegetation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Ecological Consultant/ Contractor	$14,000 to disconnect concrete channel and install native vegetation; $1,000/yr maintenance	10-20+ Years
10C	Between of Acorn St. and 132nd St. in subdivision	0.9 acres	Residential HOA (private)	Existing dry bottom turf grass detention basin servicing residential subdivision; basin is located at headwaters of Tributary I; eroded channel has formed at outlet.	Raise bottom outlet elevations and plant with native vegetation to create wetland bottom detention that also forms green infrastructure connection to Tributary I	Wetland Det.: TN= 60 lbs/yr TP= 11 lbs/yr TSS= 3.5 tons/yr	High: Critical Area	Residential HOA	Ecological Consultant/ Contractor	$18,000 to design and install wetland bottom & raise outlets; $2,000/yr maintenance	1-10 Years
10D, 10E, 10F	Along Arbor Dr. in Harpers Grove Subdivision	2.1 acres	Residential HOA (private)	Three existing dry bottom turf grass detention basins servicing residential subdivision.	Design and implement project to remove turf grass and revegetate with native prairie vegetation then maintain indefinitely.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor	$21,000 to design and install native vegetation; $2,000/yr maintenance	10-20+ Years
10G	Shopping Center off Archer Ave.; NW of Archer Ave. & State St.	1.5 acres	Business Association (private)	Existing wet bottom detention basin with mown turf grass slopes servicing portion of adjacent shopping center.	Design and implement project to remove turf grass and revegetate side slopes with native vegetation. Also establish emergent plant shelf.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Business Association	Ecological Consultant/ Contractor	$22,500 to design and install native vegetation; $2,000/yr maintenance	10-20+ Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
10J	SW corner of Munster Rd. & State St.	0.9 acres	private	Existing dry bottom turf grass detention with concrete channel running from inlet to outlet.	Design and implement project to disconnect concrete channel, remove turf grass, and retrofit with native vegetation.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Owner	Ecological Consultant/ Contractor	$16,000 to design and install native vegetation & disconnect channel; $2,000/ yr maintenance	10-20+ Years
10L	Lemont Village Square on E side of State St.	1.4 acres	Business Association (private)	Existing dry bottom turf grass detention with concrete channels running from inlets to outlets.	Design and implement project to disconnect concrete channels, remove turf grass, and retrofit with native vegetation.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Business Association	Ecological Consultant/ Contractor	$25,000 to design and install native vegetation & disconnect channels; $2,000/yr maintenance	10-20+ Years
10P	Prairie Knoll Townhomes between 128th St. & 129th St.	0.7 acres	Residential HOA (private)	One existing dry bottom basin with mown turf grass. Several outlet structures are located flush with the bottom of the basin.	Design and implement project to raise outlets and plant with native prairie and wetland vegetation to create a wetland bottom detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Ecological Consultant/ Contractor	$10,000 to raise outlets and plant native vegetation; $1,000 yr/maintenance	10-20+ Years
11A	Ashbury Woods Subdivision: NW of 129th St. & Ashbury Dr.	1.5 acres	Residential HOA (private)	Existing dry bottom turf grass detention basin servicing Ashbury Woods Subdivision; basin is located at headwaters of Tributary G	Design and implement project to raise bottom outlet elevations and plant with native vegetation to create wetland bottom detention that also forms green infrastructure connection to Tributary G	Wetland Det.: TN= 36 lbs/yr TP= 18 lbs/yr TSS= 6 tons/ yr	High: Critical Area	Residential HOA	Ecological Consultant/ Contractor	$25,000 to raise outlets and plant native vegetation; $2,000 yr/maintenance	1-10+ Years
11E	SE corner of 127th St. & Marian Dr.	0.8 acres	Residential HOA (private)	Existing dry bottom detention with mown turf grass. A concrete channel is directed from an inlet to an outlet on the basin bottom.	Design and implement project to disable concrete channel, raise outlet structure, and plant basin with native vegetation.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor	$12,000 to raise outlet, disable concrete channel, and plant native vegetation; $1,000 yr/maintenance	10-20+ Years
11F, 11G	Krystyna Crossing Sub.; S end of Kystyna Crossing	0.7 acres	Residential HOA (private)	Two existing dry bottom basins with mown turf grass. One basin has low flow concrete channels. Both basins are situated adjacent to green infrastructure area to south.	Design and implement project to disable concrete channels and plant with native vegetation to improve green infrastructure connection.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor	$10,000 to disable concrete channel and plant native vegetation; $1,000 yr/ maintenance	10-20+ Years
11H	Undeveloped Subdivision between Archer Ave. & 127th St.	0.4 acres	Owner (private)	Existing naturalized wetland bottom detention basin with good compliment of native vegetation.	Maintain existing vegetation.	na	Medium	Owner	Ecological Consultant/ Contractor	$1,000/yr maintenance	Ongoing
11I	NW of 131st St. & Magdalena Dr. in Subdivision	0.5 acres	Residential HOA (private)	Existing dry bottom basin with mown turf grass and a low flow concrete channel running from the inlet to outlet.	Design and implement project to disconnect concrete channel and install native vegetation to replace turf grass.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor	$8,000 to disable channel and install native vegetation; $1,000/yr maintenance	10-20+ Years
13B1, 13B2	Glens of Connemara Sub. between Kinsale Ct. & Lismore Ln.	2.5 acres	Residential HOA (private)	Two wet bottom turf grass lined detentions totaling 2.5 acres and servicing Glens of Connemara Subdivision located at headwaters of Tributary F; an eroded channel has formed in agricultural field to west as a result of detention outlets.	Retrofit slopes and emergent zones with native vegetation to create wetland detention. Also incorporate limestone fishing pads for aesthetics and to limit trampling of shoreline vegetation.	Wetland Det.: TN= 90 lbs/yr TP= 27 lbs/yr TSS= 9 tons/ yr	High: Critical Area	Residential HOA	Ecological Consultant/ Contractor	$50,000 to design and install native vegetation and fishing pads; $2,000/yr maintenance	1-10 Years
13D	Lemont HS Sports Complex; SW of 131St St. & Bell Rd.	1.6 acres	Lemont School District	Existing wet bottom detention basin with rock toe that services primarily the athletic field parking area.	The site provides a good demonstration area to naturalize the basin side slopes with native vegetation and install emergent plants along the shoreline.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Lemont School District	Lemont; NRCS; Ecological Consultant/ Contractor	$15,000 to design and install native vegetation; $2,000/yr maintenance	10-20+ Years
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
22	SW of 131st St. & Parker Rd.	30.1 acres	Private agricultural land	30.1 acres of drained wetlands on private agricultural land at headwaters of Tributary F; areas are slated to be Conservation Development by Village of Lemont.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation.	Wetland Det.: TN= 231 lbs/ yr TP= 52 lbs/yr TSS= 27 tons/yr	High: Critical Area	Future Developer; Lemont	USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$451,500 to design/permit/ install/ maintain wetland	As new development occurs

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
STREAMBANK & CHANNEL RESTORATION (See Figure 59)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
TribJ2: Tributary J Reach 2	Centennial Park to Tributary J Reach 1	2,425 linear feet	Lemont Park District (Public)	First 200 lf of stream reach exhibits moderate to highly eroded banks due to excess water coming from detention basins in park to north.	Stabilize streambanks using bioengineering techniques.	Streambank: STN=90% TP= 90% TSS= 90%	Medium	Lemont Park District	Lemont; USACE; Ecological Consultant/ Contractor	$45,000 to design, permit, and implement streambank stabilization	10-20+ Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
TribJ2: Tributary J Reach 2	Centennial Park to Tributary J Reach 1	2,425 linear feet	Lemont Park District (Public)	First 200 lf of stream reach has a poor buffer dominated by invasive woody species.	Restore riparian area by removing invasive woody species and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Lemont Park District	Lemont; Ecological Consultant/ Contractor	$10,000 to restore buffer; $1,000/yr maintenance	10-20+ Years
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI10	SW corner of Parker Rd. & 131st St.	143 acres	Private agricultural land	143 acres on private agricultural parcels along Tributary F (TribF). Note: parcels are slated to be Conservation Development by Lemont.	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Lemont	Cook County; USACE; NRCS/ SWCD; IEPA; Eco. Consultant	Cost for implementing a Conservation Development cannot be determined	As new development occurs
GI19	E of Valley View Dr. & W of I355	39 acres	Private agricultural/ residential land	39 acres on private residential, woodland, and agricultural parcel along headwaters of Tributary J1 (TribJ1); parcel is slated to become residential with 0-2 du/acre.	Incorporate Conservation Design standards into future development plans to preserve tributary and woodland corridor.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Lemont	Cook County; USACE; NRCS/ SWCD; IEPA; Eco. Consultant	Cost for implementing a Conservation Development cannot be determined	As new development occurs
AGRICULTURAL MANAGEMENT PRACTICES (See Figure 62)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement farm management practices is relatively low because the NRCS provides much of this information and provides matching funds.											
AG10	SW corner of Parker Rd. & 131st St.	106 acres	Private agricultural land	106 acres of agricultural land in row crop production along Tributary F.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 307 lbs/yr TP= 156 lbs/yr TSS=110 tons/ yr	High: Critical Area	Existing Farmer	NRCS/SWCD	Cost for implementing conservation tillage depends on available equipment and crop type	Annually
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
1	Lemont Park District's "The Core" parking lot	1,500 square feet	Lemont Park District	Existing depressed parking lot swales with mowed turf grass and manhole outlets that are flush with the swale bottom.	This would be a good project demonstration area to raise manhole elevations and plant with native vegetation to create parking lot bioswales.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Lemont Park District	Engineer; Ecological Consultant	$8,000 to raise outlets and install native vegetation (plugs)	1-10 Years
2	Lemont Park District's "The Core" entrance	250 square feet	Lemont Park District	Existing depressed area at building entrance with mowed turf grass and manhole outlet.	This would be a good project demonstration area to raise manhole elevations, regrade, and plant with native vegetation to create rain garden.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Lemont Park District	Engineer; Ecological Consultant	$6,000 to raise outlet, regrade, and install native vegetation (plugs)	1-10 Years
4	South of 127th St.	2.0 acres	Private	Large undeveloped depressional area south of 127th street that is currently mowed to the extent possible.	This area could be acquired and made to be a naturalized stormwater storage area to alleviate flood problems and act as wetland detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Private Owner	Lemont; Engineer; Ecological Consultant	$75,000 to acquire area and convert to naturalized detention	10-20+ Years

LEMONT TOWNSHIP

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
9D, 9E, 9F	Along I-355 Corridor	2.8 acres	Illinois DOT (private)	Three existing wet bottom detention basins along I-355 corridor with populations of highly invasive common reed grass (Phragmites australis).	Control common reed grass populations using herbicide treatments	na	Medium	Illinois DOT	Ecological Consultant/ Contractor	$5,000/year maintenance	Ongoing
12A	Fox Hills Estates	3.3 acres	Residential HOA (private)	Large wet bottom detention basin online with Trib. F. Geese are heavily utilizing the mown turf areas surrounding the basin and may be contributing to algae problems.	Install native prairie buffer and emergent plant shelf to deter geese and provide water quality benefits as well as improve green infrastructure quality.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$27,000 to design and install native prairie buffer and emergent plants; $3,000/yr maintenance	10-20+ Years
13A	Silver Fox Dr. in Subdivision	0.7 acres	Residential HOA (private)	Small wet bottom detention basin with mown turf grass online with Trib. F. Basin is choked with algae.	Install native prairie buffer and emergent plants to help remove nutrients and clear up algae.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Ecological Consultant/ Contractor	$10,000 to install buffer and emergent plants; $1,000/yr maintenance	10-20+ Years
13C	Fox Pointe Subdivision	0.6 acres	Residential HOA (private)	Dry bottom basin with mown turf grass and a low flow concrete channel running from inlet to outlet.	Disconnect concrete channel, remove turf grass, and install native vegetation.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor	$10,000 to disable channel and install native vegetation; $1,000/yr maintenance	10-20+ Years
13E	Christ Community Church	0.5 acres	Church (private)	Existing naturalized wet bottom basin servicing church. Basin has some native vegetation but much of basin buffer is a failed planting.	Replant basin buffer and supplement emergent plants along shoreline.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Church	Ecological Consultant/ Contractor	$7,000 to reinstall native prairie buffer and supplement emergent plants; $1,000/yr maintenance	1-10 Years
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
21	NW of 131st St. & Waterford Dr.	25.2	Private agricultural land	25.2 acres of drained wetlands on private agricultural land at headwaters of Tributary F; areas are slated to be Conservation Development by Village of Lemont.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation.	Wetland Det.: TN= 189 lbs/yr TP= 42 lbs/yr TSS= 22 tons/yr	High: Critical Area	Future Developer; Lemont	USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$378,000 to design/ permit/install/ maintain wetland	As new development occurs
23	Between 131st St. & Hawthorne Dr.	7.2 acres	Private agricultural land	7.2-acre drained wetland complex on private agricultural land and adjacent to Tributary F. Site is slated for future residential development.	Incorporate wetland restoration into future Conservation Development plans by using areas as wetland detention & mitigation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Future Developer; Lemont TWP	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$108,000 to design/ permit/install/ maintain wetland	As new development occurs
STREAMBANK & CHANNEL RESTORATION (See Figure 59)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
TribF1: Tributary F Reach 1	NW of 131st St. & Waterford Dr.	2,281 linear feet	Private agricultural land	2,281 lf of eroded stream channel through agricultural area formed by water exiting new detention basins in development to east.	Create a meandering stream channel in agricultural area using bioengineering techniques. Note: combine with Critical Riparian Area project TribF1.	Streambank Stabilization: TN=58 lbs/yr TP= 5 lbs/yr TSS= 3.5 tons/yr	High: Critical Area	Private Owners	NRCS/SWCD; USACE; Ecological Consultant/ Contractor	$275,000 to design, permit, and implement stream channel creation	1-10 Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
TribG1: Tributary G Reach 1	129th St. to Long Run Creek Reach 8	4,539 linear feet	Various private land owners	4,539 lf of stream channel with moderately eroded banks; several streambank sections are highly eroded.	Stabilize highly eroded streambank sections using bioengineering techniques.	Streambank Stabilization: TN=90% TP= 90% TSS= 90%	Low	Private Owners	Lemont Twp; USACE; Ecological Consultant/ Contractor	$150,000 to design, permit, and implement streambank stabilization	10-20+ Years
TribI2: Tributary I Reach 2	132nd St. to Tributary I Reach 1	1,618 linear feet	Various private residential owners	1,618 lf of stream where the banks have become highly eroded due to excess water originating from a detention basin north of 132nd St.	Stabilize highly eroded streambanks using bioengineering techniques.	Streambank Stabilization: TN=90% TP= 90% TSS= 90%	Low	Private Owners	Lemont Twp; USACE; Ecological Consultant/ Contractor	$200,000 to design, permit, and implement streambank stabilization	10-20+ Years
TribJ1: Tributary J Reach 1	Existing detention to Tributary J Reach 2	4,029 linear feet	Various private residential owners	4,029 lf of stream where sections of bank have become highly eroded due to excess water originating from a detention basin at the headwaters.	Stabilize highly eroded streambank sections using bioengineering techniques.	Streambank Stabilization: TN=90% TP= 90% TSS= 90%	Low	Private Owners	Lemont Twp; USACE; Ecological Consultant/ Contractor	$175,000 to design, permit, and implement streambank stabilization	10-20+ Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
TribF1: Tributary F Reach 1	NW of 131st St. & Waterford Dr.	2,281 linear feet	Private agricultural land	2,281 lf of stream channel through agricultural area with no buffer.	Create 30-foot (minimum) riparian buffer along stream. Note: combine with Critical Stream Reach project TribF1.	Filter Strip: TN=58 lbs/yr TP= 5 lbs/yr TSS= 3.5 tons/yr	High: Critical Area	Private Owners	NRCS/SWCD Conservation Reserve Program	$8,000 to restore buffer; $1,000/yr maintenance	1-10 Years
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI11	NW of Waterford Dr. & 131st St.	121 acres	Private agricultural land	121 acres on private agricultural parcels along Tributary F (TribF). Note: parcels are slated to be Conservation Development by Lemont.	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Lemont Twp; Lemont	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
AGRICULTURAL MANAGEMENT PRACTICES (See Figure 62)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement farm management practices is relatively low because the NRCS provides much of this information and provides matching funds.											
AG11	NW of Waterford Dr. & 131st St.	94 acres	Private agricultural land	94 acres of agricultural land in row crop production at headwaters of Tributary F.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 407 lbs/yr TP= 207 lbs/yr TSS=143 tons/yr	High: Critical Area	Existing Farmer	NRCS/SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
AG12	NE corner of Derby Rd. & 131st St.	20 acres	Private agricultural land	20 acres of agricultural land in row crop production at headwaters of Tributary F.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 59 lbs/yr TP= 30 lbs/yr TSS=21 tons/yr	High: Critical Area	Existing Farmer	NRCS/SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
9	Glen Eagles Country Club	25 acres	Glen Eagles CC (Private)	Approximately 25 acres on south end of golf course that are currently rough areas and maintained as mowed turf grass.	Opportunity to enroll in Audubon Cooperative Sanctuary Program (ACSP) and establish low stature prairie buffers in roughs and around ponds.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Low	Glen Eagles Country Club	Ecological Consultant	$75,000 to design and install prairie on 25 acres	10-20+ Years

LOCKPORT

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
30A	Stately Oaks Subdivision	1.0 acres	Residential HOA (private)	Existing wetland bottom detention basin with areas of remnant sedge meadow; invasive herbaceous and woody shrub/ trees are abundant. Basin is also at headwaters of Tributary L.	Implement maintenance program to control invasive species and protect the remnant sedge meadow.	Wetland Det.: TSS = 77.5% TN = 205 TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$1,000/year maintenance	Ongoing
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
25	Between Smith Rd. & Basham Ave.	31.4 acres	Residential (Private)	31.4 acres of drained wetlands along Long Run Creek and Trib. L on primarily private residential land.	Restore hydrology and plant native vegetation.	Wetland Det.: TSS = 77.5% TN = 205 TP = 44%	Low	Residents	Ecological Consultant/ Contractor	$310,000 to design/ permit/install/ maintain wetland	10-20+ Years
27	Between 141st St. & Tameling Dr.	3.9 acres	Private agricultural land	3.9 acres of drained wetlands on private agricultural land that is slated for future residential development.	Incorporate wetland restoration into future development plans by using area as wetland detention.	Wetland Det.: TSS = 77.5% TN = 205 TP = 44%	Low	Future developer; Lockport	Ecological Consultant/ Contractor	$58,500 to design/ permit/install/ maintain wetland	As new development occurs
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
TribM3: Tributary M Reach 3	New Rd. to Long Run Creek	1,603 linear feet	Chevron (private)	1,603 lf of stream with degraded riparian comprised on invasive shrubs and trees.	Restore degraded riparian area by removing invasive woody species.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Chevron	Ecological Consultant/ Contractor	$25,000 to remove invasive woody species; $2,000/yr maintenance	1-10 Years
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI13	Along I-355	85 acres	Private agricultural land	85 acres on private agricultural parcels at headwaters of Tributary M (TribM). Parcels are slated for future business park development	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	FPDWC	Lockport	The cost for acquiring & protecting parcels cannot be determined	If/when parcels become available for purchase
GI14	Between Archer Ave. & 135th St.	143 acres	Private residential & agricultural land	143 acres on private residential and agricultural parcels along Long Run Creek Reach 10 (LRC10) and Tributary L (TribL). Note: parcels are included in FPDWC 1996 Preservation Plan.	FPDWC or other entity acquire and protect parcels should they become available for purchase in the future.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Lockport	Will County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
GI17	W of New Rd.	Approx. 75 acres	Chevron (private)	Approximately 75 acres encompassing the southern portion of GI17. Parcels are owned by Chevron and are situated along along Long Run Creek Reach 14 (LRC14) and Tributary M (TribM). Note: parcels are included in FPDWC 1996 Preservation Plan and are adjacent to Long Run Seep Nature Preserve.	Chevron protect and restore or enhance habitat on parcels for Federally endangered Hine's Emerald Dragonfly.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Chevron	USFWS; USACE; IDNR; Ecological Consultant	The cost for restoring the parcel cannot be determined	1-10 Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
GI18	Between New Rd. & High Rd.	40 acres	Golf Course (private)	40 acres within Lockport Golf & Recreation Club. Note: parcels are included in FPDWC 1996 Preservation Plan and generally surround Long Run Seep Nature Preserve.	FPDWC or other entity acquire and protect parcels should they become available for purchase in the future	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Lockport Golf & Recreation Club	Lockport; Lockport Twp	The cost for acquiring and restoring the parcel cannot be determined	If/when parcels become available for purchase
AGRICULTURAL MANAGEMENT PRACTICES (See Figure 62)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement farm management practices is relatively low because the NRCS provides much of this information and provides matching funds.											
AG13	Along I-355	63 acres	Private agricultural land	63 acres of agricultural land in row crop production at headwaters of Tributary M.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 282 lbs/yr TP= 144 lbs/yr TSS=100 tons/yr	High: Critical Area	Existing Farmer	NRCS/SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
6	Big Run Golf Course	50 acres	Golf Course (private)	Approximately 50 acres on golf course that are currently rough areas and maintained as mowed turf grass. Many of these areas exist among remnant oak savannas/woodlands.	Excellent opportunity to enroll in Audubon Cooperative Sanctuary Program (ACSP) and establish low stature savanna and prairie buffers in roughs and around pond features.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Big Run Golf Course	Ecological Consultant	$150,000 to design and install savanna and prairie on 50 acres	10-20+ Years

LOCKPORT TOWNSHIP

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
STREAMBANK & CHANNEL RESTORATION (See Figure 59)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
LRC 11: Long Run Creek Reach 11	Big Run Golf Course	3,938 linear feet	Big Run Golf Course (private)	3,938 lf of stream at Big Run Golf Course that exhibits highly eroded streambanks and poor riffle-pool development.	Design, permit, and implement project to stabilize highly eroded streambanks using bioengineering techniques and install up to eight artificial riffles within the stream channel. Note: combine project with Critical Riparian Area Project along LRC11.	Streambank Stabilization: TN= 964 lbs/yr TP= 482 lbs/yr TSS=482 tons/ yr	High: Critical Aera	Big Run Golf Course	USACE, IDNR; Ecological Consultant/ Contractor	$450,000 to design, permit, and implement stabilization and artificial riffles	1-10 Years
TribM2: Tributary M Reach 2	Archer Ave. to Long Run Seep Nature Preserve	9,794 linear feet	Various private land	9,794 lf of stream with highly eroded banks located primarily on private residential lots.	Design, permit, and implement project to selectively stabilize highly eroded areas using bioengineering techniques.	Streambank Stabilization: TN= 2,396 lbs/yr TP= 1,199 lbs/yr TSS=1,199 tons/yr	High: Critical Area	Private Owners	NRCS/ SWCD; Lockport Twp; USACE, IDNR; Ecological Consultant/ Contractor	$1,000,000 to design, permit, and implement stabilization and artificial riffles	1-20 Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
LRC11: Long Run Creek Reach 11	Big Run Golf Course	3,938 linear feet	Big Run Golf Course (private)	3,938 lf of narrow/degraded riparian area along Long Run Creek Reach 11 (LRC11) within Big Run Golf Course. Degraded conditions are caused primarily by existing turf grass up to the stream.	Restore degraded riparian area by removing turf grass and restoring a 30-foot (minimum) native plant buffer. Note: combine with Critical Stream Reach project LRC11.	Filter Strip: TN=11 lbs/yr TP= 8 lbs/yr TSS= 1 tons/yr	High: Critical Area	Big Run Golf Course	Ecological Consultant/ Contractor	$40,000 to restore riparian buffer; $3,000/yr maintenance	1-10 Years
LRC14: Long Run Creek Reach 14	West of New Rd.	5,450 linear feet	Hanson Material Service	5,450 lf of a meandering stream with somewhat degraded floodplain dominated by invasive woody species.	Restore floodplain area to wet savanna by selectively removing invasive woody species.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Hanson Material Service	Ecological Consultant/ Contractor; USFWS	$100,000 to remove invasive woody species; $10,000/yr maintenance	1-10 Years
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI16	Big Run Golf Course & Ag. parcels to south.	484 acres	Private agricultural land	484 acres encompassing Big Run Golf Course and private agricultural parcels to south. Note: parcels are included in FPDWC 1996 Preservation Plan and generally surround Long Run Seep Nature Preserve to the east and north.	FPDWC or other entity acquire and protect parcels should they become available for purchase in the future.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	FPDWC	Lockport Twp	The cost for acquiring & protecting parcels cannot be determined	If/when parcels become available for purchase
GI17	W of New Rd.	Approx. 75 acres	Hanson Material Service (private)	Approximately 75 acres encompassing the northern portion of GI17. Parcel is owned by Hanson Material Service and is situated along Long Run Creek Reach 14 (LRC14). Note: parcels are included in FPDWC 1996 Preservation Plan and are adjacent to Long Run Seep Nature Preserve.	Hanson Material Service protect and restore or enhance habitat on parcel for Federally endangered Hine's Emerald Dragonfly	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Hanson Material Service	USFWS; USACE; IDNR; Ecological Consultant	The cost for protecting & restoring the parcel cannot be determined	1-10 Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate Cost Estimate	Implementation Schedule (Years)
AGRICULTURAL MANAGEMENT PRACTICES (See Figure 62)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement farm management practices is relatively low because the NRCS provides much of this information and provides matching funds.											
AG14	NW of Smith Rd. & 143rd St.	157 acres	Private agricultural land	157 acres of agricultural land in row crop production adjacent to Long Run Creek Reach 11 (LRC11), Tributary M, and Long Run Seep Nature Preserve.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 640 lbs/yr TP= 327 lbs/yr TSS=221 tons/yr	High: Critical Area	Existing Farmer	NRCS/ SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
AG15	NE of High Rd. & 143rd St.	22 acres	Private agricultural land	22-acre livestock area with approximately 24 horses. Area is adjacent to and drains to Long Run Creek Reach 13 (LRC13) within Long Run Seep Nature Preserve.	Implement manure management system to reduce nutrient and sediment runoff to Long Run Creek and Long Run Seep Nature Preserve.	Manure Manage: TN= 371 lbs/yr TP= 46 lbs/yr TSS= na	High: Critical Area	Existing Livestock Farmer	NRCS/ SWCD	$4,000/yr	Annually

ORLAND PARK

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
25A	Compton Ct.	1.4 acres	Residential HOA (private)	Existing wet bottom detention basin with mown turf slopes servicing adjacent multifamily subdivision. Basin drains to adjacent wetlands.	Design and implement project to naturalize basin side slopes and emergent edge with native vegetation to improve water quality and extend green infrastructure. Maintain indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$21,000 to install buffer and emergent plants; $2,000/year maintenance	10-20+ Years
25B	Centennial School	2.7 acres	Orland Park (public)	Existing large dry bottom detention basin with mown turf throughout and located adjacent to Long Run Creek.	Design and implement project to naturalize basin with native vegetation. Project would extend green infrastructure along LRC and would be a good demonstration project on the school grounds.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Medium	Orland Park	Orland Park; SWCD; Ecological Consultant/ Contractor	$28,500 to retrofit basin with native vegetation; $2,000/ year maintenance	10-20+ Years
25C	Creek Crossing Dr.	1.7 acres	Orland Park (public)	Existing wet bottom detention basin with natural but weedy side slopes located along Long Run Creek and servicing adjacent subdivision.	Design and implement project to create native vegetation buffer and emergent zone to increase water quality and green infrastructure connection.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Orland Park	Ecological Consultant/ Contractor	$25,500 to install buffer and emergent plants; $2,000/year maintenance	10-20+ Years
25D	Long Run Creek Park	2.7 acres	Orland Park (public)	Existing wet bottom detention basin with prairie buffer in good condition but with some maintenance needs.	Implement a maintenance program to maintain condition of basin.	na	Medium	Orland Park	Ecological Consultant	$2,000/year maintenance	Ongoing
25F	Long Run Creek Condominiums	0.5 acres	Residential HOA (private)	Existing dry bottom basin with mown turf grass and concrete low-flow channels between inlets and outlet.	Design and implement project to disrupt or remove concrete channels and plant to native vegetation to improve water quality and infiltration.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Residential HOA	Orland Park; Ecological Consultant/ Contractor	$10,000 to disrupt concrete channels & install native vegetation; $1,000/ year maintenance	10-20+ Years
25G	Preston Dr. “Preston Pond”	0.4 acres	Orland Park (public)	Existing wetland bottom detention basin with mown turf side slopes. Basin is noted in the Orland Park Basin Best Practices report completed by V3 Companies in 2011.	Retrofit side slopes with native prairie vegetation and maintain basin indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Orland Park	Orland Park; Ecological Consultant/ Contractor	$5,000 to install prairie buffer; $500/ year maintenance	10-20+ Years
26A	Spring & Mayflower Ln.	1.1 acres	Orland Park	Existing dry bottom detention basin with mown turn grass servicing adjacent subdivision. Basin is located adjacent to FPDCC owned land.	Design and implement project to naturalize basin with native vegetation to improve water quality, increase infiltration, and extend green infrastructure adjacent to FPDCC land.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Medium	Orland Park	FPDCC; Ecological Consultant/ Contractor	$11,500 to install native vegetation; $1,000/year maintenance	10-20+ Years
26B	Bunratty Estates	0.7 acres	Orland Park	Existing naturalized wetland bottom detention basin with good compliment of native species on bottom; side slopes are dominated by weedy vegetation.	Replant side slopes with native prairie vegetation and maintain basin indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Orland Park	Ecological Consultant/ Contractor	$5,000 to install native prairie buffer; $500/year maintenance	1-10 Years
26C	Bunratty Estates	0.4 acres	Orland Park	Existing dry bottom detention basin with mown turn grass servicing Bunratty subdivision.	Design and implement project to naturalize basin with native vegetation to improve water quality and increase infiltration.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Orland Park	Ecological Consultant/ Contractor	$4,000 to install native vegetation; $500/year maintenance	10-20+ Years
26E	Along Arbor Ridge Dr.	0.7 acres	Orland Park (public)	Existing wetland bottom detention known locally as “Persimmon Meadow Pond”. The basin sideslopes are natural but consist almost entirely of non-native species. This basin is noted in the Orland Park Basin Best Practices report completed by V3 Companies in 2011.	Retrofit side slopes with native prairie vegetation and maintain basin indefinitely.	Wet Pond Det.: TSS = 60% TN = 35% TP = 45%	Medium	Orland Park	Ecological Consultant/ Contractor	$7,500 to install native prairie buffer; $1,000/year maintenance	10-20+ Years
26F	Along Arbor Ridge Dr.	0.6 acres	Orland Park	Existing wet bottom detention basin with natural shoreline and mown turf grass side slopes.	Retrofit side slopes with native prairie vegetation and maintain basin indefinitely.	Wet Pond Det.: TSS = 60% TN = 35% TP = 45%	Low	Orland Park	Ecological Consultant/ Contractor	$6,500 to install native prairie buffer; $750/year maintenance	10-20+ Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
35C, 35D	Silo Ridge Subdivision	3.4 acres	Residential HOA (private)	Two existing wet bottom detention basins located at the headwaters of Long Run Creek; basins have stone or turf grass shoreline.	Retrofit pond buffers and emergent zone with native vegetation to minimize goose usage and filter lawn fertilizers.	Wet Pond Det.: TSS = 60% TN = 35% TP = 45%	Medium	Residential HOA	Ecological Consultant/ Contractor	$55,000 to design and install native vegetation; $2,000/ year maintenance	10-20+ Years
35F	Kindercare	0.5 acres	Business (private)	Existing dry bottom detention basin with mown turf grass.	Design and implement project to naturalize basin with native vegetation to improve water quality and increase infiltration.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Business	Ecological Consultant/ Contractor	$5,000 to install native vegetation; $500/year maintenance	10-20+ Years
35I	Pinewood Plaza	0.2 acres	Business (private)	Existing small dry bottom detention basin with mown turf grass and no outlet.	Design and implement project to naturalize basin with native vegetation to improve water quality and increase infiltration.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Business	Ecological Consultant/ Contractor	$3,000 to install native vegetation; $500/year maintenance	10-20+ Years
36A	Royal Oaks	0.8 acres	Orland Park	Existing wetland bottom detention basin with various native wetland and prairie plants but lacking maintenance.	Improve buffer with additional native vegetation and maintain entire basin indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Orland Park	Ecological Consultant/ Contractor	$8,000 to improve buffer with native vegetation; $1,000/ year maintenance	10-20+ Years
36E, 36F, 36G, 36H	Deer Haven Subdivision	1.5 acres	Orland Park & Developer (public)	Three wet bottom and one dry bottom detention basin with mown turf grass in recently developed Deer Haven subdivision.	Retrofit detentions with native vegetation in the emergent zone and buffers and maintain indefinitely.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Orland Park & Developer	Orland Park Ecological Consultant/ Contractor	$30,000 to design and install native vegetation; $2,000/ year maintenance	Prior to completion/ Village sign off
41B	Arbor Point	1.3 acres	Orland Park	Existing dry bottom turf grass detention at headwaters of Long Run Creek.	Naturalize basin with native vegetation and determine if outlets can be raised to create wetland detention	TN= 72 lbs/yr TP= 8 lbs/yr TSS= 3.5 tons/yr	High: Critical Area	Orland Park	Orland Park Engineer; Ecological Consultant/ Contractor	$20,000 to design and install native vegetation and alter outlets; $2,000/year maintenance	1-10 Years
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
1	NW corner of 151st St. & Will-Cook Rd.	14.7 acres	Private agricultural land	14.7 acres of drained wetlands on private agricultural land at headwaters of Long Run Creek; parcel is slated for future residential development.	Incorporate wetland restoration into future Conservation Development plans by using area as wetland detention & mitigation.	Wetland Det.: TN= 24 lbs/yr TP= 9 lbs/yr TSS= 9 tons/yr	High: Critical Area	Future Developer; Orland Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$220,500 to design/ permit/install/ maintain wetland	As new development occurs
2	SE corner of Royal Oaks Ln. & Wolf Rd.	23.4 acres	Private agricultural land	23.5 acres of drained wetlands on private agricultural land at headwaters of Long Run Creek; parcel is slated for future residential development.	Incorporate wetland restoration into future Conservation Development plans by using area as wetland detention & mitigation.	Wetland Det.: TN= 39 lbs/yr TP= 14 lbs/yr TSS= 14 tons/yr	High: Critical Area	Future Developer; Orland Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$351,000 to design/ permit/install/ maintain wetland	As new development occurs
3	W of Wolf Rd.	24 acres	Private agricultural land	24 acres of drained wetlands on private agricultural land at headwaters of Long Run Creek; parcel is slated for future residential development.	Incorporate wetland restoration into future Conservation Development plans by using area as wetland detention & mitigation.	Wetland Det.: TN= 39 lbs/yr TP= 14 lbs/yr TSS= 14 tons/yr	High: Critical Area	Future Developer; Orland Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$375,000 to design/ permit/install/ maintain wetland	As new development occurs
STREAMBANK & CHANNEL RESTORATION (See Figure 59)											
Technical and Financial Assistance Needs: Stream restorations are complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration. The project becomes more complex in areas that flow through several governing bodies or multiple private residences. Technical and financial assistance associated with stream maintenance is generally low for minor tasks such as removing debris.											
LRC 1: Long Run Creek Reach 1	Silo Ridge Rd. to 143rd St.	4,207 linear feet	Private agricultural land	4,207 lf of headwater stream that is highly channelized, moderately eroded, has high sediment accumulation, and poor riffle-pool development.	Design and install up to eight artificial riffles within the stream channel.	Not Applicable	Medium	Private Owner	NRCS/SWCD	$32,000 to design and install eight artificial riffles	10-20+ Years

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
LRC 2: Long Run Creek Reach 2	143rd St. to Will-Cook Rd.	5,787 linear feet	Private residential & Orland Park PD (Public)	5,787 lf of stream that is highly channelized, moderately eroded with some highly eroded areas, and poor riffle-pool development.	Design, permit, and implement project to selectively stabilize highly eroded areas using bioengineering techniques and install up to ten artificial riffles within the stream channel.	Streambank Stabilization: TN= 90% TP= 90% TSS= 90%	Medium	Private Owners & Orland Park	USACE, IDNR, Ecological Consultant/ Contractor	$300,000 to design, permit, and implement stabilization and artificial riffles	10-20+ Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
LRC 1: Long Run Creek Reach 1	Silo Ridge Rd. to 143rd St.	4,207 linear feet	Private agricultural land	4,207 lf of headwater stream with a relatively narrow/poor quality buffer dominated by invasive species.	Restore a 50-foot wide (minimum) buffer along stream by removing invasive vegetation and planting native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Medium	Private Owner	NRCS/SWCD Conservation Reserve Program	$30,000 to restore riparian buffer; $1,000/yr maintenance	10-20+ Years
LRC 2: Long Run Creek Reach 2	143rd St. to Will-Cook Rd.	5,787 linear feet	Private residential & Orland Park PD (Public)	5,787 lf of highly degraded riparian area on private & public (Orland Park Open Lands) land along Long Run Creek Reach 2 (LRC2). Invasive shrubs and trees are causing the majority of the problems.	Remove invasive woody species and restore degraded riparian area using native vegetation.	Filter Strip: TN= 330 lbs/yr TP= 52 lbs/yr TSS= 15 tons/ yr	High: Critical Area	Private Owners & Orland Park	Ecological Consultant/ Contractor	$50,000 to restore riparian buffer; $3,000/yr maintenance	1-10 Years
TribB2: Tributary B Reach 2	Wolf Rd. to Long Run Creek	1,370 linear feet	Residential HOA (private)	1,370 lf of degraded riparian area along stream within residential area. Invasive shrubs and trees are the biggest problem.	Remove invasive woody species and restore degraded riparian area using native vegetation.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Low	Residential HOA	Ecological Consultant/ Contractor	$20,000 to restore riparian buffer; $2,000/yr maintenance	10-20+ Years
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI2	SE of Wolf Rd. & 131st St.	70 acres	Private agricultural land	70 acres on private agriculture parcels that are slated for future residential development. Note: parcels are located in Tampier Lake TMDL subwatershed. Note: parcel is zoned as single family residential with sensitive areas set assize for dedication to Forest Preserve District of Cook County.	Incorporate Conservation Design standards into future development plans to the extent feasible based on current residential zoning.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Orland Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
GI3	SW of Wolf Rd. & 135th St.	100 acres	Private agricultural land	100 acres on private agriculture parcels that are slated for future residential development. Note: parcels are partially located in Tampier Lake TMDL subwatershed. Note: parcel has set density minimums.	Incorporate Conservation Design standards into future development plans to the extent feasible based on set density minimums.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Orland Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
GI4	E and W of Wolf Rd. at headwaters of Long Run Creek	163 acres	Private agricultural land	163 acres on private agriculture parcels at headwaters of Long Run Creek Reach 1 (LRCR1). Parcels are slated for future residential development. Note: parcel has set density minimums.	Incorporate Conservation Design standards into future development plans to the extent feasible based on set density minimums.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Orland Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
GI5	NE corner of 151st St. & Will-Cook Rd.	36 acres	Private agricultural land	36 acres on private agriculture land near headwaters of Long Run Creek Reach 1 (LRCR1). Parcel is slated for future residential development. Note: parcel has set density minimums.	Incorporate Conservation Design standards into future development plans to the extent feasible based on set density minimums.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Orland Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
AGRICULTURAL MANAGEMENT PRACTICES (See Figure 62)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement farm management practices is relatively low because the NRCS provides much of this information and provides matching funds.											
AG2	SE of Wolf Rd. & 131st St.	51 acres	Private agricultural land	51 acres of agricultural land in row crop production. Note: land is located in Tampier Lake TMDL subwatershed.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 233 lbs/yr TP= 119 lbs/yr TSS= 83 tons/yr	High: Critical Area	Existing Farmer	NRCS/ SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
AG4	SW of Wolf Rd. & 135th St.	66 acres	Private agricultural land	66 acres of agricultural land in row crop production. Land is partially located within Tampier Lake TMDL subwatershed.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 296 lbs/yr TP= 151 lbs/yr TSS=105 tons/yr	High: Critical Area	Existing Farmer	NRCS/ SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
AG5	E and W of Wolf Rd. at headwaters of Long Run Creek	130 acres	Private agricultural land	130 acres of agricultural land in row crop production at headwaters of Long Run Creek Reach 1 (LRC1).	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 554 lbs/yr TP= 116 lbs/yr TSS=193 tons/yr	High: Critical Area	Existing Farmer	NRCS/ SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
AG6	NE corner of 151st St. & Will-Cook Rd.	31 acres	Private agricultural land	31 acres of agricultural land in row crop production at headwaters of Long Run Creek Reach 1 (LRC1).	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 132 lbs/yr TP= 28 lbs/yr TSS=46 tons/yr	High: Critical Area	Existing Farmer	NRCS/ SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
8	Crystal Tree Golf & Country Club	30 acres	Golf Course (private)	Approximately 30 acres on golf course that are currently rough areas and maintained as mowed turf grass.	Opportunity to enroll in Audubon Cooperative Sanctuary Program (ACSP) and establish low stature prairie buffers in roughs and around pond features.	Filter Strip: TN= 40% TP= 45% TSS= 73%	Low	Crystal Tree Golf & Country Club	Ecological Consultant	$90,000 to design and install savanna and prairie on 30 acres	10-20+ Years
13	Arbor Lake Preserve	60 acres	Orland Park	60 acre preserve with variety of upland and wetland ecological communities in varying degrees of health.	Complete a Natural Area Management Plan for the preserve.	na	Low	Orland Park	Ecological Consultant	$10,000 to complete Management Plan	1-10 Years

ORLAND TOWNSHIP

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
25H	Minetz Ct.	5.4 acres	Residential HOA (private)	Existing large wet bottom detention basin with mown turf grass buffer and emergent edge dominated by invasive species. Basin is located in Tampier Lake TMDL subwatershed.	Design and implement plan to create prairie buffer, eradicate invasives from emergent edge, and plant native emergent plants to improve water quality and create wildlife and fish habitat.	Wetland Det.: TN= 81 lbs/yr TP= 9 lbs/yr TSS= 4 tons/yr	High: Critical Area	Residential HOA	SWCD; IEPA; Ecological Consultant/ Contractor	$81,000 to design & install native vegetation; $3,000/ year maintenance	1-10 Years
25I	135th & McCabe	0.9 acres	Residential HOA (private)	Existing dry bottom detention basin servicing adjacent subdivision. Basin is comprised of mown turf and has a concrete low flow channel from inlet to outlet; basin drains north to Tampier Lake.	Design and implement project to disrupt concrete channel and retrofit basin with native vegetation to create wetland bottom detention.	Wetland Det.: TN= 18 lbs/yr TP= 5 lbs/yr TSS= 2 tons/yr	High: Critical Area	Residential HOA	SWCD; IEPA; Ecological Consultant/ Contractor	$18,000 to disrupt concrete channels & install native vegetation; $1,000/ year maintenance	1-10 Years
25J	Stagecoach & McCabe	0.7 acres	unknown	Existing dry bottom detention basin consisting of mown turf grass.	Design and implement project to retrofit basin with native vegetation to improve water quality and infiltration. Maintain indefinitely.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Unknown	Ecological Consultant/ Contractor	$7,500 to design and install native vegetation; $500/year maintenance	10-20+ Years
25K	Orland Trail Subdivision	0.6 acres	Residential HOA (private)	Existing dry bottom detention with mown turf grass throughout.	Naturalize basin with native vegetation to improve water quality and infiltration; maintain indefinitely.	Dry Detention: TSS = 57.5% TN = 30% TP = 26%	Low	Residential HOA	Ecological Consultant/ Contractor	$6,500 to design and install native vegetation; $500/year maintenance	10-20+ Years
35E	Maplecreek Dr.	0.9 acres	Residential HOA (private)	Existing dry bottom detention basin with mown turf grass and a low flow concrete channel between the inlet and outlet.	Design and implement project to disrupt concrete channel and retrofit basin with native vegetation to create wetland bottom detention.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Residential HOA	Ecological Consultant/ Contractor	$18,000 to disrupt concrete channels & install native vegetation; $1,000/ year maintenance	10-20+ Years
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
5	NE corner of LRC & Wolf Rd.	4.9 acres	Unknown	4.9 acre area within the floodplain of LRC that consist of mown turf grass.	Stop mowing program, break drain tiles if present & regrade then revegetate with native wetland species.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Medium	Unknown	Orland TWP; Drain Tile Service; Ecological Consultant	$50,000 to design and implement project.	10-20+ Years

PALOS PARK

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
DETENTION BASIN RETROFITS & MAINTENANCE (See Figure 57)											
Technical and Financial Assistance Needs: Technical assistance needed to implement detention basin retrofits is relatively low while financial assistance needs are moderate. Private landowners will need the greatest assistance.											
6A	Shadow Ridge Estates Subdivision	0.3 acres	Residential HOA (private)	Existing wet bottom turf grass-lined detention basin servicing Shadow Ridge Estates Subdivision; basin is located in Tampier Lake TMDL subwatershed.	Design and implement project to install a native prairie vegetation buffer, install native emergent plants along shoreline, and maintain indefinitely.	Wetland Det.: TN = 36 lbs/yr TP= 11 lbs/yr TSS=3.5 tons/yr	High: Critical Area	Residential HOA	Ecological Consultant/ Contractor; Palos Park	$5,000 to design and install prairie buffer and emergent plants; $500/year maintenance	1-10 Years
RIPARIAN AREA & LAKE BUFFER RESTORATION & MAINTENANCE (See Figure 60)											
Technical and Financial Assistance Needs: Technical assistance needed to implement riparian area & lake buffer restoration and maintenance is moderate at first because an environmental consultant is usually hired to complete a plan and implement the work. However, costs can be greatly reduced over time if municipal or park district staff complete some restoration and most of the long term maintenance in house. Private landowners will need the greatest assistance.											
TribN1: Tributary N Reach 1	W of Wolf Rd. to FPDCC property	2,960 linear feet	Private agricultural land	1,200-lf upstream section of stream reach with degraded buffer comprised of residential lawns and invasive woody species. Note: reach is in Tampier Lake TMDL subwatershed.	Restore a 50-foot wide (minimum) buffer along stream by removing invasive vegetation and planting native vegetation.	Filter Strip: TN=190 lbs/yr TP= 30 lbs/yr TSS= 9 tons/yr	High: Critical Area	Palos Park; Private Owners	IEPA: Ecological Contractor	$25,000 to restore riparian buffer; $2,000/yr maintenance	1-10 Years
OTHER MANAGEMENT MEASURES (See Figure 63)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement these projects varies depending on complexity.											
5	Roadside swales along Ramsgate & Old Creek Rd	4.0 acres	Palos Park/ Private Owners	Approximately 4 acres of roadside swales that are currently mowed turf grass. Note: swales are located in Tampier Lake TMDL subwatershed.	Create roadside bioswales by removing turf grass and planting native vegetation.	Wetland Det.: TSS = 77.5% TN = 20% TP = 44%	Low	Palos Park; Private Owners	Engineer; Ecological Consultant	$175,000 to design project and install native vegetation	10-20+ Years

PALOS TOWNSHIP

ID#	Location	Units (size/ length)	Owner (public or private)	Existing Condition	Management Measure Recommendation	Pollutant Reduction Efficiency	Priority	Responsible Entity	Sources of Technical Assistance	Cost Estimate	Implementation Schedule (Years)
WETLAND RESTORATION (See Figure 58)											
Technical and Financial Assistance Needs: Wetland restoration projects are typically complex and require high technical and financial assistance needs to protect land, design, construct, monitor, and maintain the restoration.											
8	SE of Wolf Rd. & Frances Ln.	9.5 acres	Private agricultural land	9.5 acres of drained wetlands on private agricultural land slated for future residential development. Site is located in Tampier Lake TMDL subwatershed.	Incorporate wetland restoration into future Conservation Development plans by using area as wetland detention & mitigation.	Wetland Det.: TN= 3 lbs/yr TP= 4 lbs/yr TSS= 4 tons/yr	High: Critical Area	Future Developer; Orland Twp/ Park	USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$142,500 to design/ permit/install/ maintain wetland	As new development occurs
9	NE of Wolf Rd. & 131st St.	9.3 acres	Private agricultural land	9.3 acres of drained wetlands on private agricultural land slated for future residential development. Site is located in Tampier Lake TMDL subwatershed.	Incorporate wetland restoration into future Conservation Development plans by using area as wetland detention & mitigation.	Wetland Det.: TN= 3 lbs/yr TP= 4 lbs/yr TSS= 4 tons/yr	High: Critical Area	Future Developer; Orland Twp/ Park	USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	$139,500 to design/ permit/install/ maintain wetland	As new development occurs
GREEN INFRASTRUCTURE PROTECTION AREAS (See Figure 61)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to protect open space or implement conservation/low impact development is high because of land, design/permitting, and construction costs.											
GI1	NE of Wolf Rd. & 131st St.	59 acres	Private agricultural land	59 acres on private agriculture parcels that are slated for future residential development. Note: parcels are located in Tampier Lake TMDL subwatershed.	Incorporate Conservation Design standards into future development plans.	Pollutant reduction cannot be assessed via modeling	High: Critical Area	Future Developer; Orland Twp/ Park	Cook County; USACE; NRCS/ SWCD; Illinois EPA; Ecological Consultant	The cost for implementing a Conservation Development cannot be determined	As new development occurs
AGRICULTURAL MANAGEMENT PRACTICES (See Figure 62)											
Technical and Financial Assistance Needs: Technical and financial assistance needed to implement farm management practices is relatively low because the NRCS provides much of this information and provides matching funds.											
AG1	NE of Wolf Rd. & 131st St.	48 acres	Private agricultural land	48 acres of agricultural land in row crop production. Note: land is located in Tampier Lake TMDL subwatershed.	Enroll in NRCS/SWCD Environmental Quality Incentive Program (EQIP) and implement conservation tillage (no till) with filter strips.	No Till w/Filters: TN= 223 lbs/yr TP= 114 lbs/yr TSS= 80 tons/yr	High: Critical Area	Existing Farmer	NRCS/SWCD	The cost for implementing conservation tillage depends on available equipment and crop type	Annually
AG3	Between 131st St. & Frances Ln.	2 acres	Private land	2-acre livestock area with approximately 12 sheep. Note: land is located in Tampier Lake TMDL subwatershed.	Implement manure management system to reduce nutrient and sediment runoff to Tampier Lake	Manure Manage: TN= 28 lbs/yr TP= 3 lbs/yr TSS= na	High: Critical Area	Existing Livestock Farmer	NRCS/SWCD	$1,000/yr	Annually

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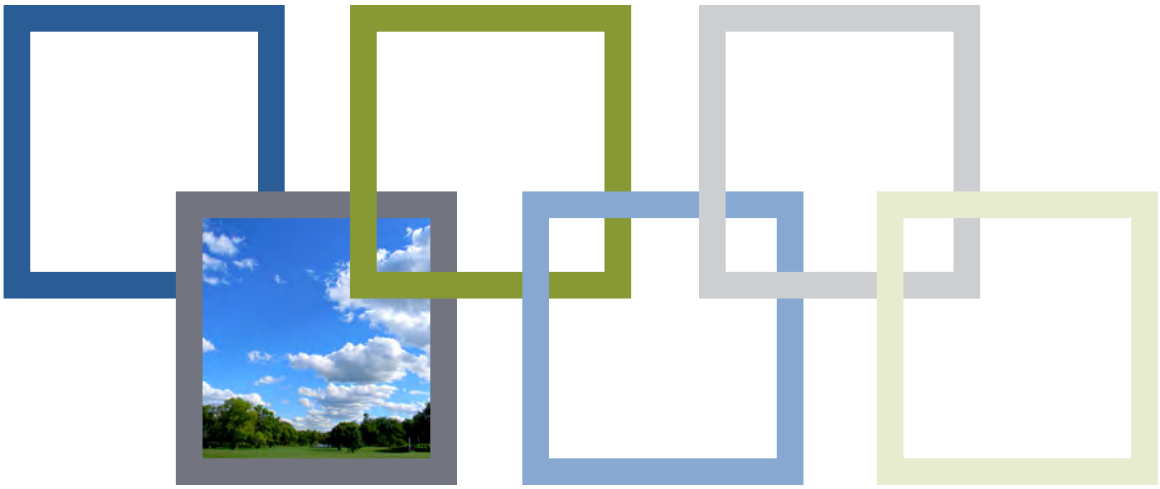

7.0 INFORMATION & EDUCATION PLAN

The health of the Long Run Creek watershed faces challenges and threats from proposed land use changes, increasing nutrient loads, streambank erosion and channelization, a depleting groundwater supply, invasive species, poor land management practices and problematic flooding. At the root of these challenges and threats is that key audiences lack the necessary knowledge and tools to make informed decisions and adopt positive behaviors to mitigate such threats and challenges. Since a significant amount of Long Run Creek watershed is held as private property, any efforts to improve water quality or increase groundwater recharge must include significant education and outreach efforts to those landowners and key stakeholders.

This Information and Education (I & E) Plan is intended to spark interest in and provide stakeholders a better understanding of Long Run Creek watershed, and then promote and initiate the recommendations of the Long Run Creek Watershed-Based Plan. This I & E Plan will serve as an outline or agenda for outreach that will support accomplishment of the long-term goals and objectives of the Watershed-Based Plan.

Through this I & E Plan, the LRCWPC will:

"Improve education and inspire behavior changes to promote and preserve the health of Long Run Creek watershed"

Municipal staffs, elected officials and other key stakeholders will have tools at their disposal to establish watershed-based practices and engrain them into their respective activities and procedures. Developers will follow guidelines that consider watershed health; and residents in the Long Run Creek watershed will be actively involved in protecting and restoring Long Run Creek and its tributaries. They will become aware of the creek's location and needs and adopt specific behaviors to improve its health. Through these changes in behaviors, the threats and challenges in the watershed will decrease, water quality will improve and the overall health of the watershed will improve.

Thorough public information and stakeholder education efforts will ultimately inspire local residents and community members to adopt recommended behaviors. The cumulative actions of individuals and

communities watershed-wide can accomplish the goals of the watershed plan. In a region dependent upon groundwater supply for water services, watershed health is of primary importance for the people of Long Run Creek watershed. When people begin to understand the issues related to water quality and natural resource protection, they begin to change their behaviors and activities, thereby improving the overall health of the watershed.

Information & Education Process

A successful I & E Plan will raise awareness of watershed issues and problems among key stakeholders and targeted audiences. However, LRCWPC cannot assume that audiences will actually adopt desired behaviors with education alone. As such, this I & E Plan incorporates standard behavior change theory (as presented by Doug Mckenzie-Mohr, http://www.cbsm.com) so that education efforts directly result in positive actions.

The Village of Lemont, on behalf of the Long Run Creek Watershed Plan Committee (LRCWPC), applied for and received a grant from the Hine's Emerald Dragonfly Habitat Conservation Plan Project Funding (administered by Hanson Material Service) to engage an environmental communications firm with experience writing and implementing education and outreach plans. This firm, Bluestem Communications (formerly Biodiversity Project), applied their experience and expertise to develop this I & E Plan in cooperation with Applied Ecological Services, Inc. (AES) by completing the following steps:

- Facilitated three interactive LRCWPC planning meetings; activities included surveys, collective brainstorming with the recommendations of the watershed plan always at the forefront;
- Developed education objectives and activities that reflect the months of collective brainstorming and planning with this group;
- Worked with the LRCWPC to confirm feasibility and effectiveness of the education objectives and activities.

Further, Bluestem Communications is leading the implementation of a selected demonstration action/campaign identified in this I & E Plan to test the effectiveness of the activity and jump start implementation of projects that address the goals of the Watershed-Based Plan. The LRCWPC selected the demonstration project from the prioritized activities in this I & E Plan. The pilot project will test "Who owns the Creek?" campaign activity listed under Objective 1: Build a sense of community around Long Run Creek and the watershed. For the pilot project, Bluestem Communications will create an attractive distributable flyer that will be mailed to targeted neighborhoods in Homer Township. A follow-up survey will be sent to the same addresses one month later to test the effectiveness of the flyer. The projected outcome of the flyer will be that residents can define the term watershed, know the physical boundaries of Long Run Creek watershed and understand the benefits/consequences of living so close to a creek. The pilot project will be implemented in spring 2014.

To develop the primary education objectives that will help improve the health of Long Run Creek watershed, Bluestem Communications and AES analyzed the list of challenges and threats identified and explained in Section 3 of this Watershed-Based Plan. For each existing threat, the following questions were asked:

- Who can affect this issue?
- What actions can people do to address it?
- What do people need to know before they can take action?

From the complete list of identified challenges and threats, we identified big-picture objectives that, if addressed, would likewise address all the specific threats. During a LRCWPC meeting, partners participated in a group effort to prioritize the long list of potential activities. They also took ownership of these activities so they could be seamlessly added to their internal organizational work plans. The list of activities has also been divided into three broad timeline categories: Phase I, Phase II, and Phase III. Some activities have also been designated as "Ongoing" or "Annual."

The full list of objectives and activities can be found in Table 45. This table includes the following components:

- Goals and objectives
- Target audiences to be reached
- Action or campaign
- Package (vehicle) for reaching audiences
- Priority/schedule
- Lead and supporting organizations
- Expected outcome/behavior change
- Estimated cost
- Indicators of success

A major component of the I & E Plan is educating key stakeholder groups about the completion of this watershed plan and its availability as a resource. By promoting the Watershed-Based Plan on the Partnership website (www.lowerdesplaines.org), at municipality and planning commission meetings, one-on-one with key stakeholders and to the general public, these important recommendations for the future health of Long Run Creek watershed will be accessible to all. To that end, professionally designed, printed and bound copies of the report will be shared with key watershed stakeholders. The Executive Summary will also be printed for distribution to as many stakeholders in the watershed as possible.

Target Audiences

Long Run Creek watershed straddles Will and Cook Counties and includes the municipalities of Homer Glen, Lemont, Orland Park, Lockport, and Palos Park. Townships include Homer Township, Orland Township, Palos Township, Lemont Township, and Lockport Township. The Forest Preserve District of Cook County and Illinois Department of Natural Resources also have large holdings within the watershed. The estimated population of the watershed in 2012 was over 42,000, with expected growth to over 62,000 by 2040. The watershed is heavily developed, or slated to be developed, with residential use. Much of the land immediately adjacent to Long Run Creek and its tributaries is in private ownership. To effect positive behavior changes, several audiences within the watershed must be reached, including:

- Municipal staff and elected officials;
- Developers;
- Students;
- Homeowners associations;
- Residents throughout the watershed; and
- Residents with property adjacent to the Long Run Creek or its tributaries.

Through research and activities with the LRCWPC, it was found that most community members in the watershed area feel a connection to their neighborhood or community association. The neighborhoods tend to be upper middle class and well taken care of, but Long Run Creek and its tributaries have been a confounding factor in many communities. Messages such as "this is your place" are likely to resonate with this audience. Further, if residents understand how the creek *enhances* their property, they will be willing to make changes.

Landscaping best management practices appear to be a major obstacle to a healthy creek; rooted in the practices of landscaping companies. Homeowners need to be educated on what is and is not proper landscaping related to protecting green infrastructure along creeks and relay this to their landscapers.

Many newer homeowners' associations in the area have conservation easements in place on their communal open space; as opposed to older subdivisions where residential lots back up to and/or include the creek. In the instances of new residential developments, it is important for the local municipality to require Development Impact Fees and/or Special Service Area Taxes that will fund the management of conservation easements in perpetuity. And, if possible, the local municipality should work with the developer to gain ownership of conservation easements so that the municipality can hire the appropriate ecological management company to manage the easements. In cases where the Homeowners Association (HOA) is in ownership of conservation easements, it is important to help HOAs understand how to maintain natural areas and provide them with a list of appropriate ecological contractors. Otherwise HOAs tend to hire formal landscaping companies who often do not know how to manage natural areas.

Decision-makers are an important audience as they control long-term actions that can impact all the other audiences. Members of the LRCWPC and homeowners can both be messengers to reach the decision-maker audience.

Education and Outreach Objectives

Implementation of this I & E Plan will achieve the following objectives:

- **Objective 1:** Build a sense of community around Long Run Creek and the watershed.
- **Objective 2:** Connect residents to decision-makers and experts with knowledge about water issues, such as pollution and problematic flooding, and their potential solutions.
- **Objective 3:** Educate watershed stakeholders on ways to improve water quality and reduce problematic flooding in Long Run Creek and its tributaries (such as improving detention basins and reducing erosion and channelization).
- **Objective 4:** Educate watershed

stakeholders on ways to preserve groundwater supply to serve future demands for water supply, and to benefit known endangered species in the watershed, such as the Hine's emerald dragonfly.

- **Objective 5:** Educate municipalities about ways to promote responsible development and best management practices in their communities.

The I & E Plan matrix (Table 45) outlines several activities or campaigns that can be implemented to achieve the objectives noted above. To help the LRCWPC implement such activities or campaigns, the following resources (Tables 43 and 44) have been compiled either as other successful campaign examples, or as inspiration for ways to implement the activities identified in the I & E Plan table.

Table 43. Activities/campaigns or tools to use to help make activities/campaigns successful.

Activity/Campaign Examples	Activity/Campaign Tools and Resources
"Don't feed the storm drain!"	Free storm drain stencil kits with directions. http://www.prairierivers.org/Projects/VolunteerOpportunities/eNewz/stencil.html
General Watershed Education	http://www.friendsofthefoxriver.org/media/docs/welcometoyourwatershed.pdf
Student and Citizen Monitoring	National Great Rivers Research and Education Center (http://www.ngrrec.org/): stream monitoring manual, kit supply lists, monitoring guidelines, identification keys, biotic index calculator, etc. Assistance with incorporating stream projects into school programs.
Native Plants	Lists of Illinois native species: www.wildflower.org/collections
Flooding	How to prepare for flooding and what you can do to prevent it http://www.ready.gov/floods
Green Infrastructure	Chicago Wilderness Green Infrastructure Vision and data: http://www.cmap.illinois.gov/green-infrastructure
	Sustainable Watershed Action Teams (SWAT): http://www.chicagowilderness.org/what-we-do/protecting-green-infrastructure/
River Cleanups	American Rivers: http://www.americanrivers.org/take-action/cleanup/
	Chicago Wilderness: http://www.chicagowilderness.org/who-we-are/corporate-council/day-of-service/

Table 44. Local events throughout the watershed at which plan activities could be implemented.

Municipality	Event Names	Month/Season
Homer Glen	Homer Harvest Days	May, June, September, October
	Homer Glen Land Day	
	Stargazing at Trantina Farm	
	Farmers Market – Saturdays	
	Homer Glen's Earth Day/Arbor Day	
	Homer Fest	
	Creek Clean Up Day	
Lemont	Environmental Advisory Commission Spring & Fall Recycling event	Spring & Fall
	Heritage Commission Trail Clean-up & Green-up	Spring & Fall
	Farmers Markets (Tuesdays, Sept. – Oct. 8am-1pm)	September
	Lemont Street Fair	
	Family Science Night	
	Nightmare on Lemont Street	October
	LEAC's Fall Recycling Event	
	Lemont Park District's Fall Fest	
	Halloween Hoedown	
	Fall Into Family Fun	November
	Lemont Park District's Shop Til You Drop	
	Hometown Holiday	December
	Lemont Park District's 5th Annual 5K	
	Lemont Park District's Breakfast with Santa	
	Lemont Park District's Family New Years Eve Day Bash	
Lockport	Farmers Markets (Mondays, Sept. – Oct.)	September
	Heritage Fest	
	Founders Club Pumpkin 5K	
	Park District Silver and Gold Fish Fry	
	Pumpkins in the Park at Dellwood Park	October
	Octoberfest	
	Fall Book Fair	
	District 91 Band Fall Concert	
	Extreme Adult Scavenger Hunt	
	Christmas in the Square	November
	Annual Christmas Tea	December
	Jingle Bell 5K Race	
	Brunch with Santa	
Orland Park	The Great Pumpkin Party	September
	Turkey Shoot	November
	Turkey Trot	
	Holiday Festival and Tree Lighting Ceremony	December
	Polar Express	
Palos Park	Fall Festival at the Farm	September
	Autumn in the Park Festival	
	Monster Mash	October
	Turkey Trot	November
	Village Tree Lighting	December

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Table 45. Information and Education Plan Matrix.

Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Objective 1: Build a sense of community around Long Run Creek and the watershed.						
Primary Activities						
Inform audiences that a watershed plan has been developed for Long Run Creek watershed; how it benefits the community; and how they can be involved	All residents, developers and municipal decision-makers	• PowerPoint slides for presentations at municipality meetings, planning commission meetings and town halls, etc. • User friendly Executive Summary of the full report for easy distribution • Final watershed plan and recommended actions called out on the Lower Des Plaines River Ecosystem Partnership website • Press release announcing completed plan distributed to press in all municipalities in the watershed	Immediately following plan completion Phase I	Lockport Homer Glen HTHD	The majority of the public in the watershed have excellent knowledge of the watershed conditions, what behaviors they can adopt to improve its health and who to contact to get involved and implement projects. The public also begins to alter every day activities leading to watershed improvement.	Printing: $15 per color copy ($3,000 for 200 copies)
PILOT PROJECT: *"Who owns the Creek?"* Campaign to educate residents about the benefits and consequences of living in a watershed and how their actions affect the long-term health of the Creek	All residents	• Long Run Creek watershed signage along roads to mark watershed boundaries; informational signage defining the watershed and its benefits in public places, like municipal buildings, community centers, libraries and parks • "This is your creek" map of the watershed showing water areas with recognizable landmarks so people can place their homes in the context of the watershed; explains what a watershed is and how they are tied to the creek. Also demonstrate where flooding is natural in the region. • "This is your Creek" fliers in water bills with map and information about the importance of keeping Long Run Creek healthy/using less water	Phase I	HTHD	Residents can define the term watershed, know the physical boundaries of Long Run Creek watershed and understand the benefits/ consequences of living so close to a creek. Residents form a community around the creek.	Signage: $2,000 (20 signs in black and white) Maps: $100 if created and printed by resident (no designed fee) Fliers: print and design $1,500
Survey residents to determine current knowledge about watershed, creek location, water quality, problematic flooding issues and attitude toward the creek and community	All residents	Short survey to be distributed in any or all of the following ways (could be created in SurveyMonkey): • paper copies at in-person events where Management Measure demonstrations are set up or educational materials are distributed; distribute at municipal halls • electronic copies sent via email to partners' email lists • electronic copies posted on municipality websites • shared via newsletters and social media	Phase II	Lockport Homer Glen HTHD	Participants are aware of the watershed location, issues facing Long Run Creek and the existence of a watershed plan. Baseline data is obtained about public attitudes and knowledge.	SurveyMonkey: $204/year or $17/ month Paper surveys: $150

Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Additional Activities						
Develop a geocache hunt to introduce residents to the creek in their area	All residents	Using the website Geocaching.com, develop a GPS-based scavenger hunt that takes participants to key spots throughout the watershed. Stops could include: • replicable examples of rain gardens or rain barrels • places that have used native plants • spots where the creek is healthy • spots where the creek needs restoration At each stop, participants will find information about the watershed, best management practices or actions they can take	Phase III	Undecided	Residents can define the term watershed, know the physical boundaries of the Long Run Creek watershed and understand the benefits/consequences of living so close to a Creek. Residents understand how the Creek can look when it is restored and actions they can take to help restore it. Residents form a community around the Creek.	$700 for membership and supplies (caches, ziplocks bags, storage containers, log books)
Develop and implement a watershed monitoring program with local biology/ life science teachers and students in high schools in Homer Glen, Lemont, Lockport, Orland Park and Palos Park	Students	Partners point interested teachers to the Monitoring Plan section of the watershed plan to incorporate creek monitoring into existing lessons. Component could include: • monitoring manual • kit supply lists and/or actual kits • monitoring guidelines • identification keys • sample curricula Data shared with partners and groups like Illinois River Watch	Phase II	HTHD	By understanding how ecological restoration and habitat improvement benefits the watershed, students develop an invested interest in watershed protection.	Testing kits, curricula copies, monitoring guidelines and ID cards ($150/classroom)
Offer "Volunteer Days" related to stewardship activities in the watershed to the general public.	All residents, students	Offer "Volunteer Days" for people to remove invasive species from natural areas, survey wildlife, or clean up litter from streams. Volunteer days could be planned in conjunction with Chicago Wilderness' annual Day of Service (every fall) or with American Rivers National River Cleanup Day. Promote cleanups through: • press release • social media • flyers in public places • community groups	Phase II	HTHD	By interacting with the natural areas within the watershed, people develop an invested interest in watershed protection and understand what they can do to be part of the solution. People feel connected to their community.	$500 per event: tools, gloves, bags, advertising
"Don't feed the storm drain" Campaign to educate residents on what storm drains do, where the water goes, and how they should be treated/ maintained	All residents	• Storm drain stenciling program with local youth groups/ scouts/4H clubs who volunteer to mark storm drains in their community • Template newsletter articles municipalities and partners can publish online or in print form about the function of storm drains and how they relate to water quality	Phase III	Township & Municipality	Understanding how storm drains function and where the water goes will decrease the amount of waste materials and debris that enter the water system through the drains.	$600 for design and print of stenciling kit
Develop student project opportunities for high schools or college, boy scouts/girl scouts top service projects, etc.	Students	Offer ecological restoration and wildlife habitat project opportunities for students. Promote through: • press release • social media • flyers in public places • community groups	As requested by students or scout leaders or Phase III	Undecided	By understanding how ecological restoration and habitat improvement benefits the watershed, students develop an invested interest in watershed protection.	$500 per student

Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Objective 2: Connect residents to decision-makers and experts with knowledge about water issues, like pollution and problematic flooding, and potential solutions.						
Primary Activities						
Maintain the existing Long Run Creek watershed information sharing website and link to partner websites	All Stakeholders	Maintain existing Lower Des Plaines Ecosystem Partnership website to keep people informed about watershed issues and opportunities. Perform technical and content updates as necessary.	Ongoing Phase I	LDPEP	Website users have information related to the watershed including potential and ongoing projects, watershed problems & opportunities, unique features, funding opportunities, and a calendar of upcoming events. An electronic copy of the watershed plan is located on the website.	No Cost
Additional Activities						
Annual tour of watershed by elected officials, municipal staff and others who are interested in seeing restoration progress, success stories, green infrastructure development, protection areas, or failed projects	Elected officials, municipal staff, developers	Watershed experts lead a half day hour tour of sites around Long Run Creek watershed that demonstrate successes, potential problems or great opportunities. Provide an opportunity for elected officials, municipal staff and developers to interact and learn from local champions and green infrastructure experts.	Annual Phase II	LDPEP	By seeing first-hand how beautiful, effective and cost effective green infrastructure practices and smart development can be, more developers will use these practices and more elected officials and municipal staff will incorporate them into local ordinances. Development and permits decision-making will be better informed.	Bus rental: $180 Promotional Flier: $500 for print and design
Demonstrate Management Measures at public events.	All residents	Host tables or exhibit booths at existing public events like farmer's markets, community festivals and school fairs. Volunteers and/ or municipal staff distribute watershed information (like the "This is your Creek" piece explained above) and demonstrate actions homeowners can take. Feature: • tips • how-to guides • resources • material lists • locations to get materials Implement demonstration projects, or highlight existing case studies within the watershed that promote the benefits of watershed protection and best management practices.	Phase II	Undecided	Residents understand the importance of maintaining a healthy Long Run Creek watershed, groundwater recharge and quality, can identify behaviors they can change to improve the watershed and begin to change everyday activities. Residents form a community around the creek.	Printed guide/material: $750 Event registration: $200/ event
Host potluck-style community meetings about the creek and watershed called "Come *grill* us about your Creek!" Residents will meet and greet with each other and decision-makers/water experts to talk informally about watershed issues like flooding, property erosion, runoff, native plants, etc.	All residents	Seasonal "grill us" events held at community centers, subdivision common spaces or public parks. Residents bring own items to grill and event sponsors provide ice cream for dessert. Community leaders, ecologists, forest preserve and park staff, etc. are on-hand to demonstrate Management Measures, and answer watershed questions. Event is promoted through: • press releases • website and social media posts • e-mails to list serves • flyers in public areas (community centers, libraries, etc.)	Phase III	Undecided	Potluck attendees build relationships with community leaders and watershed experts. Community leaders get direct feedback from residents on watershed problem areas and planning priorities. Residents understand the importance of maintaining a healthy Long Run Creek watershed, groundwater recharge and quality and begin to change everyday activities. Residents form a community around the creek.	Ice cream/event set up: $250 per event (cost of ice cream, serving supplies, spoons, bowls, table clothes – based on 75 attendees)

Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Objective 3: Educate watershed stakeholders on ways to improve water quality in Long Run Creek and its tributaries and reduce problematic flooding (like improving detention basins and reducing erosion and channelization).						
Primary Activities						

Educate the general public on the benefits of ecological/natural area restoration and management	All residents	• Offer outdoor workshops at existing ecological restoration sites to help the general public and homeowners understand how removing non-native species and replacing with native vegetation and streambank stabilization benefits the watershed.
		• Work with nurseries and home improvement stores to distribute educational information to encourage shoppers to buy native plants.
		• Also invite native plant nursery specialists and/ or representatives from *Conservation@Home* or the National Wildlife Federation-Backyard Wildlife Habitat Certification Program to help the general public identify and choose appropriate native plants and trees for use in home landscaping and where to purchase them.
		• Promote the *Conservation@Home* program and/or the National Wildlife Federation's *Certified Wildlife Habitat* program to homeowners at events (like those listed under Objective 2 above), at nurseries and home improvement stores and through promotional avenues like:
		  • newsletters
		  • municipal websites
		  • social media
		  • flyers shared at parks, community centers, etc.
		  • through HOAs and community groups
		• Homeowners who earn certification place plaques in yards, showcasing their commitment to their neighbors
			Once every five years
			
			Phase I
				LDPEP	The general public and homeowners become more aware of the use of native plants and their benefits in ecological restoration. When visiting a nursery, homeowners are able to identify native plants or go to nurseries or plant sales that specialize in native plants. Homeowners certify backyard restorations under *Conservation@Home* or the National Wildlife Federation-Backyard Wildlife Habitat Certification Program. Importantly, these certifications encourage neighbors to take similar actions.	Not Determined

Teach residents the difference between natural flooding and problematic flooding in a watershed	All residents	• Develop and distribute materials to identify areas where flooding will and should occur along the creek and tributaries in the watershed. • Use the "This is your Creek" map to show where flooding is natural so people can adjust expectations and take actions to reduce the problematic areas. • Suggest green infrastructure practices that can reduce the problematic flooding. • Conduct personalized site meetings with landowners to develop options to mitigate for flooding. FEMA offers flooding preparedness information at www.ready.gov/floods	As requested by landowners Phase I	Homer Glen	By understanding the difference between natural flooding and problematic flooding, residents can change behaviors to reduce problematic flooding and adjust their expectations during the rainy season. Homeowners in flood prone areas understand and keep an eye on future planning upstream to ensure flood problems do not increase.	Design and printing of informational materials: $500

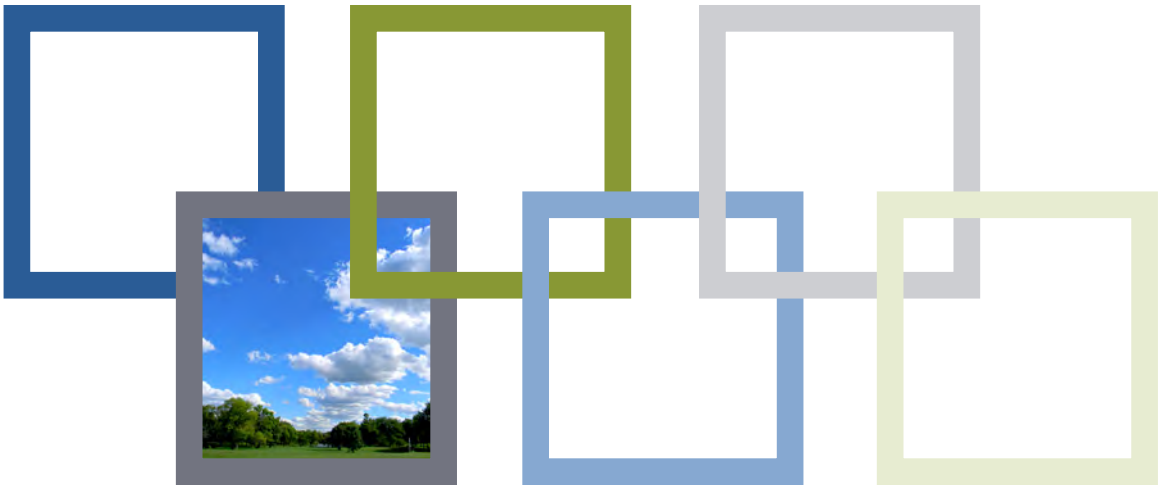
Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Teach residents about the pollution coming from the local water treatment plants	All residents	• Develop and distribute materials to help residents understand that the two water treatment plants within the watershed are currently the biggest polluters in the watershed, producing more than 50% of the nitrogen and phosphorus problem. • Educational materials could also include a postcard or petition campaign to encourage upgrades to the plants. • Residents would sign the petition or postcard and send to either local elected officials or the water treatment plant operators/owners.	Phase I	Homer Glen	Residents understand where pollution comes from in their watershed. Local municipalities put pressure on the water treatment plants to upgrade their facilities or develop and enforce a nutrient loading ordinance to reduce the pollution.	Design and printing of postcard plus distribution: $2,000
Fertilizer campaign that encourages residents to use less fertilizer, use phosphorus-free fertilizer, and perform soil tests before fertilizing	All residents	Communicate to a wider variety of landowners the negative impacts of using fertilizer high in phosphorus through: • news media • press releases • website • updates • social media posts Organizations who implement this activity would promote soil testing available through NRCS and connect them with resources for landowners to determine if phosphorus is needed on lawns.	Publicize annually and soil testing as requested Phase I	Homer Glen NRCS	Residents fertilizer less often and only fertilize because a soil test indicated it was necessary. Those who do fertilize begin to use fertilizer with appropriate phosphorus content thereby reducing phosphorus loading into the creek, tributaries, and storm drains.	Soil testing kits, average cost of kits $15-$20 per kit; overall cost $2,500
Additional Activities						
"Your land just got smaller" campaign on stream bank erosion and how to properly prevent it	Residents with properties along the creek or tributaries; HOAs	Develop materials that explain how our collective actions can increase erosion along the creek and tributaries. Highlight how eroding stream banks impair water quality and shrink the size of our land. Spread campaign information: • at in-person events • on flyers posted at community centers, parks, etc. • in newsletter articles • on websites and social media • through HOA lists Encourage homeowners to plant native plants, install buffer areas and otherwise take action to reduce erosion.	Phase II	LRCWPC	Residents in Long Run Creek watershed proactively reduce erosion from their property by changing their landscaping methods along the creek and tributary banks.	$500 for flier print and design
Encourage communities to retrofit detention basins with native vegetation to improve water quality, habitat, and groundwater infiltration	HOAs, developers, municipal staff	Produce distributable information piece about the long-term benefits of improving basins and recommendations for moving forward, including: • sample naturalized detention plans • material list • possible costs and long-term savings • qualified contractors list, etc. Include explanation of why groundwater recharge is important for their water supplies and the health of local endangered species Hine's emerald dragonfly	Phase II	Homer Glen	HOAs and developers update their failing detention basins following recommendations outlined in the Long Run Creek Watershed-Based Plan, thus increasing groundwater recharge, wildlife habitat and water quality. Municipal staff have information needed to encourage retrofits in their communities.	$200 for information piece (if designed and printed by resident and no designer fee)

Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Implement a rain barrels campaign to encourage residents to install rain barrels in their yards	All residents	• Host "Make and Take" rain barrel events as either stand-alone workshops or in conjunction with the events listed in Objective 2 above. Participants would pay a nominal fee to build their own rain barrels and learn how to install them. This can be paired with rain barrel painting or kids events. • Provide easy instructions on how to use/install rain barrels • Promote the economic and environmental benefits of using rain barrels through avenues like newsletters, websites, social media, etc. • Partner with home improvement stores/nurseries to provide discounts on rain barrels through municipal programs	Phase III	Undecided	Residents install rain barrels and use the collected water to care for their yards, reducing water consumption and reducing runoff from impervious surfaces in neighborhoods.	Supplies for rain barrel painting: $175 Rain barrel kit supplies: $5,000 (will be made back from fees)
Adopt-An-Inlet Program	All residents, HOAs	Develop and distribute an instructional guide about the proper care and maintenance of inlets. Content could include: • what an inlet is • why it is important • how it works • how improperly maintained inlets can cause flooding, etc. Provide tips for residents on how to keep debris like leaves, grass clippings and branches from blocking inlets. Share with residents through: • events listed in Objective 2 above • websites • municipal mailings • mail to established HOAs • presentations at HOA meetings	Phase III	Undecided	Residents with detention basins that contain inlets in their yards and HOAs with inlets in their shared property prevent blocked inlets by implementing basic maintenance practices.	Design and printing of instructional guide: $500
Design and implement a campaign to keep lawn debris out of the creek	Residents with properties along the creek or tributaries; HOAs	• Produce a graphic chart of landscape rules in each municipality; distribute to HOAs and/or individual homeowners so they know what they should be doing; include facts about why debris should not go in the creek bed • Develop and distribute seasonal information on yard waste disposal methods (i.e. Spring: pruned branches and mulch; Summer: grass clippings; Fall: leaves); distribute via newsletters, website and social media posts, in-person events • Produce and distribute calendar stickers for homeowners to put on their calendars to mark lawn debris/leaf pickup days • Organize neighborhood creek clean-ups/creek restoration days for residents on their own or for HOAs; people volunteer along creek banks in their neighborhood • Develop an Adopt-a-Creek program for HOAs to care for their portion of creek with recommended actions, possible timelines for actions, etc.	Phase II	Homer Glen	Residents with properties along the creek or tributaries stop dumping yard waste like branches, mulch, leaves and grass clippings into the creek, thus reducing clogged waterways and nutrient levels in the water.	graphic chart design: $500 calendar stickers: print and design: $850 Clean up days: $500 per event (as listed above)

Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Encourage residents to talk to landscape companies about creek-friendly actions, like not putting debris in the creek, reducing fertilizer use and using native plants along the banks	Residents who hire landscapers	• Develop and distribute materials to educate residents about the importance of keeping debris out of the creek and tributaries and using native plants. Distribute through HOAs, newsletters, websites, and partnerships with community groups like garden clubs. • Remind residents that they have authority over how their landscapers dispose of yard waste on their property and what kinds of plants they use. Encourage residents to talk to their landscapers about these issues. • Provide sample landscape plans that include native plants that residents could replicate in their yards. Post sample plans on websites and share through social media and newsletters.	Phase II	Homer Glen	Residents take control over the impact their landscaping decisions have on the health of the watershed by directing their landscape companies to keep debris out of the creek and tributaries and to use less fertilizer. More homeowners incorporate native plants into their landscaping.	Design and printing of educational materials: $600 Sample landscaping plans print and design: $750
Objective 4: Educate watershed stakeholders on ways to preserve groundwater supply to serve future demands for water supply, and to benefit known endangered species in the watershed, such as the Hine's emerald dragonfly.						
Primary Activities						
Promote water infiltration practices (not just conveyance) in development and redevelopment projects among municipality permitting departments and developers	Developers, municipalities	• Develop educational information about proposed Class III groundwater restrictions and depleting groundwater supplies to explain the urgency for promoting stormwater infiltration. • Develop example language municipalities could adopt as ordinances, with examples of permitting language and lists of preferred practices. Municipalities would adopt ordinances and share preferred practices through permitting offices.	Phase I	Homer Glen	Municipalities adopt water infiltration practices as part of their development plans, permits and ordinances. Developers follow recommended practices in new and retrofitted developments. More stormwater is absorbed into the ground, increasing supplies, reducing problematic flooding and benefitting the HED	Educational materials (if printed) – print and design: $500
Install educational signage near existing Management Measures and intersections near the creek	All residents	• Design and install signs at key points along major roads in the watershed that inform drivers and passengers that they are "Entering Long Run Creek Watershed". The signs should also contain a website or contact person. • Additional signs highlight places where Management Measures and conservation development have made a difference for the watershed. Lockport Prairie has great sign examples that can be duplicated.	Phase I	HTHD	Thousands of drivers/passengers see Long Run Creek watershed signage when entering the watershed. This sparks enough interest for many individuals to search municipal sites where they will find links to the LDPEP website home page. The website will provide all relevant information about the watershed including an electronic copy of the plan and schedule of upcoming events.	$5,000 for five signs
Additional Activities						
Promote rain gardens as a beautiful way to increase ground water supplies, protect the endangered Hine's emerald dragonfly and attract native wildlife	All residents	• Host how-to workshops for residents, teaching about the value of rain gardens, dispelling myths and providing plant lists and plant kits and sample design plans. • Organize a rain garden tour a year after workshop to showcase participants' rain gardens and to trouble shoot. • Partner with nurseries to have rain garden-appropriate plant sales with sample design schematics for how the plants could be used and care instructions. Develop educational brochure/ educational kiosks at nurseries.	Phase II	LDPEP	Residents learn about the value of rain gardens and are able to decipher common rain garden myths from the truth. Residents plant rain gardens in their yards.	Supplies for workshops (including plants) $3,500 per event Print and design of brochures: $3,000 at 5 nurseries

Education Action or Campaign	Target Audience	Package (vehicles and pathways for reaching audiences)	Priority/ Schedule	Lead and Supporting Organizations	Outcomes/Behavior Change	Estimated Cost
Public campaign to encourage less water use in shower, when watering the lawn and when brushing teeth	All residents	Develop and distribute information about wasteful water consumption with easy tips for reducing water use. Include information about dwindling groundwater supplies and about the Hine's emerald dragonfly. Information could be distributed through: • websites and social media • newsletters (electronic and printed) • flyers posted in public places • flyers distributed at events People could pledge to take shorter showers in-person at any of the events listed above in Objective 2. Educational materials could be distributed with shower timers to help people fulfill their pledge to take shorter showers.	Phase III	Undecided	Residents understand the link between their actions and groundwater supplies and the health of their community's endangered HED. People take shorter showers, use less water on their lawns and when brushing their teeth.	$400 for 350 custom shower timers from bulk sites $1,000 for Design and printing
Objective 5: Educate municipalities about ways to promote responsible development and best management practices in their communities						
Connect municipal staff and elected officials to resources about green infrastructure, need for responsible development, proposed Class III groundwater restrictions and depleting groundwater supplies	Municipalities	• Develop and distribute sample permitting language and lists of preferred practices • Share sample ordinance that municipalities could adopt • Share case studies of conservation developments • Attend planning commission meetings and give feedback • Present at planning, municipal and other decision-maker meetings • Share sample funding structures for how some communities have paid for infrastructure changes (i.e. Champaign, IL) • Share GIS data and maps from the Long Run Creek Planning process to aid municipalities in making planning decisions • Encourage partnership with green infrastructure groups and resources like the Chicago Wilderness Green Infrastructure Vision and Sustainable Watershed Action Teams (SWAT)	Phase I	Homer Glen HTHD	Municipalities adopt green infrastructure practices as part of their development plans, permits and ordinances. Developers follow recommended practices in new and retrofitted developments. More stormwater is infiltrated, water quality is improved, problematic flooding is reduced, and wildlife habitat is preserved	n/a

Abbreviation	Entity
LDPEP	Lower Des Plaines Ecosystem Partnership
HTHD	Homer Township Highway Department
NRCS	National Resources Conservation Service
LRCWPC	Long Run Creek Watershed Planning Committee



8.0 PLAN IMPLEMENTATION

8.1 PLAN IMPLEMENTATION ROLES & COORDINATION/ RESPONSIBILITIES

Identification of responsible entities for implementation of Management Measure recommendations was first mentioned in the Action Plan section of this report. These entities are key stakeholders that will be responsible in some way for sharing the responsibility required to implement the Watershed-Based Plan. However, no single stakeholder has the financial or technical resources to implement the plan alone. Rather, it will require working together and using the strengths of individual stakeholders to successfully implement this plan. Key stakeholders are listed in Table 46. Appendix E includes additional information about each stakeholder and possible roles.

There are several important first steps that the Long Run Creek Watershed Planning Committee (LRCWPC) partners will need to accomplish prior to plan implementation.

1. Watershed partners are encouraged to adopt and/or support (via a resolution) the Long Run Creek Watershed-Based Plan.
2. The partners will need to recruit "champions" within each municipality and other stakeholder groups to form a Watershed Implementation Committee that actively implements the Watershed-Based Plan and conducts progress evaluations.
3. The watershed partners may also need to hire and fund a Watershed Implementation Coordinator or find an employee internally to follow through on plan implementation.

Table 46. Key Long Run Creek watershed stakeholders/partners.

Key Watershed Stakeholder/Partner	Acronym/Abbreviation
City of Lockport	Lockport
Commonwealth Edison Company	ComEd
Enbridge, Inc.	Enbridge
Forest Preserve District of Cook County	FPDCC
Forest Preserve District of Will County	FPDWC
Lower Des Plaines Ecosystem Partnership	LDPEP
Golf Courses	GC
Hanson Material Service	HMS
Homer Township Highway Department	Homer Twp
Illinois, Cook County, and Will County Dept. of Transportation	DOTs
Illinois Department of Natural Resources	IDNR
Illinois Nature Preserves Commission	INPC
Illinois Environmental Protection Agency	Illinois EPA
Lemont Township & Highway Department	Lemont Twp
Long Run Creek Watershed Planning Committee	LRCWPC
US Fish & Wildlife Service	USFWS
Village of Homer Glen	Homer Glen
Village of Lemont	Lemont
Village of Orland Park	Orland Park
Village of Palos Park	Palos Park
Will County Planning & Zoning Commission	WCPZC
Will County Stormwater Management Planning Committee	WCSMPC
Will-South Cook Soil and Water Conservation District	SWCD

8.2 IMPLEMENTATION SCHEDULE

The Watershed Implementation Committee should try to meet at least quarterly each year to guide the implementation of the Long Run Creek Watershed-Based Plan. The development of an implementation schedule is important in the watershed planning process because it provides a timeline for when each recommended Management Measure should be implemented in relation to others. High Priority Critical Area projects, for example, are generally scheduled for implementation in the short term. A schedule also helps organize project implementation evenly over a given time period, allowing reasonable time availability for developing funding sources and opportunities.

For this plan, each "Site Specific Management Measure" recommendation located in the Management Measures Action Plan (see Section 6.0) contains a column with a recommended "Implementation Schedule" based on the short term (1-10 years) for High Priority Critical Areas and 10-20+ years for medium and low priority project recommendations. Other recommendations such as maintenance activities have ongoing or as needed schedules. Some projects that are high priority could be recommended for long term implementation based on selected practices, available funds, technical assistance needs, and time frame. In addition, the "Information & Education" plan (see Section 7.0) is designed to be completed over three phases spanning five years. Finally, the "Monitoring Plan" is designed to be conducted and evaluated every five years to determine if progress is being made toward achieving plan goals and objectives.

8.3 FUNDING SOURCES

Opportunities to secure funds for watershed improvement projects are widespread due to the variety and diversity of Management Measure recommendations found in the Action Plan. Public and private organizations that administer various conservation and environmental programs are often eager to form partnerships and leverage funds for land preservation, restoration, and environmental education. In this way, funds invested by partners in Long Run Creek watershed can be doubled or tripled, although actual dollar amounts are difficult to measure. A list of potential funding programs and opportunities is included in Appendix F. The list was developed by Applied Ecological Services, Inc. (AES) through involvement in other watershed and ecological studies.

Funds generally fall into two relatively distinct categories. The first includes existing grant programs, funded by a public agency or by other sources. These funds are granted following an application process. The IEPA Nonpoint Source Management Program (Section 319 Grants) is an example: an applicant will submit a grant application to the program, and, if the proposed project meets the required criteria and if the funds appropriated have not been exhausted, a grant may be awarded.

The second category, one that can provide greater leverage, might be called "money to be found." The key to this money is to recognize that any given project may have multiple benefits. It is important to note and explore all of the potential project benefits from the perspective of potential partners and to then engage those partners. Partners may wish to become involved because they believe the project will achieve their objectives, even if they have little interest in the specific objectives of the Watershed-Based Plan.

It is not uncommon for an exciting and innovative project to attract funds that can be allocated at the discretion of project partners. When representatives of interested organizations gather to talk about a proposed project, they are often willing to commit discretionary funds simply because the proposed project is attractive, is a priority, is a networking opportunity, or will help the agency achieve its mission. In this way, a new partnership is assembled.

Leveraging and Partnerships

It is critically important to recognize that no one program has been identified that will simply match the overall investment of the Long Run Creek watershed partners in implementing the Watershed-Based Plan. Rather, partnerships are most likely to be developed in the context of individual and specific land preservation, restoration, or education projects that are recommended in the Plan. Partners attracted to one acquisition may not have an interest in another located elsewhere for jurisdictional, programmatic, or fiscal reasons.

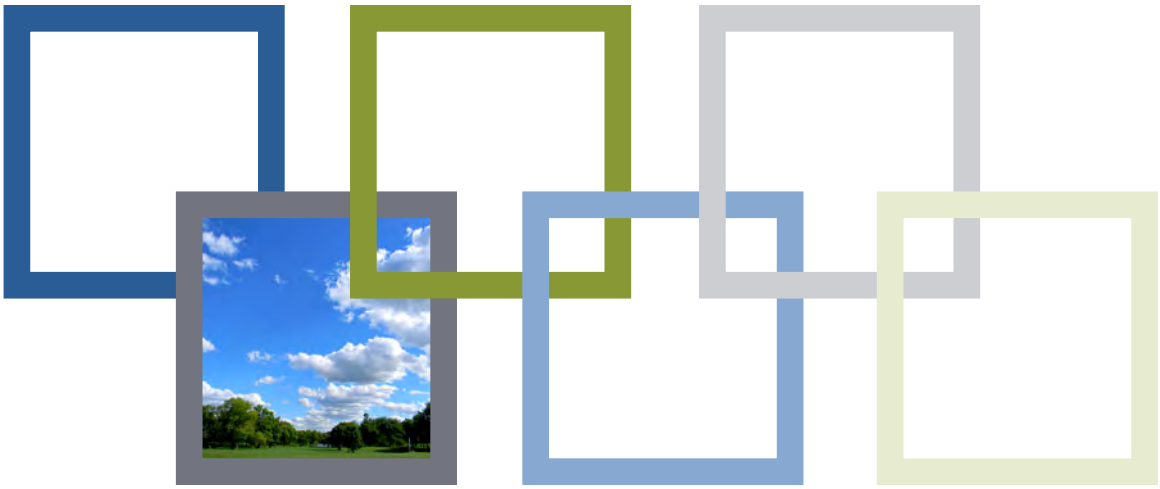
Almost any land or water quality improvement project ultimately requires the support of those who live nearby if it is to be successful over the long term. Local neighborhood associations, homeowner associations, and similar groups interested in protecting water resources, open space, preventing development, or protecting wildlife habitat and scenic vistas, make the best partners for specific projects. Those organizations ought to be contacted in the context of specific individual projects.

It is equally important to note that the development of partnerships that will leverage funding or goodwill can be, and typically is, a time-consuming process. In many cases, it takes more time and effort to develop partnerships that will leverage support for a project than it does to negotiate with the landowners for use or acquisition of the property. Each protection or restoration project will be different; each will raise different ecological, political and financial issues, and each will in all likelihood attract different partners. It is also likely that the process will not be fully replicable. That is, each jurisdiction or partner will have a different process and different requirements.

In short, a key task in leveraging additional funds is to assign responsibility to specific staff or for developing relationships with individual agencies and organizations, recognizing that the funding opportunities might not be readily apparent. With some exceptions, it will not be adequate simply to write a proposal or submit an application; more often, funding will follow a concerted effort to seek out and engage specific partners for specific projects, fitting those projects to the interests of the agencies and organizations. Successful partnerships are almost always the result of one or two enthusiastic individuals or "champions" who believe that engagement in this process is in the interests of their agency. There is an old

adage in private fundraising: people give to other people, not to causes. The same thing is true with partnerships using public funds.

Partnerships are also possible, and probably necessary, that will leverage assets other than money. By entering into partnerships with some agencies, organizations, or even neighborhood groups, a stakeholder will leverage valuable goodwill, and relationships that have the potential to lead to funds and other support, including political support, from secondary sources.



9.0 MEASURING PLAN PROGRESS & SUCCESS

A monitoring plan and evaluation component is an essential step in the watershed planning process to evaluate plan implementation progress over time. This watershed plan includes two monitoring/ evaluation components:

1. The "Water Quality Monitoring Plan" includes methods and locations where monitoring should occur and a set of criteria (indicators & targets) used to determine whether impairment reduction targets and other watershed improvement objectives are being achieved over time.

2. "Report Cards" for each plan goal were developed that include interim, measurable milestones linked to evaluation criteria that can be evaluated by the planning committee over time.

9.1 WATER QUALITY MONITORING PLAN & EVALUATION CRITERIA

Background Information

Available water quality data collected within Long Run Creek watershed is summarized in Section 4.1. The most recent chemical water quality data for Long Run Creek was collected in 2012 by Applied Ecological Services, Inc. (AES) as part of this planning effort. Other recent data includes that collected by Integrated Lakes Management, Inc. (ILM) in 2007 and 2008. The Illinois EPA has not sampled Long Run Creek since 1997 but is actively monitoring water quality in Tampier Lake. As recently as

2012, Long Run Creek was not 303(d) listed and fully supports "*Aquatic Life*" Designated Use according to Illinois EPA. More recent data, however, suggest moderate impairment to Long Run Creek via elevated phosphorus, nitrogen, and total suspended solid levels. Tampier Lake appears on the Illinois EPA's 303(d) impaired waters list in 2012. Illinois EPA lists total suspended solids (TSS), phosphorus, aquatic plants, and aquatic algae as the causes of impairment to the "*Aesthetic Quality*" Designated Use of the lake. As a result, Illinois EPA completed a Total Maximum Daily Load (TMDL) study/report for Tampier Lake in March 2010.

The following monitoring plan recommendations should be implemented to measure changes in watershed impairments related primarily to water quality. Water quality monitoring is performed by first collecting physical, chemical, biological, and/or social indicator data. This data is then compared to criteria (indicators & targets) related to established water quality objectives.

The water quality monitoring plan is designed to; 1) capture snapshots of water quality within Long Run Creek, various tributaries to Long Run Creek, and Tampier Lake through time; 2) assess changes in water quality following implementation of Management Measures, and 3) assess the public's social behavior related to water quality issues. **It is important that all future monitoring be completed using protocol and methods used by the Illinois EPA for QAQC purposes.** Illinois EPA Quality Assurance Project Plans (QAPPs) and Standard Operating Procedures (SOPs) can be found at http://www.epa.state.il.us/water/water-quality/methodology/index.html.

Monitoring Plan Implementation

Procedures by which physical, chemical, and biological monitoring data should be collected in the watershed, recommended monitoring locations, monitoring entity, monitoring frequency, and expected costs are outlined in Table 47. Figure 64 includes the location of all existing and new recommended monitoring locations. Note: monitoring locations related to individual Management Measures are not described as this monitoring will come later when projects are implemented.

Physical and Chemical Monitoring Methods & Recommendations

Physical and chemical monitoring of water can be time consuming and expensive depending on the complexity of the monitoring program. Usually the budget and/or personnel available for monitoring limit the amount of data that can be collected. Therefore, the monitoring program should be developed to maximize the usable data given the available funding and personnel. Any monitoring program should be flexible and subject to change to collect additional information or use newer equipment or technology when available.

Streams and Seeps

Many different parameters can be included in physical monitoring of water quality in streams and seeps. Measurements of temperature, pH, conductivity, dissolved oxygen, and turbidity should be collected in the field for any monitoring done on Long Run Creek, tributaries, or seeps at Long Run Seep Nature Preserve using portable instruments. The measurements can then be recorded on data sheets in the field or the units can be taken back to the lab and the data downloaded.

Chemical parameters tested for in streams and seeps should generally include those outlined in Table 48. Unlike physical monitoring, chemical monitoring requires grab samples be collected and taken to certified labs for analysis. Future chemical monitoring in Long Run Creek, tributaries, and seeps should include 5-10 samples at each location measured during base flow and again after significant (1.5 inches) storm events then compared to target water quality values.

Table 47. Recommended water quality and biological monitoring programs/locations.

Waterbody/ Location	Monitoring Entity/Program	Monitoring Location (See Figure 64)	Monitoring Frequency	Parameters Tested	Cost to Implement
Existing Recommended Monitoring Programs					
Long Run Creek	Illinois EPA/ IDNR Facility Related Stream Survey Program	1 site off High Rd. (IEPA # GHE-01)	Every 5 years	Physical; Chemical; Biological	Not Applicable
Tampier Lake	Illinois EPA Ambient Lakes Monitoring Program	3 sites on Tampier Lake (IEPA # RGZO 1-3)	Every 5 Years	Physical; Chemical	Not Applicable
New Recommended Monitoring Programs					
Long Run Creek, Trib M, Trib F	Long Run Creek Watershed Planning Committee	5 sites: LRC & Trib M (High Rd.), Trib F (Maple Ave.), LRC (Cedar Rd. & Will-Cook Rd.)	Every five years	Chemical	$10,000 each 5-year cycle
Derby Meadows & Chickasaw Hills WWTPs	Illinois American-Waste Water Treatment Plants	2 Outfalls to Long Run Creek	One time per month	Chemical (Nitrogen & Phosphorus)	$6,000 per year
Long Run Creek	Illinois RiverWatch	3 sites: Long Run Creek (High Rd., Cedar Rd., & Will-Cook Rd.)	Every five years	(Macroinverts)	Not Applicable
Long Run Seep Nature Preserve	Private Consultant and/ or Illinois DNR	Seeps/springs at Long Run Seep Nature Preserve	Every five years minimum	Chemical; Discharge; Biological (HED)	$20,000 every 5-year cycle
Individual	Stakeholder in cooperation with Environmental Consultants	Varies: Specific to each measure	Pre and post project	Physical, Chemical, and Biological	$5,000 for each measure

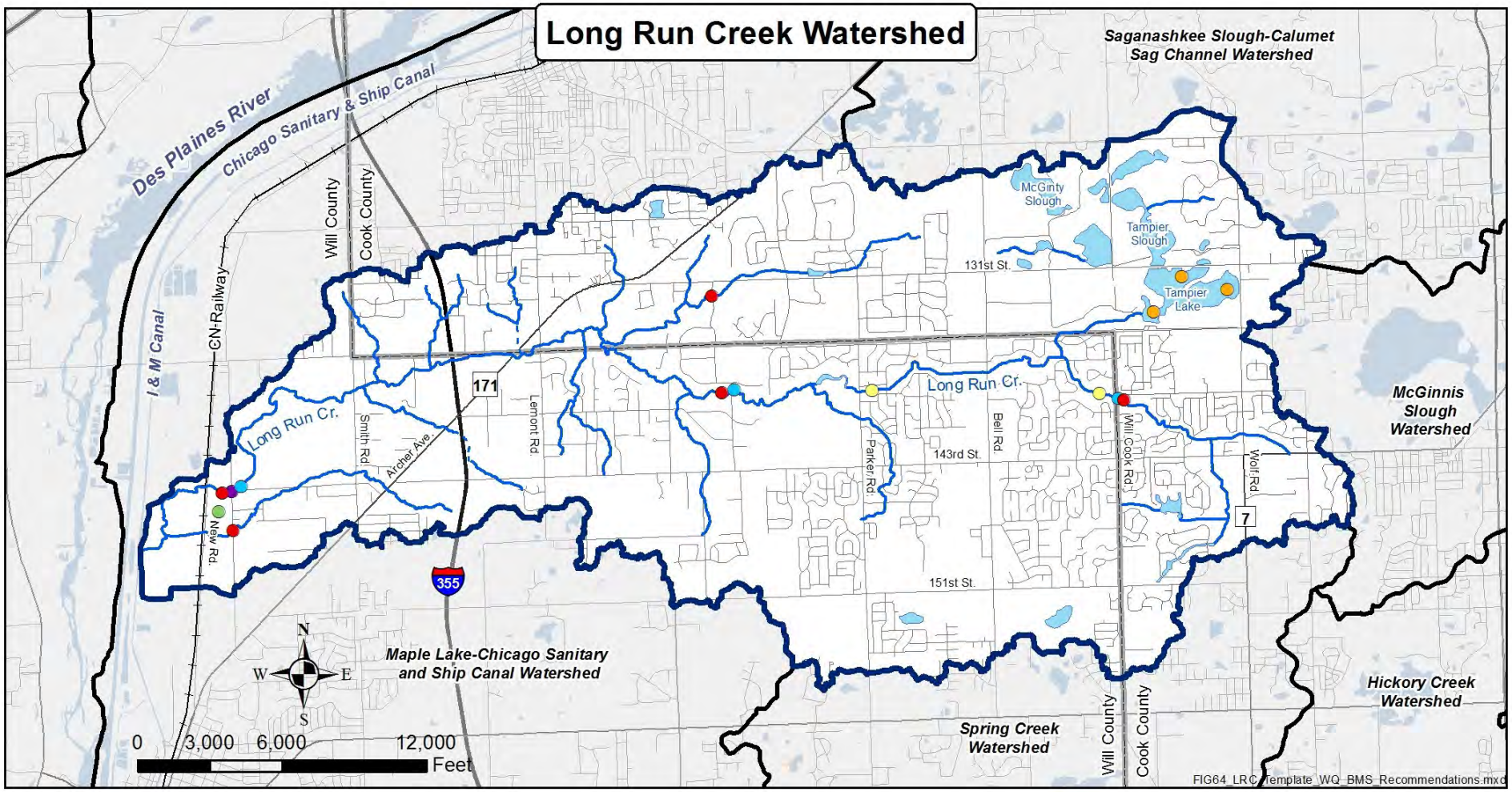


Figure 64

Applied Ecological Services, Inc.

Fig. 64: Recommended Water Quality and Biological Monitoring Locations

Legend

- Roads
- Streams & Tributaries
- Stream Break
- Significant Open Water
- LRC Watershed Boundary
- Adjacent Watershed
- County Boundary

Monitoring Entity

- Derby Meadows & Chickasaw Hills WWTPs
- IEPA ALMP
- IEPA/IDNR
- IL RiverWatch
- LRCWPC
- Private Consultant and/or IDNR

Data Sources: AES

It is also important to obtain discharge calculations when monitoring pollutant loading in streams. Fortunately, a USGS gage station is currently located on Long Run Creek at Lemont Rd. The gage station is able to measure the vertical height of the gage and stream flow throughout time. Flow can then be inferred from gage height readings. Real time data for the gage station at Lemont Road can be found at http://waterdata.usgs.gov/usa/nwis/rt and should be used to accurately time post storm event sampling by striving to collect samples as the water levels in Long Run Creek are rising but prior to cresting. Future monitoring of discharge from seeps at Long Run Seep Nature Preserve will be important to better understand the conditions needed by Hine's Emerald Dragon fly larval populations.

It is crucial to collect representative water samples using careful handling procedures. Unrepresentative samples or samples contaminated during collection or handling are often useless. The collected samples should be submitted for analysis to a laboratory certified by the National Environmental Laboratory Accreditation Conference (NELAC). Alternatively, money can be saved by having one of the Long Run Creek Watershed Planning Committee partners analyze samples using a municipal water treatment plant lab if it has the proper certification. Generally, the laboratory will work closely with the monitoring entity to assure that the samples are collected in the proper containers with preservatives for the parameter of interest. The laboratory usually provides the containers, ice chests for transport, labels, and chain-of-custody forms to the client as part of their service.

Table 48. Physical & chemical stream monitoring parameters, collection, and handling procedures.

Parameter	Statistical, Numerical, or General Use Guideline	Container	Volume	Preservative	Max. Hold Time
Physical Parameters Measured in Field					
pH	>6.5 or <9.0	These parameters are measured in the field			
Conductivity	<1,667 µmhos/cm				
Dissolved Oxygen	>5.0 mg/l				
Temperature	<90 F				
Turbidity	<14 NTU				
Chemical & Physical Parameters Analyzed in Lab					
Total Suspended Solids	<12 mg/l	Plastic	32 oz	Cool 4° C	7 days
Biochemical Oxygen Demand	<5.0 mg/l	Plastic	32 oz	Cool 4° C	48 hours
Nitrate-Nitrite Nitrogen	<15.0 mg/l	Plastic	4 oz	Cool 4° C 20% Sulfuric Acid	28 days
Total Kjeldahl Nitrogen*		Plastic	32 oz	Cool 4° C 20% Sulfuric Acid	28 days
Total Phosphorus	<0.0725 mg/l: Streams <0.05 mg/l: Lakes	Plastic	4 oz	Cool 4° C 20% Sulfuric Acid	28 days
Chloride	<500 mg/l	Plastic	32 oz	Cool 4° C	28 days

* TKN measures organic nitrogen and ammonia-nitrogen in the sample. TKN + nitrate-nitrogen equal total nitrogen of the sample.

Two new recommended chemical monitoring programs are recommended for Long Run Creek Watershed (Table 47). The first and most important monitoring effort should be implemented as a cooperative effort between the LRCWPC partners and occur every 5 years at five separate stream locations as shown on Figure 64. Monitoring at these key locations will yield data over time that will help indicate if pollutants in the watershed are being reduced to target levels, are staying the same, or increasing.

The second recommended chemical monitoring effort should be conducted by Illinois American Water Company at their Derby Meadows and Chickasaw Hills WWTPs. It has been determined via this watershed study that combined, these treatment plants contribute to over 65% of the total nitrogen loading and over 56% of the total phosphorus loading. However, the Illinois EPA does not require or regulate monitoring for total nitrogen and total phosphorus via the NPDES permits that are currently in place. By monitoring these two parameters once a month at effluent outfalls, Illinois American could better understand their contribution of pollutants in the watershed and leverage interest in plant upgrades and work with stakeholders to reduce pollutant loading.

Lakes

Most water quality samples related to pollutant loading are obtained from streams because the data provides estimates of pollutant loading following storm events. In lakes however, the water is usually slow to cycle through the system and different techniques are needed to assess water quality. In addition to collecting many of the parameters included in Table 48, biologists and limnologists often use "productivity" of a lake to assess its health. Productivity is measured via the Trophic State Index (TSI), an index that uses phosphorus and chlorophyll concentrations as the primary means to assess lake health. The state of Illinois set the standard for Total Phosphorus (TP) at 0.05 mg/l for lakes. When phosphorus levels exceed 0.05 mg/l, lake-wide algal blooms can occur leading to decreased water clarity, decreased light penetration, and increased total suspended solids.

The work required to collect physical and chemical data and develop TSI values for Tampier Lake is currently being done by Illinois EPA under the Ambient Lakes Monitoring Program (ALMP). This monitoring should continue in the future on a five year cycle and be used to determine if established TMDL limits are being met.

Biological Monitoring Methods and Recommendations

The Illinois EPA uses biological data for determining "Aquatic Life" Use Attainment in streams because fish and macroinvertebrates are relatively easy to sample/identify and reflect specific and predictable responses to human induced changes to the landscape, stream habitat, and water quality.

Two indices have been developed that measure water quality using fish and macroinvertebrates - fish Index of Biotic Integrity (fIBI) and Macroinvertebrate Biotic Index (MBI). These indices are best applied prior to a project such as a stream restoration to obtain baseline data and again following restoration to measure the success of the project. Or, they can be conducted simply to assess resource quality in a stream or tributary reach.

It is also important to note that monitoring recommendations in Table 47 include monitoring Hine's Emerald Dragonfly (HED) populations at Long Run Seep Nature Preserve at least every 5 years to understand larval populations in particular but also, in combination with chemical and discharge monitoring, to gain a better idea of the requirements needed to sustain the HED population. Population augmentation via captive-rearing should also be explored as recommended by USFWS.

Fish Index of Biotic Integrity (fIBI)

The fIBI is designed to assess water quality and biological health directly through several attributes of fish communities in streams. After the fish have been collected using electrofishing equipment and identified, the data is used to evaluate 12 metrics and a rating is assigned to each metric based on whether it deviates strongly from, somewhat from, or closely approximates the expected values found in a high quality reference stream reach. The sum of these ratings gives a total IBI score for the site. The best possible IBI score is 60. The Illinois EPA has determined that a score less than 41 indicates a stream is not fully supporting for "Aquatic Life" (Table 49). A manual for calculating IBI scores for streams in Illinois is available from Illinois DNR.

The only ongoing analysis of fIBI values is included as part of the Illinois EPA/ Illinois DNR Facility Related Stream Survey Program that was last implemented in 1997 but that should occur every five years in the watershed. No additional ongoing fIBI

Biologists collecting fish in stream. Source: www.state.nj.us.

monitoring recommendations are made due to high costs. Where possible however, fish sampling and calculation of fIBI values should be built into future stream restoration projects.

Macroinvertebrate Biotic Index (MBI)

The MBI is designed to rate water quality using aquatic macroinvertebrate taxa tolerance to degree and extent of organic pollution in streams. The MBI is calculated by taking an average of tolerance ratings weighted by the number of individuals in the sample. The Illinois EPA has determined that an MBI score greater than 5.9 indicates a stream is not fully supporting "Aquatic Life" (Table 49). A manual for collecting and calculating MBI scores for streams is available from Illinois EPA. Two new recommended chemical monitoring programs are recommended for Long Run Creek Watershed (Table 47).

Under the Illinois RiverWatch program, macroinvertebrates at two sites on Long Run Creek (Cedar Rd. & Lemont Rd.) were analyzed between 1998 and 2001. It is recommended that future monitoring by RiverWatch occur at three different sites every five years in order to capture data that better reflects the impact of pollutants originating from WWTPs (Table 47; Figure 64).

Table 49. Illinois EPA indicators of aquatic life impairment using MBI and fIBI scores.

Biological Indicator	MBI and fIBI Scores		
MBI	> 8.9	5.9 < MBI < 8.9	≤ 5.9
fIBI	≤ 20	20 < IBI< 41	≥ 41
Impairment Status - Use Support - Resource Quality			
Impairment Status	Severe Impairment	Moderate Impairment	No Impairment
Designated Use Support	Not Supporting	Not Supporting	Fully Supporting
Resource Quality	Poor	Fair	Good

Source: Integrated Water Quality Report (2010).

Habitat Monitoring Methods and Recommendations

Stream habitat assessments comprise a major component of physical water quality monitoring. Many habitat assessment methods are available for assessing streams such as those developed by Illinois DNR and Ohio EPA. The Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA is a quick, accurate, and straightforward analysis with dependable and repeatable results found to correlate well with biological integrity of streams in the Midwest. The QHEI is also used by the Illinois EPA to assess "*Aquatic Life*" Use Attainment in streams. It is composed of six criteria that are scored individually then summed to provide the total QHEI score. The best possible score is 100. QHEI scores from hundreds of stream segments indicate that habitat values greater than 60 generally support average quality warm-water fauna. Scores greater than 80 typify pristine habitat conditions that have the ability to support exceptional warm-water fauna (Ohio EPA 1999). Areas with habitat scores lower than 60 may support warm-water fauna but usually exhibit significant degradation. Table 50 summarizes QHEI score classifications. Stream restoration projects should strive to create conditions that produce QHEI scores of at least 60.

The index should be used on any stream reach and on stream restoration projects to document improvements. Prior to stream restoration, a QHEI evaluation should be completed by the project ecologist or engineer. A follow-up QHEI for comparison purposes should be conducted by the same ecologist/engineer at least 2-4 years following project implementation after plant material grows and in-stream structures have had time to perform. QHEI forms and a narrative explaining how to use the index can be located on the web at http://rock.geo.csuohio.edu/norp/qhei.htm.

Social Indicators of Water Quality

Quantifying social indicators of success in a watershed planning initiative is difficult. It is subjective to a large degree and complaints about poor conditions are often heard rather than compliments on improvements. The Great Lakes Regional Water Program (GLRWP), a leading organization that addresses water quality research, education, and outreach in Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin, defines social indicators as standards of comparison that describe the context, capacity, skills, knowledge, values, beliefs, and behaviors of individuals, households, organizations, and communities at various geographic scales. The GLRWP suggests that social indicators used in water quality management plans and outreach efforts are effective for several reasons including:

- Help watershed committee evaluate projects related to education and outreach;
- Help support improvement of water quality projects by identifying why certain groups install Management Measures while other groups do not;
- Measure changes that take place within grant and project timelines;
- Help watershed committee with information on policy, demographics, and other social factors that may impact water quality;
- Measure outcomes of water quality programs not currently examined.

GLRWP has developed a Social Indicators Data Management and Analysis Tool (SIDMA) to assist watershed stakeholders with consistent measures of social change by organizing, analyzing, and visualizing social indicators related to non-point source (NPS) management efforts. Detailed information about GLRWP's social indicator tool can be found at: http://35.8.121.111/si/Home.aspx.

Table 50. QHEI score classes and characteristics.

QHEI	Class	Usual Characteristics
80-100	Excellent	Comparable to pristine conditions; exceptional assemblage of habitat types; sufficient riparian zone
60-79	Good	Impacts to riparian zone
30-59	Fair	Impacts to riparian zone; channelization; most in-stream habitat gone
0-29	Poor	All aspects of habitat in degraded state

Figure 65. Steps to measure social indicators.

To summarize, the SIDMA tool uses a seven step process to measure social indicators as shown in Figure 65.

Several potential social indicators could be evaluated by the LRCWPC using different strategies to assess changes in water quality. For example, surveys, public meetings, and establishment of interest groups can give an indication of the public feelings about the water quality in the watershed. It is important to involve the public in the water quality improvement process at an early stage through public meetings delineating the plans for improvement and how it is going to be monitored. Table 51 includes a list of potential social indicators and measures that can be used by the watershed committee to evaluate the social changes related to water quality issues.

Table 51. Social indicators and measures to understand behavior toward watershed issues.

Social Indicator	Measure
Media Coverage	• # of radio broadcasts related to watershed protection • # of newspaper articles related to watershed protection • # of press releases relate to watershed protection • # of social media posts related to watershed protection
Resident Awareness	• # of residents who are aware a watershed plan exists • % of residents who know where water from their property drains • # of residents who attend municipal meetings • # of residents participating in Geocaching within the watershed • # of residents attending "Volunteer Days" and workshops • # of HOAs that manage natural areas appropriately • # of informational flyers distributed per given time period
Watershed Management Activities	• # of watershed signage along roads • # of schools helping implement the watershed monitoring plan • # of residents that perform ecological restoration on their properties • # of stream miles cleaned up per year • # of Green Infrastructure Parcels protected during development • # of linear feet or miles of trails created or maintained each year • # of watershed partners who adopt the watershed management plan

Monitoring social indicators in the watershed will be the responsibility of the LRCWPC. On-line internet surveys are among the most popular method to gauge social behavior. A survey should be developed that identifies residents' perceptions of water quality problems and protection strategies. Citizens that respond to the survey should be given a chance to donate a small amount of money ($1 for example) to a non-profit environmental group. Then thank you letters should be sent to those that responded, while those that did not respond should be sent a second survey. The results of the survey can be used to develop appropriate media, citizen awareness, and watershed management activities to improve social behavior.

Water Quality Evaluation Criteria

Water quality criteria (expressed as measurable indicators & targets) have been developed so that water quality objectives can be evaluated over time. The criteria are designed to be compared against data gathered from the Monitoring Plan and other data then analyzed to determine the success of the watershed plan in terms of protecting and improving water quality. These criteria also support an adaptive management approach by providing ways to reevaluate the implementation process if adequate progress is not being made toward achieving water quality objectives.

Section 2 of this plan includes a water quality goal (Goal 3) with eleven objectives. Criteria are selected for each water quality objective to determine whether components of the water quality goal are being met (Table 52). Criteria are based on Illinois EPA water quality criteria, data analysis, reference conditions, literature values, and/or expert examination. Criteria are also designed to address potential or known sources of water quality impairment identified in Section 5. Future evaluation of the criteria will allow the LRCWPC to gage plan implementation success or determine if there is a need for adaptive management. Note: evaluation criteria are included for the water quality goal only; criteria for other plan goals are examined within the appropriate progress evaluation "Report Cards" in Subsection 9.2.

Table 52. Set of criteria related to the water quality goal and objectives.

GOAL 3: Improve Surface Water Quality to Meet Applicable Standards.	
Water Quality Objective	**Criteria: Indicators and Targets**
1) Incorporate nutrient removal technologies into future upgrades for Derby Meadows & Chickasaw Hills WWTPs that reduce effluent TP to <1.0 mg/l and total nitrogen to <5.5 mg/l.	• *Chemical Water Quality Standards:* <1.0 mg/l TP and <5.5 mg/l TN in effluent based on average of monthly water quality samples.
2) Stabilize 26,789 linear feet of highly eroded streambank located along six "High Priority-Critical Area" stream reaches.	• *Number of Restored Streambank Reaches:* All six "High Priority-Critical Area" stream reach restoration projects implemented. • *Chemical & Physical Water Quality Standards:* <19 mg/l TSS, <0.0725 mg/l TP, and <2.461 mg/l TN in stream water quality samples. • *Biotic Indexes:* Macroinvertebrate and fish communities achieve at least "Fair" resource quality based on MBI & fIBI scores respectively. • *Social Indicator:* >50% of surveyed residents know that streambank erosion is a problem in the watershed and support streambank stabilization efforts.
3) Restore 14,966 linear feet of buffer along four "High Priority-Critical Area" riparian areas.	• *Number of Riparian Restorations:* All four "High Priority-Critical Area" riparian areas are restored. • *Chemical & Physical Water Quality Standards:* <19 mg/l TSS, <0.0725 mg/l TP, and <2.461 mg/l TN in stream water quality samples. • *Social Indicator:* >50% of surveyed residents know importance of restoring riparian areas.
4) Install a vegetated buffer along 9,650 linear feet of Tampier Lake shoreline at "High Priority-Critical Area."	• *Linear Feet of Lake Buffer Restoration:* At least 75% (7,237 lf) of buffer restored. • *Chemical & Physical Water Quality Standards:* <0.05 mg/l TP in lake water quality samples. • *Trophic State Index:* Trophic State does not exceed "Eutrophic" in Tampier Lake. • *Social Indicator:* >50% of surveyed lake users recognize the importance of having a natural buffer around the lake.
5) Restore 355 acres of wetland at thirteen "High Priority-Critical Area" wetland restoration sites.	• *Number of Wetland Restorations:* At least 6 of 13 "High-Priority-Critical Area" wetland restoration projects are implemented. • *Social Indicator:* >50% of surveyed residents know the importance of wetlands and support wetland restoration projects.
6) Retrofit 21 "High Priority-Critical Area" detention basins.	• *# of Detention Basin Retrofits:* >75% (16 of 21) "High Priority-Critical Area" detention basins are retrofitted. • *Social Indicator:* >50% of surveyed stakeholders understand the water quality and habitat benefits created by retrofitting detention basins with native vegetation.
7) Implement conservation tillage (no till) farming practices on 13 sites (1,282 acres) identified as "High Priority-Critical Area" cropland.	• *# of Sites in No Till:* Greater than 641 acres (>50%) of "High Priority-Critical Area" cropland in no till. • *Social Indicator:* >75% of farmers know the importance of no till farming for reducing pollutants to Long Run Creek.
8) Implement manure reduction practices on two sites (24 acres) identified as "High Priority-Critical Area" livestock operations.	• *# of Sites under Manure Management:* Two sites identified as "High Priority-Critical Area" livestock operations follow manure management plans. • *Social Indicator:* 100% of farmers know the importance of manure management for reducing pollutants to Long Run Creek.
9) Decrease the use of phosphorus in agricultural, commercial, and residential fertilizing based on soil testing and Illinois Phosphorus Law.	• *Chemical Water Quality Standards:* <0.0751 mg/l TP in streams and <0.05 mg/l TP in Tampier Lake based on water quality samples. • *Social Indicator:* >25% of surveyed residents, farmers, and businesses know the current phosphorus level of their lawns and apply phosphorus based on these levels.
10) Identify all septic systems in violation of county ordinance requirements and implement maintenance or adequate sizing.	• *% of Septic Violations Addressed:* >50% of septic system violations are addressed per year. • *Social Indicator:* >75% of surveyed residents and businesses understand the importance of maintaining septic systems for improved water quality.
11) All municipalities in the watershed implement a minimum bi-weekly street sweeping program.	• *# of Municipalities with Programs:* >75% of municipalities implement at least bi-weekly street sweeping program. • *Social Indicator:* >75% of surveyed residents understand why tax dollars are spent on street sweeping to improve water quality.

9.2 GOAL MILESTONES/ IMPLEMENTATION & PROGRESS EVALUATION "REPORT CARDS"

Milestones are essential when determining if Management Measures are being implemented and how effective they are at achieving plan goals over given time periods. Tracking milestones allows for adaptive management whereby periodic plan updates and changes can be made if milestones are not being met.

Watersheds are complex systems with varying degrees of interaction and interconnection between physical, chemical, biological, hydrological, habitat, and social characteristics. Criteria that reflect these characteristics may be used as a measure of watershed health. Goals and objectives in the watershed plan determine which criteria should be monitored to evaluate the success of the watershed plan.

A successful watershed plan involves volunteer stakeholder participation to get projects completed, and must include a feedback mechanism to measure progress toward meeting goals. Watershed "Report Cards," developed specifically for each goal in this plan, provide this information. Each Report Card provides:

1. Summaries of current conditions for each goal to set the stage for what efforts are needed
2. Most important performance criteria related to goal objectives (see Section 2.0)
3. Milestones for various time frames (short term milestones were developed by LRCWPC)
4. Monitoring needs and efforts required to evaluate milestones
5. Remedial actions to take if milestones are not met
6. Notes section

Report Cards were developed for each of the six plan goals and are located at the end of this section. The milestones are based on "Short Term" (1-10 years; 2014-2024), "Medium Term" (10-20 years; 2024-2034), and "Long Term" (20+ years; 2034+) objectives. Grades for each milestone term should be calculated using the following scale: 80%-100% of milestones met = A; 60%-79% of milestones met = B; 40%-59% of milestones met = C; and < 40% of milestones met = failed.

Report Cards should be used to identify and track plan implementation to ensure that progress is being made towards achieving the plan goals and to make corrections as necessary. Lack of progress could be demonstrated in factors such as monitoring that shows no improvement, new environmental problems, lack of technical assistance, or lack of funds. In these cases the Report Card user should explain why other factors resulted in milestones not being met in the notes section of the Report Card.

Early on in the plan implementation process, the Long Run Creek Watershed Planning Committee (LRCWPC) should assign or hire a Watershed Implementation Coordinator to update the committee on plan implementation progress by way of the Report Cards. If needed, adaptive management should be implemented accordingly by referencing the adaptive management recommendations on each Report Card then developing a strategy to either change the milestone(s) or decide how to implement projects or actions to achieve the milestone(s).

Report Cards can be evaluated at any time. However, it is recommended that they be evaluated every five years to determine if sufficient progress is being made toward achieving milestones or if adaptive management is needed.

Goal 1 Report Card

Manage natural and cultural components of the identified Green Infrastructure Network.

Historic and Current Condition:

- The historic landscape was a mix of prairie, savanna, and marsh prior to European settlement in the 1830s.
- In 2012, residential areas were most common (7,231 acres; 44.4%) followed by agricultural (2,011 acres; 12%).
- The largest change of a land use/land cover is predicted to occur on agricultural land (-1,581 acres; -78%) in the next 30 years.
- A parcel level inventory found that open space comprises over 9,100 acres or nearly 54% of the watershed.
- 17 Important Natural Areas are found in the watershed; John J. Duffy Preserve is the largest at 1,614 acres.
- Future development patters will likely continue to degrade watershed conditions if Green Infrastructure is not protected.

Criteria/Targets to Meet Goal Objectives:

- All 5 municipalities incorporate Green Infrastructure Plan into Comprehensive Plans and development review maps.
- 100% of developments on "Critical Green Infrastructure Protection Areas" use Conservation/Low Impact Design.
- All 5 publically owned Important Natural Areas have/implement management plans.
- At least 5 of 7 golf courses within the Green Infrastructure Network incorporate natural landscaping.
- 3.0 miles of new trails are created that extend and connect within the Green Infrastructure Network.
- >50% of land owners along Long Run Creek and tribs take steps to manage land for green infrastructure benefits.

Goal/Objective Milestones:		**Grade**
1-10 Yrs: (Short)	1) Green Infrastructure Network is incorporated into 4 of 5 municipal Comp Plans & development reviews. 2) >50% of developments on "Critical Green Infrastructure Protection Areas" follow plan recommendations. 3) Management plans developed/implemented at John J. Duffy Preserve & Long Run Seep Nature Preserve. 4) 5 of 7 golf courses incorporates natural landscaping. 5) 1.0 mile of new trails is created. 6) Surveys show >30% of residents along LRC & tribs understand how their actions affect the watershed.	
10-20 Yrs: (Medium)	1) 75% of developments on "Critical Green Infrastructure Protection Areas" follow plan recommendations. 2) Management plans are developed/implemented at Homer Glen Marsh, Arbor Lake Park, and LRC Park. 3) 1.0 mile of new trails is created 4) Surveys show that >40% of residents along LRC & tribs begin to manage land for green infrastructure.	
20+ Yrs (Long)	1) 100% of developments on "Critical Green Infrastructure Protection Area" follow plan recommendations. 2) 1.0 mile of new trails is created. 3) Surveys show that >50% of residents along LRC & tribs begin to manage land for green infrastructure.	

Monitoring Needs/Efforts:

- Track number of communities that incorporate Green Infrastructure Network into Comp Plans and development reviews.
- Track developments on "Critical Green Infrastructure Protection Areas" that incorporate Conservation/Low Impact Design.
- Track number of management plans that are created & implemented on public natural areas.
- Track number and type of natural landscaping incorporated at golf courses.
- Track miles of new trails created in the watershed.
- Conduct surveys of residents along LRC & tributaries asking about their understanding of watershed issues practices used.

Remedial Actions:

- Meet with municipalities that do not include the Green Infrastructure Network in Comp Plans and development reviews.
- Investigate via FOIA reasons/decisions that were made for developments that did not incorporate GI recommendations.
- Determine limits of funding where management plans are not developed/implemented on public natural areas.
- Meet with golf course representatives to discuss possible low cost natural landscaping options.
- Meet with Com Ed and other owners of large open spaces to discuss possible trails.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 2 Report Card

Improve groundwater recharge to benefit public water supply and federally designated Hine's Emerald Dragonfly critical habitat.

Current Conditions:

- Aquifers found beneath Long Run Creek watershed consists of the deep Ancell Unit, Ironton-Galesville Unit, and Mt. Simon Unit. Shallow groundwater is found in the Quaternary Unit. Deep and Shallow aquifers are tapped for public use.
- There are currently seven active community groundwater wells in the watershed.
- ISWS studies suggest 800-1,500 foot drawdowns in deep aquifers by 2050.
- Endangered Hine's Emerald Dragonfly habitat in seeps at Long Run Seep Nature Preserve is threatened by contaminated groundwater and hydrology changes.
- In 2012, Illinois Nature Preserves Commission (INPC) petitioned Illinois EPA to designate the Groundwater Contribution Area to Long Run Seep Nature Preserve as a Class III Special Resource Groundwater Classification.
- "Traditional" development over the past 20 years generally did not incorporate groundwater infiltration practices.

Criteria/Targets to Meet Goal Objectives:

- 100% of HED mitigation dollars go towards projects that support Hine's Emerald Dragonfly critical habitat.
- 100% of developments located within the proposed Class III GCA incorporate stormwater infiltration practices.
- All municipalities adopt/support policy requiring developments to use infiltration within the proposed Class III GCA.
- A monitoring plan for Hine's Emerald Dragonfly is implemented at least every 5 years.
- 100% of new groundwater wells are modeled to predict impacts to Hine's Emerald Dragonfly critical habitat.

Goal/Objective Milestones:		**Grade**
1-10 Yrs: (Short)	1) 100% of HED mitigation dollars go toward improving HED critical habitat. 2) >75% of developments within the proposed Class III GCA incorporate stormwater infiltration practices. 3) All municipalities adopt policy requiring developments in Class III GCA to include stormwater infiltration 4) A monitoring plan for Hine's Emerald Dragonfly is implemented. 5) All new groundwater wells are modeled to determine impacts to Hine's Emerald Dragonfly critical habitat.	
10-20 Yrs: (Medium)	1) 100% of HED mitigation dollars go toward improving HED critical habitat. 2) 100% of developments within the proposed Class III GCA incorporate stormwater infiltration practices. 3) A monitoring plan for Hine's Emerald Dragonfly is implemented. 4) All new groundwater wells are modeled to determine impacts to Hine's Emerald Dragonfly critical habitat	
20+ Yrs: (Long)	1) 100% of HED mitigation dollars go toward improving HED critical habitat. 2) 100% of developments within the proposed Class III GCA incorporate stormwater infiltration practices. 3) A monitoring plan for Hine's Emerald Dragonfly is implemented. 4) All new groundwater wells are modeled to determine impacts to Hine's Emerald Dragonfly critical habitat.	

Monitoring Needs/Efforts:

- Track any impacts to HED critical habitat and where mitigation dollars are appropriated.
- Track development that uses stormwater infiltration when located within the proposed Class III GCA.
- Track number of municipalities that adopt policy requiring developments Class III GCA to include stormwater infiltration.
- Track monitoring efforts for Hine's Emerald Dragonfly.

Remedial Actions:

- Conduct FOIA requests to determine where HED impact mitigation dollars where appropriated and why.
- Conduct FOIA requests when developments in the Class III GCA do not incorporate stormwater infiltration practices.
- Meet with municipalities to review policy changes related to developments in Class III GCA.
- Determine limits of funding when an HED monitoring plan is not implemented.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 3 Report Card

Improve surface water quality to meet applicable standards.

Current Conditions:

- According to Illinois EPA (2012 Integrated Report), Long Run Creek is "Fully Supporting" for *Aquatic Life*. However, recent data suggests moderate impairment via high total phosphorus (TP), total nitrogen (TN), and total suspended solids (TSS).
- The majority of pollutants are originating from two WWTP's (TP & TN) and streambank erosion (TSS).
- Biological data suggests that Long Run Creek is moderately impaired but is still a "Fair" quality aquatic resource.
- According to Illinois EPA (2012 Integrated Report), Tampier Lake is "Fully Supporting" for *Aquatic Life* but "Not Supporting" for *Aesthetic Quality* caused by TSS, TP, aquatic plants, and aquatic algae.
- Illinois EPA completed a Total Maximum Daily Load (TMDL) for Tampier Lake in 2010.

Criteria/Targets to Meet Goal Objectives:

- WWTP upgrades reduce TP to <1.0 mg/l and TN to <5.5 mg/l TN in effluent.
- All six (26,789 lf) "High Priority-Critical Area" stream reaches restored.
- All four (14,966 lf) "High Priority-Critical Area" riparian areas restored.
- At least 50% (4,500 lf) of Tampier Lake "High Priority-Critical Area" buffer restored.
- At least 6 of 13 (50%) "High Priority-Critical Area" wetlands restored.
- At least 16 of 21 (75%) "High Priority-Critical Area" detention basins retrofitted.
- At least 641 acres (50%) identified as "High Priority-Critical Area" cropland uses conservation tillage (no till) farming.
- Two sites (24 acres) identified as "High Priority-Critical Area" livestock operations follow manure management plans.
- At least 25% of surveyed farmers, businesses, and residents use phosphorus levels based on soil testing and IL law.
- At least 50% of septic system violations are addressed each year.
- At least 4 of 5 (80%) municipalities implement a minimum bi-weekly street sweeping program.

Goal/Objective Milestones:		**Grade**
1-10 Yrs: (Short)	1) One of two WWTP's receive upgrades that reduce TP to <1.0 mg/l and TN to <5.5 mg/l TN. 2) At least two of six "High Priority-Critical Area" stream reaches is restored. 3) At least two of four "High Priority-Critical Area" riparian areas are restored. 4) At least 25% (2,400 lf) of buffer is restored along Tampier Lake shoreline. 5) At least 3 of 13 "High Priority-Critical Area" wetlands are restored. 6) At least 5 of 21 "High Priority-Critical Area" detention basins are retrofitted. 7) At least 256 acres (40%) of "High Priority-Critical Area" cropland is in no till. 8) Both "High Priority-Critical Area" livestock operations sites follow manure management plans. 9) At least 10% of surveyed farmers, businesses, & residents apply phosphorus based on soil testing & IL law. 10) At least 50% of septic system violations are addressed each year. 11) At least 2 of 5 (40%) municipalities implement a minimum bi-weekly street sweeping program.	
10-20 Yrs: (Medium)	1) Both WWTPs receive upgrades that reduce TP to <1.0 mg/l and TN to <5.5 mg/l TN. 2) At least three of six "High Priority-Critical Area" stream reaches are restored. 3) At least three of four "High Priority-Critical Area" riparian areas are restored. 4) At least 50% (4,500 lf) of buffer is restored along Tampier Lake shoreline. 5) At least 4 of 13 "High Priority-Critical Area" wetlands are restored. 6) At least 10 of 21 "High Priority-Critical Area" detention basins are retrofitted. 7) At least 50% (641 acres) of "High Priority-Critical Area" cropland is in no till. 8) At least 20% of surveyed farmers, businesses, & residents apply phosphorus based on soil testing & IL law. 9) At least 50% of septic system violations are addressed each year. 10) At least 4 of 5 (80%) municipalities implement a minimum bi-weekly street sweeping program.	
20+ Yrs: (Long)	1) All six "High Priority-Critical Area" stream reaches are restored. 2) All four "High Priority-Critical Area" riparian areas are restored. 3) At least 6 of 13 (50%) "High Priority-Critical Area" wetlands are restored. 4) At least 16 of 21 (75%) "High Priority-Critical Area" detention basins are retrofitted. 5) At least 25% of surveyed farmers, businesses, and residents apply fertilizer based on soil testing & IL law. 6) At least 50% of septic system violations are addressed each year.	

Monitoring Needs/Efforts:

- Track WWTP upgrades and monitoring results via FOIA requests.
- Track stream, riparian area, and Tampier Lake buffer restoration projects.
- Track wetland restoration project implementation and success.
- Track detention basin retrofit project implementation and success.
- Track acres of cropland in no till farming.
- Track manure management plan implementation.
- Conduct surveys of farmers, businesses, and residents to assess phosphorus use in fertilizers.
- Track septic system violations versus repairs via county records.
- Track municipalities that implement a street sweeping program.
- Monitor water quality in LRC and Tampier Lake per the "Monitoring Plan" in this report.

Remedial Actions:

- Contact Illinois EPA regarding potential to help fund WWTP upgrades.
- Locate Illinois EPA 319 grants that are being submitted for recommended stream, riparian, buffer, wetland, and detention basin projects and determine success rate.
- NRCS contact farmers to determine why they are not implementing no till or manure management practices.
- Contact Will/Cook Counties to determine why failing septic systems are not being addressed.
- Contact municipalities to determine why funding will not allow for street sweeping.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 4 Report Card

Create and/or update county and local policy to protect watershed resources.

Current Policy and Regulations:

- Land development is regulated by Will and Cook County Stormwater Ordinances.
- Other entities with watershed jurisdictional or technical advisory roles include the USACE, USFWS and IDNR, and the Will/Cook County Soil and Water Conservation District (SWCD).
- Most municipalities do not provide additional watershed protection beyond existing county stormwater ordinances.
- The Illinois EPA Bureau of Water regulates wastewater and stormwater discharges to streams and lakes via NPDES.

Criteria/Targets to Meet Goal Objectives:

- All 5 municipalities adopt or support (via a resolution) the Long Run Creek Watershed-Based Plan.
- All 5 municipalities update comp plans and zoning ordinances to include tools such as conservation/low impact design standards for all "High Priority-Critical Area" Green Infrastructure Protection Areas.
- All 5 municipalities develop funding sources for developments within the Green Infrastructure Network.
- All 5 municipalities encourage developers to protect and restore natural areas then donate these areas to appropriate long term manager with dedicated SSA funding.
- All 5 municipalities recommend infiltration practices within developments located w/in the proposed Class III GCA
- All 5 municipalities promote wetlands lost via development to be mitigated for within Long Run Creek Watershed.
- All 5 municipalities allow for native landscaping in local ordinances.
- At least 25% of surveyed stakeholders apply phosphorus only according to soil testing and IL law.

Goal/Objective Milestones:		**Grade**
1-10 Yrs: (Short)	1) At least 4 of 5 municipalities in the watershed adopt/support the Long Run Creek Watershed-Based Plan. 2) At least 4 of 5 municipalities include conservation/low impact design standards for all GIN areas. 3) At least 2 of 5 municipalities develop funding for developments in the GI Network. 4) At least 2 of 5 municipalities encourage developers to restore natural areas and donate with SSA funding 5) At least 3 of 5 municipalities recommend infiltration within developments in the Class III GCA. 6) At least 3 of 5 municipalities promote wetland mitigation to occur within Long Run Creek watershed. 7) All 5 municipalities allow for native landscaping in local ordinances. 8) At least 15% of surveyed stakeholders apply phosphorus based on soil testing and IL law.	
10-20 Yrs: (Medium)	1) All 5 municipalities in the watershed adopt the Long Run Creek Watershed-Based Plan. 2) All 5 municipalities include conservation/low impact design standards for all GI areas. 3) All 5 municipalities develop funding for developments in the GI Network. 4) All 5 municipalities encourage developers to restore natural areas and done with SSA funding. 5) All 5 municipalities recommend infiltration within developments in the Class III GCA. 6) All 5 municipalities promote wetland mitigation to occur within Long Run Creek watershed. 7) At least 20% of surveyed stakeholders apply phosphorus based on soil testing and IL law.	
20+ Yrs: (Long)	1) All five municipalities (100%) promote wetland mitigation within Long Run Creek watershed. 2) All five municipalities (100%) allow for native landscaping in local ordinances. 3) At least 25% of surveyed stakeholders apply phosphorus based on soil testing and IL law.	

Monitoring Needs/Efforts:

- Track number of municipalities that adopt the Long Run Creek Watershed-Based Plan and develop ordinances to allow native landscaping and protect GI via conservation and/or low impact development and Special Service Area (SSA) taxes.
- Track infiltration practices used within developments located within the Class III GCA.
- Track wetland losses from development and where mitigation occurs.
- Create and distribute stakeholder survey related to phosphorus use.

Remedial Actions:

- Meet with municipalities who do not adopt the plan and recommended policies to help them better understand the benefits of following GI recommendations, requiring SSA's, mitigating for wetland losses, etc.
- Work with NRCS to offer free soil testing related to phosphorus use if surveys indicate no positive change.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 5 Report Card

Manage and mitigate for existing and future structural flood problems.

Current Condition:

- Four documented Flood Problem Areas (FPAs) were identified. FPA #1 is overbank flooding of residential homes located at the southeast corner of Long Run Creek and Smith Road. FPA #2 is overbank flooding of the 135th St. located at the intersection of 135th Street and Archer Avenue. FPA #3 is overbank flooding of residential homes located at the northeast and southeast corners of Long Run Creek's intersection with Cedar Road within Homer Glen. FPA #4 is wetland inundation of 143rd St. located along 143rd Street and west of Wolf Road within Orland Park.
- FEMA's 100-year floodplain occupies 1,152 acres or 7% of the watershed along Long Run Creek and several tributaries.

Criteria/Targets to Meet Goal Objectives:

- At least 3 of 6 (50%) "High Priority-Critical Area" detention basins retrofitted along LRC Reaches 3 & 4.
- >50% of future developments in Subwatershed Management Units 1, 8, 18, & 20 include impervious reduction measures.
- All four (100%) structural Flood Problem Areas (FPAs) are addressed.
- Limited development is allowed within FEMA's 100-year floodplain.
- At least 200 homeowners or businesses receive tax incentives for using stormwater infiltration, harvesting/reuse technology.

Goal/Objective Milestones:		**Grade**
1-10 Yrs: (Short)	1) At least 2 of 6 "High Priority-Critical Area" detention basins retrofitted along LRC Reaches 3 & 4. 2) At least 25% of future developments in SMUs 1, 8, 18, & 20 include impervious reduction measures. 3) At least 2 of 4 structural Flood Problem Areas are addressed. 4) Limited development occurs within FEMA's 100-year floodplain. 5) At least 100 homeowners or businesses use stormwater infiltration, harvesting/reuse technology.	
10-20 Yrs: (Medium)	1) At least 3 of 6 "High Priority-Critical Area" detention basins retrofitted along LRC Reaches 3 & 4. 2) At least 50% of future developments in SMUs 1, 8, 18, & 20 include impervious reduction measures. 3) All four 4 structural Flood Problem Areas are addressed. 4) Limited development occurs within FEMA's 100-year floodplain. 5) At least 150 homeowners or business use stormwater infiltration, harvesting/reuse technology.	
20+ Yrs: (Long)	1) All 4 structural Flood Problem Areas addressed. 2) At least 200 homeowners or business use stormwater infiltration, harvesting/reuse technology.	

Monitoring Needs/Efforts:

- Track number of "High Priority-Critical Area" detention retrofits along LRC Reaches 3 and 4.
- Track number and type of impervious reduction measures included in future development within SMUs 1, 8, 18, & 20.
- Track number of developments that are allowed within FEMA's 100-year floodplain.
- Track number of homeowners or businesses that use stormwater infiltration, harvesting/reuse technology.

Remedial Actions:

- Meet with municipalities to determine lack of interest or funding for detention retrofits along LRC Reaches 3 and 4.
- Meet with municipalities that do not encourage impervious reduction measures in SMUs 1, 8, 18, & 20.
- Conduct follow-up visits to Flood Problem Area sites during flood events to determine if additional remedial work is needed.
- Meet with municipalities that allow development within FEMA's 100-year floodplain.
- Meet with municipalities to encourage tax incentives for using stormwater infiltration, harvesting, or reuse technology.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

Goal 6 Report Card

Implement watershed educational opportunities.

Current Condition:

- The health of Long Run Creek watershed faces challenges and threats from proposed land use changes, increasing nutrient loads, streambank erosion and channelization, a depleting groundwater supply, invasive species, poor land management, and problematic flooding. At the root of these challenges and threats is that key audiences lack the necessary knowledge and tools to make informed decisions and adopt positive behaviors to mitigate such threats and challenges. Since a significant amount of the watershed is held as private property, any efforts to improve water quality or increase groundwater recharge will need to include significant education and outreach efforts to those landowners and stakeholders.
- This watershed plan includes an Information and Education (I & E) Plan intended to spark interest in and provide stakeholders a better understanding of the watershed, and then promote and initiate the recommendations in the watershed plan.

Criteria/Targets to Meet Goal Objectives:

- LRCWPC initiates all Phase I recommendations & two Phase II & III recommendations under Objective 1 in the I & E Plan.
- LRCWPC initiates all Phase I recommendations & one Phase II & III recommendation under Objective 2 in the I & E Plan.
- LRCWPC initiates two Phase I recommendations & two Phase II & III recommendations under Objective 3 in the I & E Plan.
- LRCWPC initiates one Phase I recommendation & one Phase II & III recommendation under Objective 4 in the I & E Plan.
- LRCWPC initiates one Phase I recommendation under Objective 4 in the I & E Plan.
- LRCWPC initiates at least one Phase II & III recommendation under Objectives 1-5 annually during long term (20+ years)

Goal/Objective Milestones:		**Grade**
1-10 Yrs: (Short)	1) LRCWPC initiates all Phase I recommendations under Objective 1 in the I & E Plan. 2) LRCWPC initiates all Phase I recommendations under Objective 2 in the I & E Plan. 3) LRCWPC initiates two Phase I recommendations under Objective 3 in the I & E Plan. 4) LRCWPC initiates one Phase I recommendation under Objective 4 in the I & E Plan. 5) LRCWPC initiates one Phase I recommendation under Objective 5 in the I & E Plan.	
10-20 Yrs: (Medium)	1) LRCWPC initiates two Phase II & III recommendations under Objective 1 in the I & E Plan. 2) LRCWPC initiates one Phase II & III recommendation under Objective 2 in the I & E Plan. 3) LRCWPC initiates two Phase II & III recommendations under Objective 3 in the I & E Plan. 4) LRCWPC initiates one Phase II & III recommendation under Objective 4 in the I & E Plan.	
20+ Yrs: (Long)	1) LRCWPC initiates at least one Phase II & III recommendation under Objectives 1-5 annually.	

Monitoring Needs/Efforts:

- Track number of Phase I, II, and III recommendations under Objectives 1-5 (outlined in I & E Plan) initiated each year by LRCWPC partners.

Remedial Actions:

- LRCWPC partners discuss implementation of education campaigns during future planning meetings to ensure that efforts are initiated.

Notes:

Grade Evaluation: 80%-100% met = A; 60%-79% met = B; 40%-59% met = C; and < 40% = failed.

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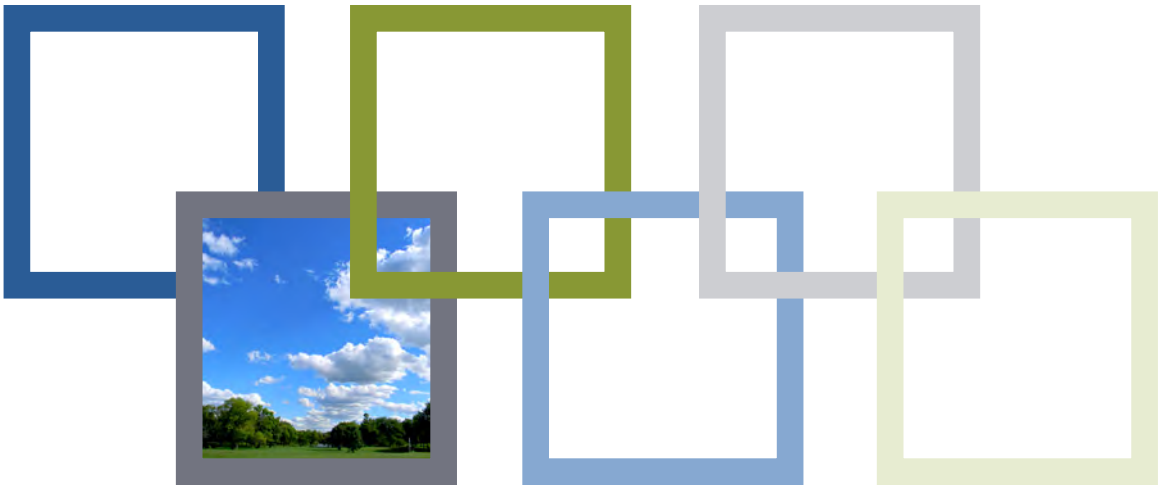

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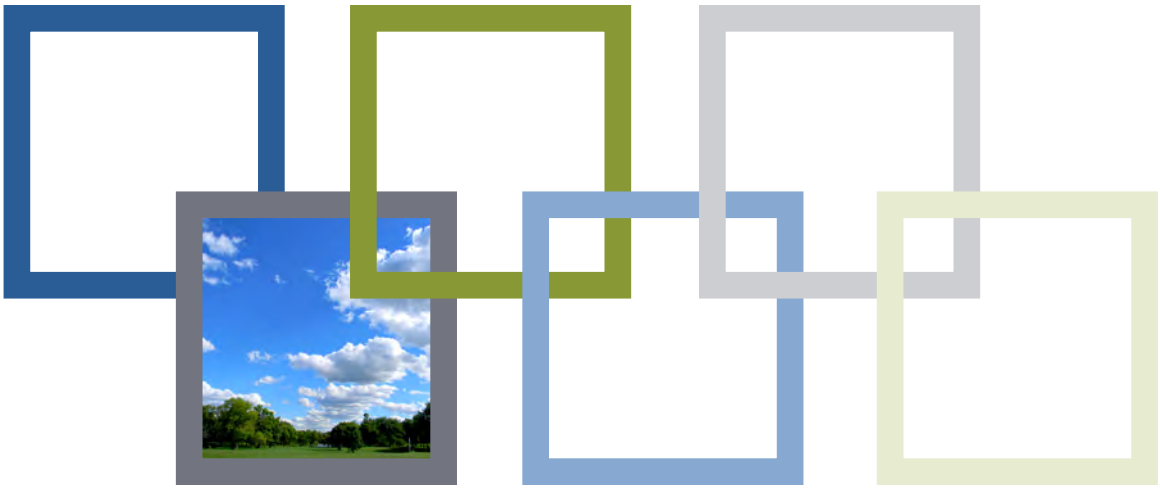

11.0 GLOSSARY OF TERMS

100-year floodplain: A 100-year flood is a flood that has a 1-percent chance of being equaled or exceeded in any given year. A base flood may also be referred to as a 100-year storm and the area inundated during the base flood is called the 100-year floodplain.

303(d) Impaired Waters: The Federal Clean Water Act requires states to submit a list of impaired waters to the USEPA for review and approval using water quality assessment data from the Section 305(b) Water Quality Report. States are then required to develop total maximum daily load analyses (TMDLs) for waterbodies on the 303(d) list.

305(b): The Illinois 305(b) report is a water quality assessment of the state's surface and groundwater resources that is compiled by the IEPA as a report to the USEPA as required under Section 305(b) of the Clean Water Act.

ADID wetlands: Wetlands that were identified through the Advanced Identification (ADID) process. Completed in 1992, the ADID process sought to identify wetlands that should be protected because of their high functional value. The three primary functions evaluated were:

1. Ecological value based on wildlife habitat quality and plant species diversity;
2. Hydrologic functions such as stormwater storage value and/or shoreline/bank stabilization value; and
3. Water quality values such as sediment/toxicant retention and/or nutrient removal/transformation function.

Applied Ecological Services Inc. (AES): A broad-based ecological consulting, contracting, and restoration firm that was founded in 1978. The company consists of consulting ecologists, engineers, landscape architects, planners, and contracting staff. The mission of AES is to bring wise ecological decisions to all land use activities.

Aquatic habitat: Structures such as stream substrate, woody debris, aquatic vegetation, and overhanging vegetation that is important to the survival of fish and macroinvertebrates.

Aquifer: A layer of permeable rock, sand, or gravel through which ground water flows, containing enough water to supply wells and springs.

Base flow: The flow that a perennially flowing stream reduces to during the dry season. It is often supported by groundwater seepage into the channel.

Bedrock: The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Best Management Practices (BMPs): See Management Measures

Biodiversity: The variety of organisms (plants, animals and other life forms) that includes the totality of genes, species and ecosystems in a region.

Bioengineering (or Soil Bioengineering): Techniques for stabilizing eroding or slumping stream banks that rely on the use of plants and plant materials such as live willow posts, brush layering, coconut logs and other "greener" or "softer" techniques. This is in contrast to techniques that rely on creating "hard" edges with riprap, concrete and sheet piling (metal and plastic).

Bio-infiltration: Excavated depressional areas where stormwater runoff is directed and allowed to infiltrate back into groundwater rather than allowing to runoff. Infiltration areas are planted with appropriate vegetation.

Center for Watershed Protection (CWP): Non-profit 501(c)3 corporation founded in 1992 that provides local governments, activists, and watershed organizations around the country with the technical tools for protecting some of the nation's most precious natural resources such as streams, lakes and rivers.

Certified Municipalities: A municipality that is certified to enforce the provisions of local stormwater ordinances. The municipality's designated Enforcement Officer enforces the provisions in the Ordinance.

Channelized stream: A stream that has been artificially straightened, deepened, or widened to accommodate increased stormwater flows, to increase the amount of adjacent land that can be developed or used for urban development, agriculture or for navigation purposes

Clean Water Act (CWA): The CWA is the basic framework for federal water pollution control and has been amended in subsequent years to focus on controlling toxics and improving water quality in areas where compliance with nationwide minimum discharge standards is insufficient to meet the CWA's water quality goals.

Conservation development: A development designed to protect open space and natural resources for people and wildlife while at the same time allowing building to continue. Conservation design developments designate half or more of the buildable land area as undivided permanent open space.

Conservation easement: The transfer of land use rights without the transfer of land ownership. Conservation easements can be attractive to property owners who do not want to sell their land now, but would support perpetual protection from further development. Conservation easements can be donated or purchased.

Debris jam: Natural and man-made debris in a stream channel including leaves, logs, lumber, trash and sediment.

Designated Use: Appropriate uses are identified by taking into consideration the use and value of the water body for public water supply, for protection of fish, shellfish, and wildlife, and for recreational, agricultural, industrial, and navigational purposes. In designating uses for a water body, States and Tribes examine the suitability of a water body for the uses based on the physical, chemical, and biological characteristics of the water body, its geographical setting and scenic qualities, and economic considerations

Detention basin: A man-made structure for the temporary storage of stormwater runoff with controlled release during or immediately following a storm.

Digital Elevation Model (DEM): Regularly spaced grid of elevation points used to produce elevation maps.

Discharge (streamflow): The volume of water passing through a channel during a given time, usually measured in cubic feet per second.

Dissolved oxygen (DO): The amount of oxygen in water, usually measured in milligrams/liter.

Downcutting: The action of a stream to deepen itself, often as a result of channelization.

Ecology: The scientific study between living organisms and their interactions with their natural or developed environment, other organisms, and their abiotic environment.

Ecosystem: An ecological community together with its environment, functioning as a unit.

Erosion: Displacement of soil particles on the land surface due to water or wind action.

European settlement: A period in the early 1800s when European settlers moved across the United States in search of better lives. During this movement, much of the historical communities were altered for farming and other types of development.

Eutrophic: A waterbody having a high level of biological productivity. A typical eutrophic waterbody either has many aquatic plants and is clear or has few plants and is less clear. Both situations have potential to support many fish and wildlife.

Federal Emergency Management Agency (FEMA): Government agency within the Department of Homeland Security that responds to, plans for, recovers from, and mitigates against disasters/emergencies, both natural and man-made.

Fee-in-lieu: Defined by the USACE and EPA as a payment "to a natural resource management entity for implementation of either specific or general wetland or other aquatic resource development projects" for projects that "do not typically provide compensatory mitigation in advance of project impacts."

Fen: Peat-forming wetlands that receive nutrients from sources other than precipitation: usually from upslope sources through drainage from surrounding mineral soils and from groundwater movement. Fens are characterized by their water chemistry which is neutral or alkaline with relatively high dissolved mineral levels.

Filamentous algae: Simple one-celled or multi-celled organisms (usually aquatic) capable of photosynthesis that are an indicator of high nutrient levels in the water column.

Filter strip: A long narrow portion of vegetation used to retard water flow and collect sediment for the protection of watercourses, reservoirs or adjacent properties.

Flash hydrology/flooding: A quickly rising and falling overflow of water in stream channels that is usually the result of increased amounts of impervious surface in the watershed.

Flood problem area (FPA): One or more buildings, roads or other infrastructure in one location that are repeatedly damaged by flooding.

Flow Regime: The pattern of flow variability for a particular river or region.

Floodplain (100-year): Land adjoining the channel of a river, stream, watercourse, lake or wetland that has been or may be inundated by floodwater during periods of high water that exceed normal bank-full elevations. The 100-year floodplain has a probability of 1% chance per year of being flooded.

Floodproofing: Any combination of structural and non-structural additions, changes or adjustments to structures or property which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and contents.

Floodway: The floodway is the portion of the stream or river channel that includes the adjacent land areas that must be reserved to discharge the 100-year flood without increasing the water surface.

Geographic Information System (GIS): A computer-based approach to interpreting maps and images and applying them to problem-solving.

Geology: The scientific study of the structure of the Earth or another planet, especially its rocks, soil, and minerals, and its history and origins.

Global Positioning System (GPS): Satellite mapping system that enables locators and mapping to be created via satellite.

Green infrastructure network: An interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks and other conservation lands, farms, and forests of conservation value; and wilderness and other open spaces that support native species, maintain natural ecological

processes, sustain air and water resources and contribute to the health and quality of life.

Greenways: A protected linear open space area that is either landscaped or left in its natural condition. It may follow a natural feature of the landscape such as a river or stream, or it may occur along an unused railway line or some other right of way. Greenways also provide wildlife corridors and recreational trails.

Groundwater recharge: Primary mechanism for aquifer replenishment which ensures future sources of groundwater for commercial and residential use.

Headwaters: Upper reaches of streams and tributaries in a watershed.

HUC Code: A hydrologic unit code (HUC) that refers to the division and subdivision of U.S. watersheds. The hydrologic units are arranged or nested within each other, from the largest geographic area (regions) to the smallest geographic area (cataloging units).

Hydraulic and Hydrologic modeling: Engineering analysis that predicts expected flood flows and flood elevations based on land characteristics and rainfall events.

Hydraulic structures: Low head dams, weirs, bridges, levees, and any other structures along the course of the river.

Hydric soil: Soil units that are wet frequently enough to periodically produce anaerobic conditions, thereby influencing the species composition or growth, or both, of plants on those soils.

Hydrologic Soil Groups (HSG): Soils are classified by the Natural Resource Conservation Service into four Hydrologic Soil Groups based on the soil's runoff potential. The four Hydrologic Soils Groups are A, B, C and D. A's generally have the smallest runoff potential and D's the greatest.

Hydrology: The scientific study of the properties, distribution, and effects of water on the earth's surface, in the soil and underlying rocks, and in the atmosphere.

Hydrophytic vegetation: Plant life growing in water, soil or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content; one of the indicators of a wetland.

Illinois Department of Natural Resources (IDNR): A government agency established to manage, protect and sustain Illinois' natural and cultural resources; provide resource-compatible recreational opportunities and to promote natural resource-related issues for the public's safety and education.

Illinois Department of Transportation (IDOT): The Illinois Department of Transportation focuses primarily on the state's policies, goals and objectives for Illinois' transportation system and provides an overview of the department's direction for the future.

Illinois Environmental Protection Agency (IEPA): Government agency established to safeguard environmental quality, consistent with the social and economic needs of the State, so as to protect health, welfare, property and the quality of life.

Illinois Natural Areas Inventory (INAI): A survey conducted by the Illinois Department of Natural Resources to catalogue high quality natural areas, threatened and endangered species and unique plant, animal and geologic communities for the purpose of maintaining biodiversity.

Illinois Nature Preserves: State-protected areas that are provided the highest level of legal protection, and have management plans in place.

Illinois Pollution Control Board (IPCB): An independent agency created in 1970 by the Environmental Protection Act. The Board is responsible for adopting Illinois' environmental regulations and deciding contested environmental cases.

Impervious Cover Model: Simple urban stream classification model based on impervious cover and stream quality. The classification system contains three stream categories, based on the percentage of impervious cover that predicts the existing and future quality of streams based on the measurable change in impervious cover. The three categories include sensitive, impacted, and non-supporting.

Impervious cover/surface: An area covered with solid material or that is compacted to the point where water cannot infiltrate

underlying soils (e.g. parking lots, roads, houses, patios, swimming pools, tennis courts, etc.). Stormwater runoff velocity and volume can increase in areas covered by impervious surfaces.

Incised channel: A stream that has degraded and cut its bed into the valley bottom; indicates accelerated and often destructive erosion.

Index of Biotic Integrity (IBI): An index used to evaluate the heath of a stream based on the fish community present.

Infiltration: Portion of rainfall or surface runoff that moves downward into the subsurface soil.

Invasive vegetation/plant: Plant species that are not native to an area and tend to out-compete native species and dominate an area (e.g. European buckthorn or garlic mustard).

Low Impact Development: Comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds.

Macroinvertebrate (aquatic): Invertebrates that can be seen by the unaided eye (macro). Most benthic invertebrates in flowing water are aquatic insects or the aquatic stage of insects, such as stonefly nymphs, mayfly nymphs, caddisfly larvae, dragonfly nymphs and midge larvae. They also include such things as clams and worms. The presence of benthic macroinvertebrates that are intolerant of pollutants is a good indicator of good water quality.

Macroinvertebrate Biotic Index (MBI): Method used to rate water quality using macroinvertebrate taxa tolerance to organic pollution in streams.

Management Measures: Also known as Best Management Practices (BMPs) are non-structural practices such as site planning and design aimed to reduce stormwater runoff and avoid adverse development impacts - or structural practices that are designed to store or treat stormwater runoff to mitigate flood damage and reduce pollution. Some BMPs used in urban areas may include stormwater detention ponds, restored wetlands, vegetative filter strips, porous pavement, silt fences and biotechnical streambank stabilization.

Marsh: An area of soft, wet, low-lying land, characterized by grassy vegetation and often forming a transition zone between water and land.

Meander (stream): A sinuous channel form in flatter river grades formed by the erosion on one side of the channel (pools) and deposition on the other (point bars).

Mitigation: Measures taken to eliminate or minimize damage from development activities, such as construction in wetlands or Regulatory Floodplain filling, by replacement of the resource.

Moraine (terminal): A ridge-like accumulation of till and other types of drift that was produced at the outer margin or farthest advance, of a retracting glacier.

Municipal Separate Stormwater Systems (MS4's): A system that transports or holds stormwater, such as catch basins, curbs, gutters, ditches, man-made channels, pipes, tunnels, and or/storm drains before discharging into local waterbodies.

National Pollutant Discharge Elimination System (NPDES Phase II): Clean Water Act law requiring smaller communities and public entities that own and operate a Municipal Separate Storm Sewer System (MS4) to apply and obtain an NPDES permit for stormwater discharges. Permittees at a minimum must develop, implement, and enforce a stormwater program designed to reduce the discharge of pollutants from the MS4 to the maximum extent practicable. The stormwater management program must include these six minimum control measures:

1. Public education and outreach on stormwater impacts
2. Public involvement/participation
3. Illicit discharge detection and elimination
4. Construction site stormwater runoff control
5. Post-construction stormwater management in new development and redevelopment

6. Pollution prevention/good housekeeping for municipal operations

National Wetland Inventory (NWI): U.S. Fish and Wildlife Service study that provides information on the characteristics, extent, and status of U.S. wetlands and deepwater habitats and other wildlife habitats.

Native Landscaping: A landscape that contains plants or plant communities that are indigenous to a particular region.

Native vegetation/plants: Plant species that have historically been found in an area.

Nitrogen: A colorless, odorless unreactive gas that forms about 78% of the earth's atmosphere. The availability of nitrogen in soil is important for ecosystem processes.

Natural community/area: an assemblage of plants and animals interacting with one another in a particular ecosystem.

No-net-loss: A policy for wetland protection to stem the tide of continued wetland losses. The policy has generated requirements for wetland mitigation so that permitted losses due to filling and other alterations are replaced and the net quality wetland acreage remains the same.

Nonpoint source pollution (NPS pollution): Refers to pollutants that accumulate in waterbodies from a variety of sources including runoff from the land, impervious surfaces, the drainage system and deposition of air pollutants.

Nutrients: Substances needed for the growth of aquatic plants and animals such as phosphorous and nitrogen. The addition of too many nutrients (such as from sewage dumping and over fertilization) will cause problems in the aquatic ecosystem through excess algae growth and other nuisance vegetation.

Open space parcel: Any parcel of land that is not developed and is often set aside for conservation or recreation purposes

Partially open parcel: Parcels that have been developed to some extent, but still offer some opportunities for open space and Best Management Practice (BMP) implementation.

Phosphorus: A nonmetallic element that occurs widely in many combined forms especially as inorganic phosphates in minerals, soils, natural waters, bones, and teeth and as organic phosphates in all living cells.

Point source pollution: Refers to discharges from a single source such as an outfall pipe conveying wastewater from an industrial plant or wastewater treatment facility.

Policy: A high-level overall plan embracing the general goals and acceptable procedures especially of a governmental body.

Pollutant load: The amount of any pollutant deposited into waterbodies from point source discharges, combined sewer overflows, and/or stormwater runoff.

Pool: A location in an active stream channel usually located on the outside bends of meanders, where the water is deepest and has reduced current velocities.

Prairie: A type of grassland characterized by low annual moisture and rich black soil characteristics.

Preventative measures: Actions that reduce the likelihood that new watershed problems such as flooding or pollution will arise, or that those existing problems will worsen. Preventative techniques generally target new development in the watershed and are geared toward protecting existing resources and preventing degradation.

Programmatic Action: A series of steps to be carried out or goals to be accomplished.

Protection Area: Chicago Metropolitan Agency for Planning (CMAP) defines a "Protection Area" as an area that represents subsections of a watershed that have valuable characteristics; valuable either in the sense that (1) they contain resources and characteristics that may need to be protected and/or (2) property ownership or land use characteristics make the subsection a strong candidate for action (CMAP 2007).

Rain gage station: Point along a stream where the amount of water flowing in an open channel is measured. The USGS makes most streamflow measurements by current meter. A current meter is an instrument used to measure the velocity of flowing water. By placing a current meter at

a point in a stream and counting the number of revolutions of the rotor during a measured interval of time, the velocity of water at that point is determined.

Rainwater Harvesting: The accumulation and storing of rainwater for reuse before it reaches an aquifer.

Regulatory floodplain: Regulatory Floodplains may be either riverine or non-riverine depressional areas. Projecting the base flood elevation onto the best available topography delineates floodplain boundaries. A floodprone area is Regulatory Floodplain if it meets any of the following descriptions:

1. Any riverine area inundated by the base flood where there is at least 640 acres of tributary drainage area.

2. Any non-riverine area with a storage volume of 0.75 acre-foot or more when inundated by the base flood.

3. Any area indicated as a Special Flood Hazard Area on the FEMA Flood Insurance Rate Map expected to be inundated by the base flood located using best available topography.

Regulatory floodway: The channel, including on-stream lakes, and that portion of the Regulatory Floodplain adjacent to a stream or channel as designated by the Illinois Department of Natural Resources-Office of Water Resources, which is needed to store and convey the existing and anticipated future 100-year frequency flood discharge with no more that a 0.1 foot increase in stage due to the loss of flood conveyance or storage, and no more than a 10% increase in velocities. Where interpretation is needed to determine the exact location of the Regulatory Floodway boundary, the IDNR-OWR should be contacted for the interpretation.

Remnant: a small fragmented portion of the former dominant vegetation or landscape which once covered the area before being cleared for human land use.

Retrofit: Refers to modification to improve problems with existing stormwater control structures such as detention basins and conveyance systems such as ditches and stormsewers. These structures were originally designed to improve drainage and reduce flood risk, but they can also be retrofitted to improve water quality.

Ridge: A line connecting the highest points along a landscape and separating drainage basins or small-scale drainage systems from one another.

Riffle: Shallow rapids, usually located at the crossover in a meander of the active channel.

Riparian: Referring to the riverside or riverine environment next to the stream channel, e.g., riparian, or streamside, vegetation.

Runoff: The portion of rain or snow that does not percolate into the ground and is discharged into streams by flowing over the ground instead.

Savanna: A type of woodland characterized by open spacing between its trees and by intervening grassland.

Sediment: Soil particles that have been transported from their natural location by wind or water action.

Sedimentation: The process that deposits soils, debris and other materials either on other ground surfaces or in bodies of water or watercourses.

Seep: A moist or wet place where groundwater reaches the earth's surface from an underground aquifer.

Socioeconomics: Field of study that examines social and economic factors to better understand how the combination of both influences something.

Special Service Area (SSA) Tax: Special taxing districts in municipalities that are established by ordinance, often at the request of developers of new housing subdivisions, in order to pass on the costs of the streets, landscaping, water lines, and sewer systems to homeowners who reside within.

Stakeholders: Individuals, organizations, or enterprises that have an interest or a share in a project. (see also Watershed Stakeholders).

Stormsewershed: An area of land whose stormwater drains into a common storm sewer system.

Stormwater management: A set of actions taken to control stormwater runoff with the objectives of providing controlled surface drainage, flood control and pollutant reduction in runoff.

Stream corridor: The area of land that runs parallel to a stream.

Stream monitoring: Chemical, biological and physical monitoring used to identify the causes and sources of pollution in the river and to determine the needs for reduction in pollutant loads, streambank stabilization, debris removal and habitat improvement.

Stream reach: A stream segment having fairly homogenous hydraulic, geomorphic and riparian cover and land use characteristics (such as all ditched agriculture or all natural and wooded). Reaches generally should not exceed 2,000 feet in length.

Streambank stabilization: Techniques used for stabilizing eroding streambanks.

Substrate (stream): The composition of the bottom of a stream such as clay, silt or sand.

Subwatershed: Any drainage basin within a larger drainage basin or watershed.

Subwatershed Management Unit (SMU): Small unit of a watershed or subwatershed that is delineated and used in watershed planning efforts because the effects of impervious cover are easily measured, there is less chance for confounding pollutant sources, boundaries have fewer political jurisdictions, and monitoring/mapping assessments can be done in a relatively short amount of time.

Swale: A vegetated channel, ditch or low-lying or depressional tract of land that is periodically inundated by conveying stormwater from one point to another. Swales are often used in natural drainage systems instead of stormsewers.

Threatened and Endangered Species (T&E): An "endangered" species is one that is in danger of extinction throughout all or a significant portion of its range. A "threatened" species is one that is likely to become endangered in the foreseeable future.

Till: A heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders deposited directly by and underneath a glacier without stratification.

Topography: The relative elevations of a landscape describing the configuration of its surface. Study and depiction (such as charts or maps) of the distribution, relative positions, and elevations of natural and man-made features of a particular landscape.

Total Maximum Daily Load (TMDL): A TMDL is the highest amount of a particular pollutant discharge a waterbody can handle safely per day.

Total suspended solids (TSS): The organic and inorganic material suspended in the water column and greater than 0.45 micron in size.

Treatment Train: Several Management Measures/Best Management Practices (BMPs) used together to improve water quality, infiltration and reduce sedimentation.

Trophic State Index (TSI): Trophic State is a measure of the degree of plant material in a body of water. It is usually measured using one of several indices (TSI) of algal weight (biomass): water transparency (Secchi Depth), algal chlorophyll, and total phosphorus.

Turbidity: Refers to the clarity of the water, which is a function of how much material including sediment is suspended in the water.

United States Army Corps of Engineers (USACE): Federal group of civilian and military engineers and scientists that provide services to the nation including planning, designing, building and operating water resources and other Civil Works projects. These also include navigation, flood control, environmental protection, and disaster response.

United States Environmental Protection Agency Section 319 (Section 319): Section 319 of the Clean Water Act encourages and funds nonpoint source pollution control projects (any indirect pollution, like runoff, stormwater discharge, road salt, sediment, etc.) or NPS reduction at the source.

United States Geological Survey (USGS): Government agency established in 1879 with the responsibility to serve the Nation by providing reliable scientific information

to describe and understand the Earth; minimize loss of life and property from natural disasters; manage water, biological, energy, and mineral resources; and enhance and protect our quality of life.

Urban runoff: Water from rain or snow events that runs over surfaces such as streets, lawns, parking lots and directly into storm sewers before entering the river rather than infiltrating the land upon which it falls.

USDA TR55 Document: A single event rainfall-runoff hydrologic model designed for small watersheds and developed by the USDA, NRCS, and EPA.

Vegetated buffer: An area of vegetated land to be left open adjacent to drainageways, wetlands, lakes, ponds or other such surface waters for the purpose of eliminating or minimizing adverse impacts to such areas from adjacent land areas.

Vegetated swale: An open channel drainageway used along residential streets and highways to convey stormwater and filter pollutants in lieu of conventional storm sewers.

Velocity (of water in a stream): The distance that water can travel in a given direction during a period of time expressed in feet per second.

Wastewater Treatment: Process that modifies wastewater characteristics such as its biological oxygen demand (BOD), chemical oxygen demand (COD), pH, etc. in order to meet effluent or water discharge standards.

Water Chemistry: The nature of dissolved materials (e.g. chlorides or phosphates) in water.

Waters of the United States (WOUS): For the purpose of this Ordinance the term Waters of the United States refers to those water bodies and wetland areas that are under the U. S. Army Corps of Engineers jurisdiction.

Watershed: An area confined by topographic divides that drains to a given stream or river. The land area above a given point on a waterbody (river, stream, lake, wetland) that contributes runoff to that point is considered the watershed.

Watershed Based Plan: A document that provides assessment and management information for geographically defined watershed, including the analysis, actions, participants, and resources related to development and implementation of the plan.

Watershed partner(s): Key watershed stakeholders who take an active role in the watershed management planning process and implementing the watershed plan.

Watershed Vulnerability Analysis: Rapid planning tool for application to watersheds and subwatersheds that estimates future and impervious cover and provides guidance on factors that might alter the initial classification or diagnosis of a watershed or subwatershed.

Wet meadow/sedge meadow: A type of wetland away from stream or river influence with water made available by general drainage and consisting of non-woody vegetation growing in saturated or occasionally flooded soils.

Wetland: A wetland is considered a subset of the definition of the Waters of the United States. Wetlands are land that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support, under normal conditions, a prevalence of vegetation adapted for life in saturated soil conditions (known as hydrophytic vegetation). A wetland is identified based upon the three attributes: 1) hydrology, 2) hydric soils and 3) hydrophytic vegetation.

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