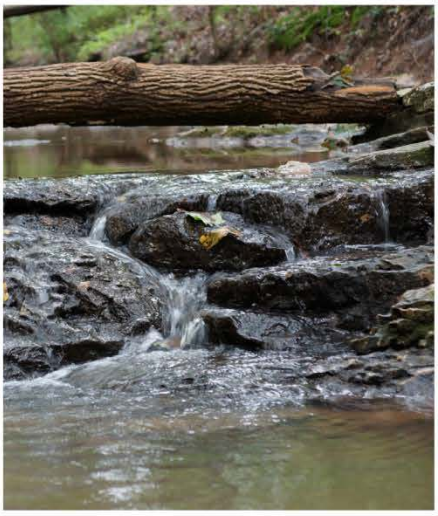
LOWER SILVER CREEK WATERSHED PLAN

A Guide to Protecting and Restoring Watershed Health

LOWER
SILVER CREEK
WATERSHED PLAN



EXECUTIVE SUMMARY

September 2018

HEARTLANDS
CONSERVANCY
Investing In The Nature Of Southwestern Illinois

September 2018

Prepared by:

HEARTLANDS CONSERVANCY

406 E. Main St.
Mascoutah, IL 62258
www.heartlandsconservancy.org
Phone: 618-566-4451
Fax: 618-566-4452

for

Illinois Environmental Protection Agency

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Cover photos: HeartLands Conservancy and Bryan Werner

Silver Creek Nature Preserve. Photo: HeartLands Conservancy.

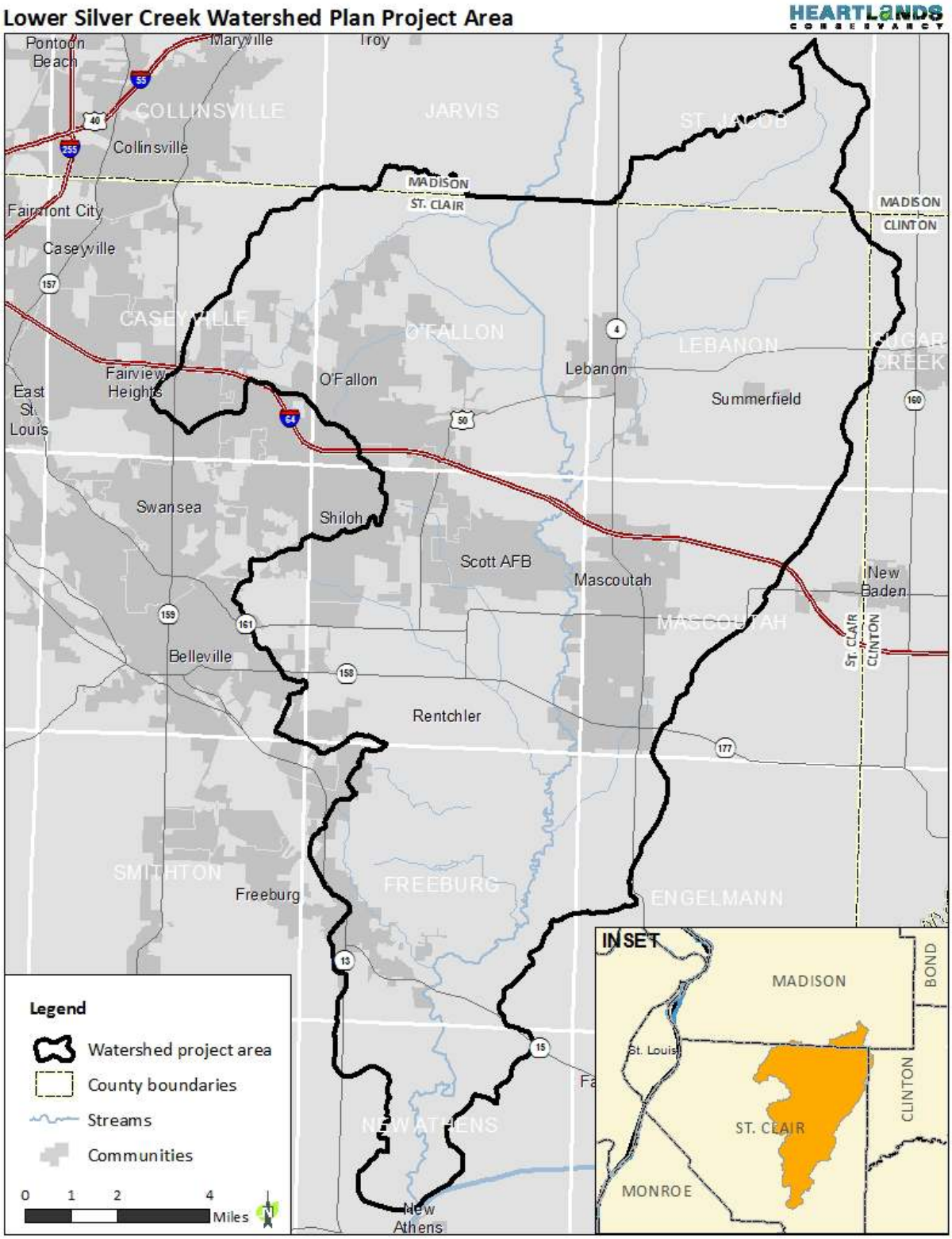
EXECUTIVE SUMMARY

Introduction

In 2016, HeartLands Conservancy received a grant from the Illinois Environmental Protection Agency (IEPA) to develop a Watershed Plan for the Lower Silver Creek watershed, which drains to the Kaskaskia River. The intent was to fully analyze the watershed and make recommendations toward improving water quality, mitigating adverse effects of flooding, and providing watershed-level recommendations for stormwater management.

The Lower Silver Creek watershed is the area of land which drains into Silver Creek in St. Clair County. The watershed includes surface water bodies (e.g., streams), groundwater (e.g., aquifers), and the surrounding landscape, which is largely agricultural land. Eight municipalities fall within the watershed boundaries.

The Watershed Plan offers guidance for managing watershed resources on public property, as well as providing a platform to encourage other watershed stakeholders (landowners, residents, businesses, developers, public agencies, and non-profits) to participate. The plan is not regulatory, meaning it does not become law. The intent is to encourage voluntary improvements to water quality and stormwater management in the watershed, for agricultural, urban, and natural areas and waters.


Lower Silver Creek Watershed Plan Project Area
HEARTLANDS CONSERVANCY
Pontoon Beach
Maryville
Troy
COLLINSVILLE
JARVIS
Collinsville
MADISON
ST. CLAIR
MADISON
CLINTON
Fairmont City
Caseyville
CASEYVILLE
O'FALLON
LEBANON
SUGAR CREEK
Fairview Heights
O'Fallon
Lebanon
East St. Louis
Summerfield
Swansea
Shiloh
Scott AFB
Mascoutah
New Baden
MASCOUTAH
ST. CLAIR
CLINTON
Belleville
Rentchler
SMITHTON
Freeburg
FREEBURG
ENGELMANN
NEW ATHENS
New Athens
Legend
Watershed project area
County boundaries
Streams
Communities
0 1 2 4
Miles
N
INSET
MADISON
BOND
St. Louis
CLINTON
ST. CLAIR
MONROE

The Lower Silver Creek Watershed

The Lower Silver Creek watershed is located 20 miles east and south of St. Louis, Missouri. The majority of the watershed lies within St. Clair County, Illinois, and small portions lie within Madison and Clinton counties. The watershed's 454 miles of streams drain roughly 126,000 acres of land. Silver Creek flows south from the project area to join the Kaskaskia River, which ultimately drains into the Mississippi River.

The Lower Silver Creek watershed project area contains numerous subwatersheds, called HUC12s and HUC14s. "HUC" stands for Hydrologic Unit Code, a number that identifies the general location and size of the watershed. Many of the issues identified in the watershed are assessed at these subwatershed levels.

Most of the watershed's 77,500 residents live in unincorporated areas where farming is the primary land use. Agricultural land makes up 63% of the watershed, with most of that land in row crop farming. Eight municipalities, thirteen townships, and three counties are located within the watershed.

Goals, Objectives, and Targets

The plan promotes a functioning, healthy watershed and guides the development, enhancement, and implementation of actions to achieve these goals:

GOALS
GOAL 1: Improve Surface Water Quality
GOAL 2: Reduce Flooding/Mitigate Flood Damage
GOAL 3: Promote Environmentally Sensitive Development
GOAL 4: Support Healthy Habitat
GOAL 5: Develop Organizational Frameworks
GOAL 6: Conduct Education and Outreach

Objectives were developed to specify progress towards these goals. Targets in this plan were set at levels that can feasibly be reached by the implementation of a suite of Best Management Practices (BMPs), or Management Measures, over time. The targets include a 25% reduction in phosphorus loading and a 15% reduction in nitrogen loading by 2030 (based on Illinois Nutrient Loss Reduction Strategy), and a 15% reduction in sediment loading (based on estimated impacts of proposed BMPs) by 2030.

Key Watershed Issues

Analysis of the existing and predicted future conditions in the watershed (Appendix A: Watershed Resource Inventory) included collecting data from several government data sources, delineating HUC14 watershed boundaries, using the USEPA's Spreadsheet Tool for Estimating Pollutant Loads (STEPL), conducting an aerial assessment of stream and riparian conditions, field checks at stream sites, and stakeholder engagement. From this research, the following issues were identified:

Surface water issues

- **Primary Sources of Water Quality Impairment.** The primary causes of impairment identified by the IEPA to Silver Creek and its tributaries are phosphorus, sediment, and dissolved oxygen (DO).
- **Soil Erosion from Agricultural Land.** With 63% of the watershed in agricultural use, soil erosion is common, carrying nutrients and sediments from fields to waterways.
- **Soil Erosion from Streams.** Streambank and channel erosion contributes approximately 53% of the sediment loading.
- **Logjams.** Logjams contribute to soil erosion as stream flow acts to erode the stream channel.
- **Private Sewage and Animal Waste.** Poorly maintained private sewer systems and runoff of animal waste contribute bacteria such as *E. coli* to surface water.
- **Infiltration into sanitary sewers (de facto combined sewers).** Aging sanitary sewer infrastructure leaks cause sewer backups and combined sewer overflows, leading to higher water treatment costs.
- **Dumping and Littering.** Trash and debris is an issue in places where roads cross the creek and its tributaries.

Flooding issues

- **Prevalent Flooding.** Flooding is common both inside and outside of floodplains, with frequent damage to homes, businesses, and crops, and loss of road access.
- **Extensive Floodplain.** Almost 20% of the watershed is in the 100-year floodplain.
- **Flooding Outside of Floodplains.** The flatter, higher ground at the edges of the watershed experiences flash floods/urban flooding, often as a result of large areas of impervious surfaces, changes in local hydrology, and severe storm events. Lack of stormwater infrastructure, inadequate infrastructure, aging infrastructure, and inadequate maintenance of infrastructure contribute to the problem.

Land cover and development issues

- **Poorly Planned Development.** Population growth in the watershed will likely be accompanied by new development on agricultural land or forest. Many older developments did not include well-designed or adequate drainage infrastructure, which has exacerbated water quality and flooding issues.
- **Poor Aquifer Replenishment.** Replenishment of aquifers has declined as impervious surfaces increased.

Habitat issues

- **Invasive Species Present**. Invasive species crowd out native plants that protect streambanks from erosion.
- **Unprotected Habitat for Endangered Species.** Where their native habitat is not preserved as open space, endangered species cannot be expected to thrive over the long term.
- **Poor Riparian Conditions.** Approximately six miles of the riparian area, the area directly adjacent to streams on either side, is in "poor" ecological condition (Appendix A, p.78).

Organizational needs/issues

- **Need for Partnerships.** A network of partners is needed to improve water quality and flooding issues and implement this plan.
- **Need for Updated Operations.** Existing municipal, township, and county operations would benefit from changes that then become routine and long-lived.
- **Need for Funding.** Leveraging funding from government and other programs is needed to fully implement the plan and ensure landowners have ongoing support.

Information and outreach issues

- **Need for Communication.** More communication about funding and technical resources is needed between potential partners.
- **Lack of Access to Technical Resources and Funding.** There is a need to connect and assist potential partners, with technical resources and funding opportunities.
- **Need for Outreach to Key Stakeholders.** A large group of landowners and other key stakeholders working together is needed to achieve the goals of this plan.

Critical Areas

"Critical Areas" were identified at locations in the watershed where existing or potential future causes and sources of pollutants or existing functions are significantly worse than other areas of the watershed, OR there is significant potential for the area to make progress towards one or more of the plan's goals. The Critical Areas were identified using survey and stakeholder information, aerial and field assessments, and U.S. Department of Agriculture (USDA) modeling.

The following Critical Areas were identified:

1. Critical Stream Reaches: Highly degraded stream reaches (8.9 miles)
2. Critical Riparian Areas: Highly degraded riparian areas (14.1 miles)
3. Critical Wetland Areas: Areas suitable for wetland restoration (671 acres)

Implementation

Recommended actions, identified as Management Measures, that address the plan's goals, objectives, and targets are provided to partners.

Recommended Management Measures

Programmatic Measures, including general remedial, preventive, and policy watershed-wide measures, and **Site-Specific Measures**, on-the-ground practices that can be implemented to improve surface and groundwater quality and flooding, are recommended. Management Measures identified for Critical Areas are prioritized for short-term implementation (e.g., wetland restoration projects in Critical Wetlands Areas). All recommendations in the plan are for guidance only and are not required by any federal, state, or local agency.

Together, these practices can make changes in the watershed that will meet and exceed the Impairment Reduction Targets. Significant participation from local landowners, farmers, residents, municipalities, and developers will be needed to achieve these targets.

Programmatic Measures

Protection and management of natural areas

- Conservation Development design, which protects natural features like streams, steep slopes, and forest in new development (especially subdivisions), and management procedures for these areas.
- Open space and natural area protection from the design stage through to the stage where the landowner owns the property.
- Green infrastructure incentives, which promote the protection of forest, wetlands, and other green infrastructure (e.g., planting street trees).
- Monitoring of water quality, flow, and stream health to help measure progress.
- Hydrologic/flood studies, to properly identify the floodplain and update floodplain maps.

Restoration of natural areas

- In-lieu fee ecological mitigation, a type of program that funds the restoration of ecologically sensitive wetlands and streams to mitigate for the losses of those features to new development.
- Native landscaping, which encourages the use of native plants on public and private property.
- Stream Cleanup Team, which removes litter and debris from streams and waterbodies.

Wastewater management

- Sewage Treatment Plant upgrades, which reduce the pollutant loading in wastewater discharge from wastewater facilities.
- Private sewage monitoring, a proactive program that samples private sewage systems to check for water quality problems and to encourage regular maintenance.

Natural resource policy

- Flood Damage Prevention Ordinance, which limits inappropriate development in floodplains, adopted by counties and municipalities.
- Riparian Buffer Ordinance, which limits development in riparian areas (areas adjacent to streams and waterbodies), encouraging forest and grassland that helps to filter and slow down runoff.
- Watershed Plan integrated into community policies and programs.

Funding

- Federal and state programs such as the Conservation Reserve Enhancement Program (CREP) and the Environmental Quality Incentives Program (EQIP) are available to landowners in the watershed to finance practices that prevent soil erosion, among other benefits.
- Financial support for stormwater infrastructure created, such as a Stormwater Utility, which is dedicated to upgrades and maintenance of detention basins, ditches, and other conveyance structures.

Site-Specific Measures

Agricultural

- Animal waste storage/treatment systems, which reduce nutrient and bacteria pollution from livestock waste.
- Bioreactors, also known as denitrifying bioreactors, which are ditches filled with wood chips that contain denitrifying bacteria that remove nitrogen from water coming from tile drainage systems.
- Comprehensive Nutrient Management Plans, which lead to reduced nutrient pollution from livestock operations.
- Conservation tillage (reduced tillage/no-till), which leads to a reduction in soil erosion and the transport of associated nutrients, such as phosphorus, to the waterways.
- Contour buffer strips, which are narrow strips of perennial vegetation that slow surface runoff and trap sediment, significantly reducing sheet and rill erosion and removing pollutants from runoff.
- Cover crops, which prevent erosion, improve soil health, break pest cycles, and suppress weeds.
- Grassed waterways, which are vegetated channels designed to slow surface water to reduce soil erosion and flooding.
- Nutrient Management Plans, which lead to reduced nutrient pollution from land on which crops are grown.
- Ponds, which store stormwater, settle out sediments, and allow nutrient uptake by aquatic organisms.
- Riparian buffers, which are vegetated zones immediately adjacent to streams that protect the stream channel.
- Terraces, which consist of ridges and channels constructed across the slope of a field, reducing soil erosion and surface runoff on sloping fields.
- Water and Sediment Control Basins (WASCOBs), which are small earthen ridge-and-channel structures or embankments built across a small watercourse in a field. They hold runoff, reducing the amount of sediment and sediment-borne phosphorus leaving the field and preventing the formation of gullies.
- Wetlands, which function as one of the most effective pollution removal practices.

Forest

- Forest stand improvement, which manages forest species composition (including removal of invasive species), can increase infiltration, reduce erosion, and provide long-term wildlife habitat.

Urban areas

- Bioswales, also known as vegetated swales, which increase infiltration and delay stormwater surges during heavy rainfall.
- Detention basins (new and retrofitted), which store flows during and incrementally release the stored water.
- Pervious pavement, which allows infiltration of stormwater into a below-ground storage area through holes in the pavement.
- Rain gardens, which temporarily store and infiltrate rain water, significantly slowing the flow of water, improving water quality, and providing wildlife food and habitat.
- Rainwater collection and reuse, using rain barrels or cisterns.
- Single property flood reduction strategies, which differ from property to property, based on the sources of flooding and appropriate flood reduction strategies.
- Stormwater system maintenance and expansion, which is crucial for the efficient conveyance of stormwater.
- Tree planting, adding street trees in the public right-of-way, or on private property, to help control stormwater runoff.

Streams and lakes

- Logjam removal, which removes debris from the stream channel, reducing scouring in the stream channel and the risk of floods overtopping the channel.
- Shoreline stabilization, which reduces bank erosion along lake shores.
- Streambank and channel restoration, which includes stabilization, grade control structures (e.g. riffles and pools), and re-meandering where appropriate. These reduce erosion and can provide flood storage.

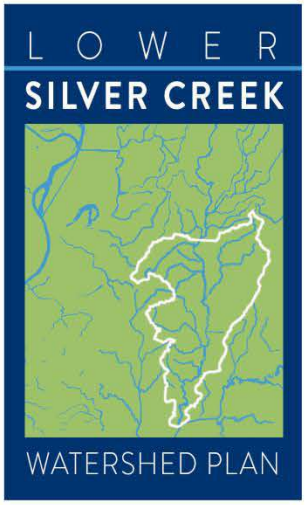
Measuring Success

Activities in the watershed plan will be assessed over time, to measure the success of the watershed plan and its implementation. A set of Progress Report Cards is included in Appendix F, and it includes milestones for short-term (one to 10 years; 2018-2028), medium-term (10 to 20 years; 2028-2038), and long-term (20+ years; 2038+) timeframes. The report card can be used to identify and track plan implementation and effectiveness. Checking in at appropriate milestones helps watershed partners make corrections and ensure that progress is being made towards achieving the plan's goals.

Information and Education Plan

Public outreach and educational activities are vital for supporting a healthier watershed. The Information and Education component of this plan supports the cumulative actions of partners, stakeholders, and the public across the watershed to accomplish its goals and objectives. Recommended information and outreach activities include:

- Municipal outreach, including information on websites and social media;
- Watershed plan outreach;
- An Agricultural BMP Workshop;
- A BMP or Demonstration Project Tour;
- A public events booth;
- Field days;
- Educational signs;
- School projects; and
- Watershed protection awareness.



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