



# Project Workplan

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**Project Title:** South Heron Lake TMDL Implementation

## 1. Project Summary:

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### Project information

**Latitude/Longitude:** 43° 40' 34.57° N & 95° 08' 48.54° W  
**\*County:** Jackson  
**Start date:** April 1, 2019 **End date:** August 31, 2022  
**Total cost:** Grant: \$122,125.00, Cash Match: \$122,125.00, In-Kind Match: \$4,125.04, Total Project Cost: \$248,375.04

The following refers to the lists on the MPCA website under "Semi-Annual Budgeting and Reporting Forms" at <http://www.pca.state.mn.us/index.php/water/water-types-and-programs/water-nonpoint-source-issues/clean-water-partnership/reporting-requirements-for-clean-water-partnership-section-319-and-clean-water-fund-projects.html>

**Best Management Practices (BMPs):** Stream Channel Stabilization, Wetland Restoration

Primary and Secondary Categories of Pollution:

	Primary	Secondary	Others
Category (name only)	Agriculture	Non-Irrigated Crop Production	

Nonpoint Source (NPS) Functional Category:

	Primary	Secondary	Others
Category (name only)	BMP Design/Implementation	Erosion Control Projects	Total Maximum Daily Loads (TMDLs)

Waterbody type: Lakes, Streams

Type of pollutant(s) (use name, not code #s): Phosphorus, Sedimentation-Siltation, and Nitrogen

Ecoregion: Western Corn Belt Plains

## 2. Statement of Problems, Opportunities, and Existing Conditions

Historically, the Heron Lake watershed was predominantly wetland prairie with saturated, organically rich soils, the latter of which has made the region fertile ground for agricultural production. South Heron Lake was once key migratory waterfowl habitat. However, the conversion of surrounding lands has had a drastic impact on the lake, with increased algal blooms helping to eliminate native wild celery, a key food source for ducks and other migratory waterfowl. This project will address a 19,879-acre watershed that is agricultural, primarily row crop corn and soybeans. The water that runs off this watershed outlets into Jackson County Judicial Ditch No. 3 (JD 3). This ditch system outlets directly into South Heron Lake.

South Heron Lake (32-0057-07) has a 303(d) listed impairment for the designated use of aquatic recreation for nutrient/eutrophication biological indicators. This impairment results in low clarity and excessive algae because of the high amount of phosphorus in the lake. This project is a top priority due to excessive erosion in the watershed which contributes to the phosphorus impairment on South Heron Lake.

The West Fork Des Moines River (WFDMR) and Heron Lake TMDL Final Report, which includes the South Heron Lake, indicates that water quality conditions include severe algae blooms, loss of rooted aquatic vegetation, fewer migratory waterfowl, rough fish impacts, decreased water clarity, and flooding. The South Heron Lake TMDL Implementation project area is located within the WFDMR watershed. Cropland and pastureland accounted for 62.3 percent of the phosphorus load in the watershed. Cropland and pasture runoff contribution to phosphorus loadings are most influenced by the soil erosion rate, the percentage of cropland and pasture within 300 feet of a watercourse (ditches, streams, lakes, wetlands, etc.), agricultural or commercial phosphorus fertilizer application rate, and manure application method. According to the WFDMR and Heron Lake TMDL Final Report, it is estimated that the overall magnitude of reduction needed to meet water quality standards is 87 percent for excess nutrients in North and South Heron Lake. Specifically, the TMDL outlines the need for a 79 percent reduction in phosphorus from nonpoint sources, highlighting the importance of the outlined practices in meeting water quality standards for South Heron Lake.

The primary purpose of the South Heron Lake TMDL Implementation is to reduce phosphorus entering South Heron Lake. To accomplish this purpose, the HLWD intends to restore and stabilize 3,300 linear feet of streambank in the JD 3 system that outlets directly into South Heron Lake. In addition, two wetland restorations will be completed and nine alternative side inlets will be installed.

The Agricultural BMP Handbook describes water quality benefits of streambank stabilization as preventing erosion at key areas, maintaining adequate flow conveyance, and improvements for habitat, recreation, or aesthetics. Committee members involved in the development of the WFDMR and Heron Lake TMDL Implementation Plan emphasized the need for streambank stabilization to limit soil loss. The streambank stabilization in this project is along the last 3,300 feet of the ditch and will be designed to reduce erosion where JD 3 outlets into South Heron Lake.

Wetland restoration benefits described in the Agricultural BMP Handbook are to filter runoff from cropland, feedlots, aquaculture operations, and agricultural processing facilities. Committee members involved in the development of the WFDMR and Heron Lake TMDL Implementation Plan stressed the importance of making wetland restorations a high priority in the watershed. The wetland restorations in this project will be designed to filter runoff from cropland, reducing soil entering JD 3 and South Heron Lake and are up to 15,715 feet from the lake.

Alternative side inlets, also called alternative tile inlets, are outlined in the Agricultural BMP Handbook as an effective practice for phosphorus reduction, primarily through sediment deposition as a result of a reduction in peak flows. Locations for these shallow depressions with native plantings slowly release water into the drainage system, reducing erosion and removing

sediment with the temporary ponding of water. The alternative side inlets will be placed in multiple locations ranging from 1,610 to 15,700 feet from South Heron Lake.

The outlined practices have all been prioritized based upon Agricultural Conservation Planning Framework (ACPF) modeling, as well as field data, and are targeted for maximum phosphorus reductions. All practices will be designed to Natural Resources Conservation Service standards, which have a proven track record of effectiveness in Minnesota in reducing the amount of nutrients making their way into nearby waterways. Additionally, all of the practices proposed for inclusion in this project are identified in the Agriculture BMP Handbook as preferred and proven practices for reducing sedimentation, erosion, and nutrients. The ACPF Toolbox was used to determine potential project locations based on high erosion areas along streambanks and areas that were susceptible to the pooling of water. Site locations for wetlands were then confirmed using LiDAR and aerial photos. Drone footage and survey data were used to identify areas of bank erosion as well as alternative side inlet locations. This project will focus on the BMPs that were identified as the highest priority based upon the use of the tools described above.

For the South Heron Lake TMDL Implementation, collaboration between landowners, the HLWD, ISG, Jackson Soil and Water Conservation District (SWCD), and the City of Lakefield has been ongoing for multiple years. Over 80 landowners have been contacted as part of the engagement process. Stakeholders have participated in a dozen meetings to discuss the water quality concerns, potential practices to be implemented, and future steps that must be taken in order to improve water quality for South Heron Lake. The HLWD, ISG, Jackson SWCD, and City of Lakefield staff (Project Partners) intend to continue their efforts of working directly with the landowners within the JD 3 watershed by holding three landowner meetings. In this process, water quality problems will be described to landowners in terms that are relevant to the area relating to economics and recreation. The landowners engaged in BMP implementation will be tracked, lessons learned will be described, and landowner stories will be gathered to make indicators of success visible throughout the watershed.

### 3. Goals, Objectives, Tasks, and Subtasks

#### **Objective 1:** Project Implementation

##### **Task A:** Construction Preparation

Design BMPs, complete specifications and construction documents, and provide construction oversight.

**Timeframe:** April 2019 – August 2022

**Responsible Party:** ISG staff

##### **Task B:** Streambank restoration and stabilization

Complete streambank restoration and stabilization of 3,300 linear feet. This includes grading work to reconnect the channel to buffer area and native plantings that will help limit future erosion and reduce peak flows

**Timeframe:** April – November 2019; April – November 2020; April – November 2021; April – August 2022

**Responsible Party:** ISG staff

##### **Task C:** Wetland restoration

Complete two wetland restorations totaling 17.25 acres. Grant funds will be used to pay for native plantings and buffer and a portion of grading and construction costs. In-kind and cash match contribution from landowners and administered through the HLWD will be used to pay for necessary tile line breaks, wetland outfall, and costs associated with wetland storage capacity.

**Timeframe:** April – November 2019; April – November 2020; April – November 2021; April – August 2022

**Responsible Party:** ISG staff

##### **Task D:** Alternative side inlets

Construct nine alternative side inlets. Grant funds will be used to pay for grading required to construct the shallow and native plantings. In-kind and cash match contribution from landowners and administered through the HLWD will be used to pay for a portion of costs associated with site grading as well as costs associated with moving stored water to the existing drainage system.

**Timeframe:** April – November 2019; April – November 2020; April – November 2021; April – August 2022

**Responsible Party:** ISG staff

**Objective 1 Timeline:** April 2019 – August 2022

**Objective 1 Cost:** Grant: \$100,625.00, Cash Match: \$100,625.00, In-Kind Match: \$0.00, Total: \$201,250.00

**Objective 1 Deliverables:** Streambank restoration and stabilization, two wetland restorations, and nine alternative side inlets

#### **Objective 2:** Civic Engagement

##### **Task A:** Landowner meetings

Work directly with the landowners within the JD 3 watershed by holding three landowner meetings. At least one landowner meeting will be held on an annual basis to ensure landowners are completely engaged in all aspects of the project. In this process, water quality problems will be described to landowners in terms that are relevant to the area relating to economics and recreation. Landowner stories will be gathered to make indicators of success visible throughout the watershed.

**Timeframe:** April 2019 – August 2022

**Responsible Party:** HLWD, ISG, Jackson SWCD, City of Lakefield

##### **Task B:** Website

A web page will be created within the HLWD website for grant reports and civic engagement information. Web

page creation will take place at the beginning of the project and updates will be made semi-annually for reports and as needed for civic engagement information.

**Timeframe:** April 2019 – August 2022

**Responsible Party:** HLWD

**Objective 2 Timeline:** April 2019 – August 2022

**Objective 2 Cost:** Grant: \$2,500.00, Cash Match: \$2,500.00, In-Kind Match: \$1,250.44, Total: \$6,250.44

**Objective 2 Deliverables:** three landowner meetings, landowners engaged in implementation, lessons learned, landowner stories, and webpage with regular updates

**Objective 3:** Evaluation

**Task A:** Monitoring.

Streambank stabilization, wetland restoration, and alternative side inlets installed through this project will be monitored monthly from May through October for the three-year grant period. A Quality Assurance Project Plan (QAPP) will be completed before monitoring is conducted. Preconstruction monitoring will be done at all sites. To ensure the effectiveness of the outlined practices and build more broad based support for water quality BMPs within the watershed, monitoring will be conducted prior to implementation at the identified locations. Once the practices have been installed, monitoring will occur once per month (May-October) until August 2022. Specific monitoring for each practice will include:

- **Wetland Restoration:** Flowrates will be determined using HOBOWare pressure sensors. The monitoring equipment will measure pressure. Using fundamental fluid mechanic equations, water depth can be determined. The flowrate will be interpolated based on the wetland and ditch geometry, hydrologic model, and topographic survey. The monitoring equipment will record depth measurements every five minutes. A survey will be taken on the wetland before construction, at completion of wetland restoration, and in 2022 to determine accumulation of sediment in wetland. Accumulated sediment will allow determination of trapping efficiency and long term sediment reductions of the restored wetland. ISG will be responsible for completing yearly installation and removal of monitoring equipment, collection of monitoring data, all necessary data analysis, and survey.
- **Streambank Restoration/Stabilization:** Suspended solids will be monitored using grab samples at the outlet to South Heron Lake. Grab samples will be taken at the outlet to South Heron Lake before and after implementing streambank restoration. A new site will be established according to MPCA protocol. Samples will be taken monthly during the months of May through October. ISG will be responsible for monthly sampling, coordination with testing lab, and any necessary data analysis.
- **Alternative Side Inlets:** Sediment reduction will be monitored as it enters the channel. Alternative side inlets will capture sediment at the inlet of drop intake. A detailed survey will be completed at the intake after construction is completed at each of the nine intakes that are installed. In 2022, an additional detailed survey will be completed at each intake. This will determine the trapping efficiency and long term sediment reductions of the alternative side inlets. ISG will be responsible for survey and any necessary data analysis.

**Responsible Party:** ISG staff

**Objective 3 Timeline:** May - October 2019; May – October 2020; May – October 2021; May - August 2022

**Objective 3 Cost:** Grant: \$19,000.00, Match: \$19,000.00, Total: \$38,000.00

**Objective 3 Deliverables:** monitoring data report

**Objective 4:** Grant Administration

**Task A:** Administration

Administer grant and complete reporting requirements. HLWD Administrator will be the grant administrator and will complete all reporting requirements. Semi-annual reports will be completed in the format provided by MPCA and are due February 1 and August 1 each year for the length of the project. A final report completed in the format provided by the MPCA is due within 30 days of the completion of the project. Report all BMPs into eLink for each semi-annual report and for the final report.

**Responsible Party:** HLWD staff

**Objective 4 Timeline:** April 2019 – August 2022

**Objective 4 Cost:** Grant: \$0.00, Cash Match: \$0.00, In-Kind Match: \$2,874.60, Total: \$2,874.60

**Objective 4 Deliverables:** semi-annual, annual, and final reports as required by the grant agreement

## 4. Measurable Outcomes

1. The outlined practices would provide a total phosphorus load reduction of 895.2 pounds annually, resulting in a 3.5 percent reduction towards the overall goal.

Streambank Restoration:

- Phosphorus: 24.2 lbs/yr
- Sediment: 21.04 tons/yr

Wetland Restorations:

- Phosphorus: 133 lbs/yr
- Sediment: 116 tons/yr

- Nitrogen: 33,705 lbs/yr

Alternative Side Inlets:

- Phosphorus: 738 lbs/yr
- Sediment: 642 tons/yr

2. Updates about monitoring results will be given at HLWD, landowner, and county board meetings. Overall project results will be distributed via news release to area news media and posted on the HLWD website.
3. Interim goals for this project are to have construction projects started by fall 2019 and to have 50 percent of the construction projects completed by fall 2020.
4. Interim goals for this project are to have the first landowner meeting held in spring 2019, the second in fall 2019, and the third in spring 2020.
5. Criteria to determine whether loading reductions are being achieved over time and substantial progress is being made toward attaining targets or assuring continued attainment of water quality standards includes the success of each sector achieving allocation targets and from monitoring data collected on South Heron Lake.

## 5. Project Budget (*Attached*)