



MCPP Update

DECEMBER 2018

MIDDLE CEDAR PARTNERSHIP PROJECT

Local farmers working together with upstream conservation entities and downstream water users to improve soil health, water quality, and water quantity in the Middle Cedar Watershed.

June 5, 2015 - June 5, 2020

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The Middle Cedar Partnership Project (MCP) is a collaboration between downstream water users, upstream conservation entities and local farmers. Led by the City of Cedar Rapids, these groups partner to increase the implementation of nutrient-management and flood-reduction practices in targeted areas of the Middle Cedar watershed. The project's goals are improved water quality, water quantity, and soil health.

WATER QUALITY & SOIL HEALTH

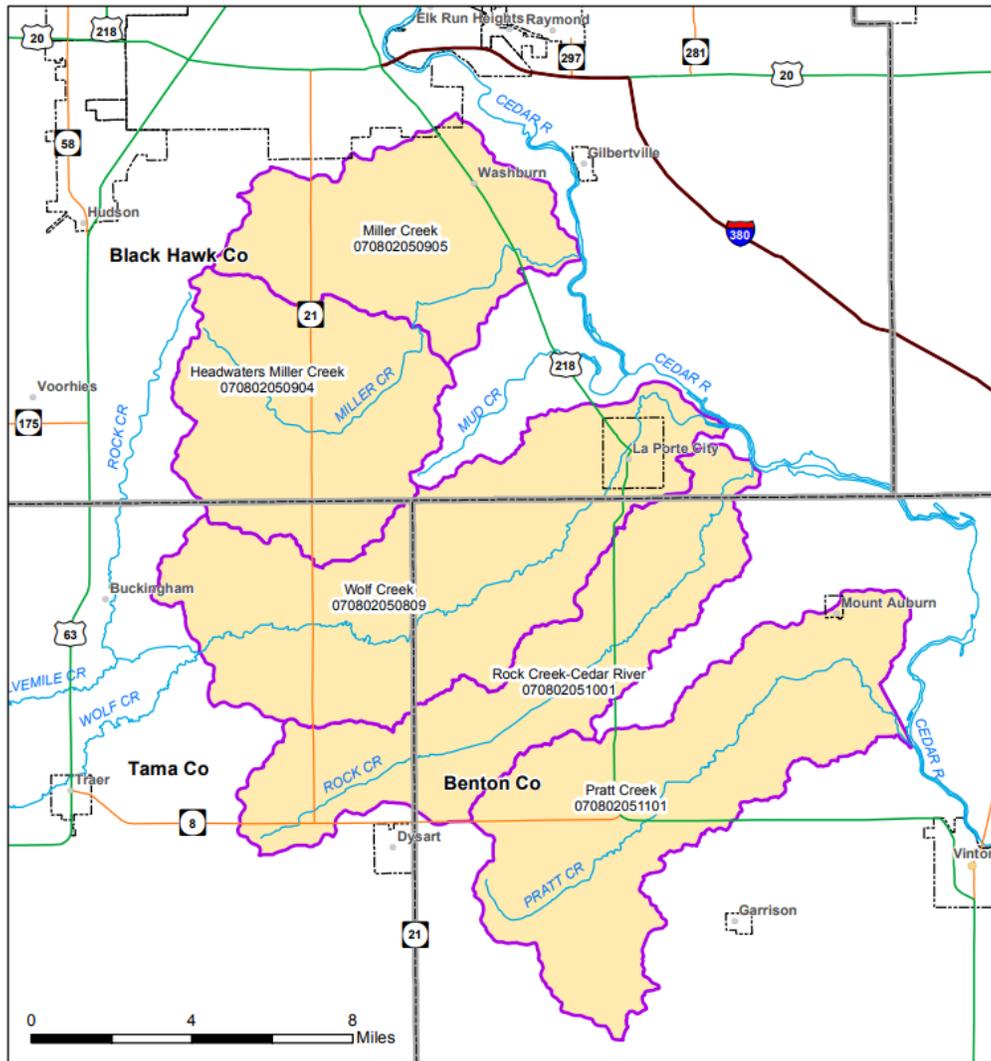
Due to its annual average levels of nitrogen and phosphorus, the Iowa Water Resources Coordinating Council (IWRCC) designates the Middle Cedar watershed as one of nine priority watersheds under the Iowa Nutrient Reduction Strategy. Soil conservation practices work to hold nitrates and phosphorus in place on the field, reducing unwanted contributions to the water supply and decreasing the need for additional nutrient application.

The City of Cedar Rapids draws drinking water from shallow alluvial wells under the influence of the Cedar River. More than 70 percent of the drinking water produced by the Cedar Rapids Water Treatment facilities also goes to large industrial users, like PepsiCo, Cargill, General Mills, and Archer Daniels Midland. Without the ability to provide safe, high-quality water for industrial and residential consumers, Cedar Rapids would experience a devastating economic ripple effect. There is an urgent need to address increasing concentrations of nitrates and extreme flood events in the Cedar River. This project lays the foundation for needed improvements, and brings together a diverse group of conservation partners.

WATER QUANTITY

The Middle Cedar watershed contains multiple communities that have experienced considerable flood damage and associated economic impacts. Watershed management practices can stabilize the water supply both in times of drought and flood. After experiencing a severe drought in 2012 and the increased frequency of flood events, the City of Cedar Rapids understands the need to address water quantity challenges.

PROJECT MAP



The Middle Cedar watershed is a 2,417-square-mile part of the larger Cedar River watershed. The MCPP focuses on five HUC 12 watersheds located in Benton, Tama, and Black Hawk Counties. The five watersheds total 135,000 acres.

TIMELINE

2014–CURRENT

The **Miller Creek Water Quality Initiative Project** utilized creative outreach strategies to educate farmers about conservation practices

The **Benton/Tama Nutrient Reduction Demonstration Project** targeted seed corn growers, encouraging the use of cover crops and other strategies.

2014

United States Department of Agriculture (USDA) makes Regional Conservation Partnership Program (RCPP) funding available through special application.

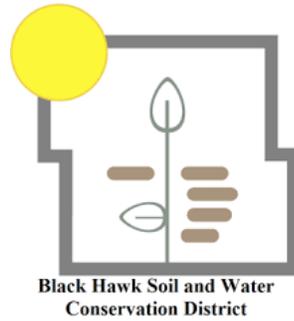
JUNE 2015–2020

The MCPP uses funding through RCPP and 16 project partners to expand the scope, outreach, and longevity of existing Miller Creek and Benton/Tama demonstration projects into five sub-watersheds in the Middle Cedar watershed.

RCPP grant funding is available through USDA's Natural Resources Conservation Service (NRCS). To receive funding, project partners provide recurring reports to the NRCS.

SUBMITTED REPORTS TO DATE:

- Quarterly Financial Reports, FY 16–19
- Semiannual Program Reports, FY16–18



IOWA STATE UNIVERSITY
Extension and Outreach



FINANCIALS

CITY OF CEDAR RAPIDS

- \$278 thousand to date in outreach, education, and water quality analysis

OTHER COLLABORATING PARTNERS

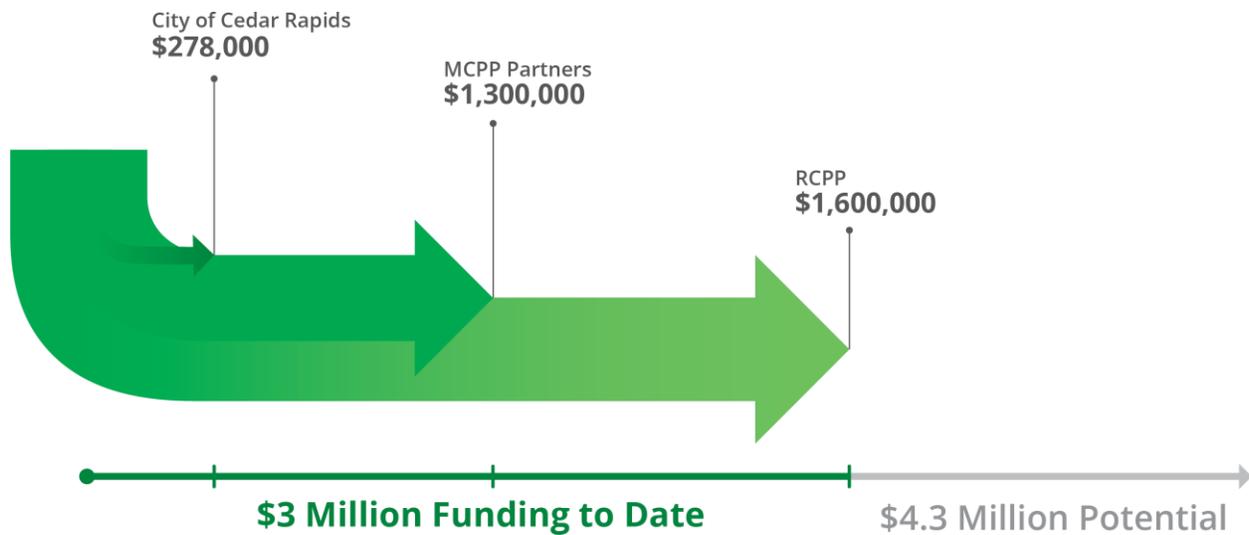
- \$1.3 million to date in plan development, outreach, education, and water quality analysis

RCPP GRANT FUNDING (USDA/NRCS)

- \$1.6 million to date in financial assistance through Regional Conservation Partnership Program (RCPP)
- Direct payment to producers and landowners

TOTAL FINANCIAL SUPPORT (PROJECT LIFETIME)

- \$4.3 million in financial and technical assistance potential from June 2015–2020.



OBJECTIVE 1: DEVELOP WATERSHED PLANS

OVERVIEW

Develop watershed plans and maps that will help prioritize where Best Management Practices (BMPs) should be placed to have the greatest benefit. These plans are a critical component providing a roadmap for water and soil improvements which maintain agronomic performance and quality of life in the MCPP region.

PERFORMANCE

Plans developed and finalized in December 2015 with the assistance of Iowa Soybean Association.

The plans lay out a phased implementation approach to ensure continuous improvements are made toward long-term goals for the watersheds.

- Miller Creek Watershed Improvement Plan (2015)
- Benton/Tama Watershed Improvement Plan (2015)

OBJECTIVE 2: IMPLEMENT BMPs

OVERVIEW

The project will provide financial and technical assistance to upstream entities to implement BMPs that serve the project’s goals of improved soil health, water quality, and water quantity. The project will align with watershed plans, track and assess practice types and installation locations, and assess data over time to ensure the maximum return on investment.

PRACTICE IMPLEMENTATION*

To date, the MCPP has entered into **54 contracts** with farmers and landowners to implement soil and water conservation practices. The total USDA **funding obligated to these contracts is \$1,432,927**.

The **total acres under contract are 10,297** or approximately **9% of the row crop acres in the targeted watersheds**.

PRACTICES	TOTAL IMPLEMENTED FY15–FY18
Nutrient Management	357 acres
Cover Crops	17,382 acres
No-Till	800 acres
Strip-Till	210 acres
Bioreactors	2 bioreactors
Saturated Buffers	5 saturated buffers
Third Party Projects	(various)

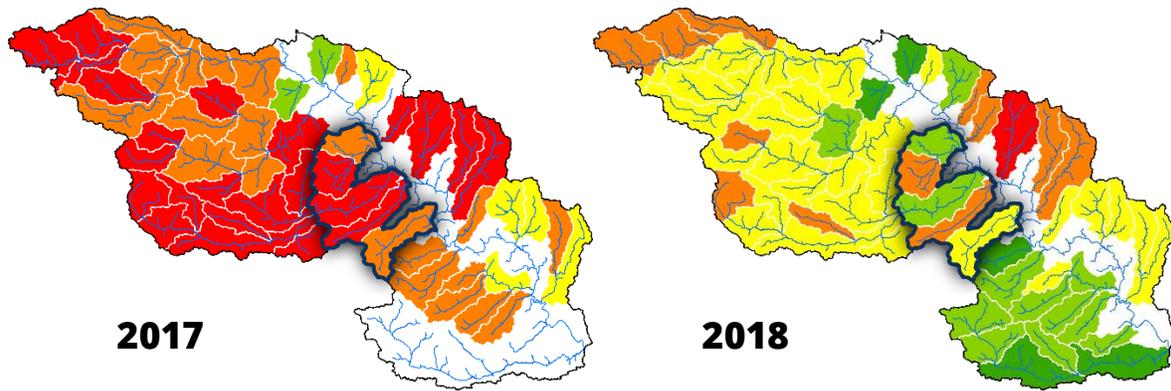
**Learn more about practice implementation on page 13.*

DATA

In partnership with Iowa Soybean Association and Coe College, key sampling snapshots have been performed in the Middle Cedar Watershed. Due to the nature of data collection and changing weather patterns, it is not practical to use the information learned as year-over-year comparisons. Sampling data can help identify priority areas for current and future work. As we collect additional sampling data over the years, larger trends may emerge.

DATA

NITRATE



Nitrate as N (mg/L)

- 3.8 - 5.0
- 5.1 - 7.5
- 7.6 - 10.0
- 10.1 - 12.5
- 12.6 - 15.0

Sampling data from snapshots taken at sites in the Middle Cedar Watershed. MCPP region distinguished by thick outline.

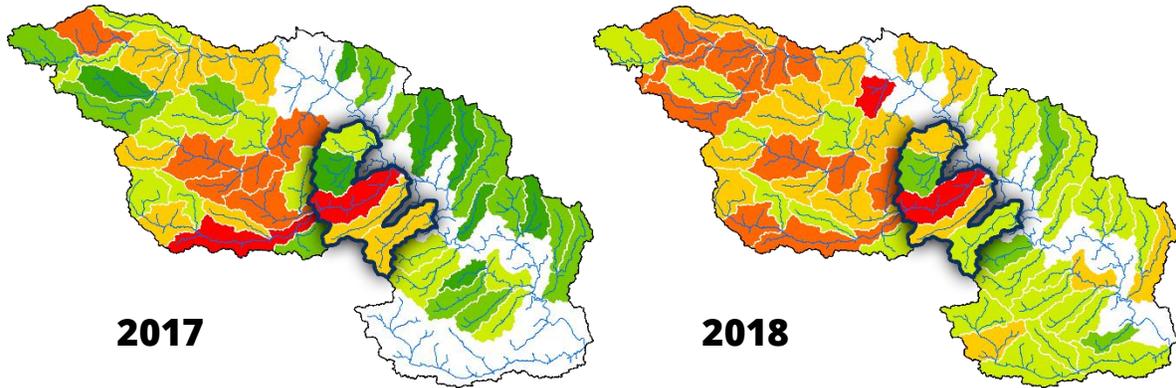
Two samples were conducted per site in 2017. In 2018, a more robust set of data (five samples per site) is available and additional sites were sampled.

In 2018, additional sample dates allowed sub-watersheds to be broken among more categories providing better resolution in differences. Higher concentrations were in smaller, headwater watersheds and at sites on the northeast side of the Cedar River. Both of these areas had significant rain events in August and September. While there is significant row crop land use in the sites at the lower end of the Middle Cedar (including sites added in 2018), average concentrations were lower than for similar areas farther north.

Sampling data provided through partnerships with Iowa Soybean Association and Coe College.

DATA

SEDIMENT



Total Suspended Solids (mg/L)

- 5.5 - 10.1
- 10.2 - 20.2
- 20.3 - 35.8
- 35.9 - 61.4
- 61.5 - 86.0
- 86.1 - 127.5

Sampling data from snapshots taken at sites in the Middle Cedar Watershed. MCPP region distinguished by thick outline.

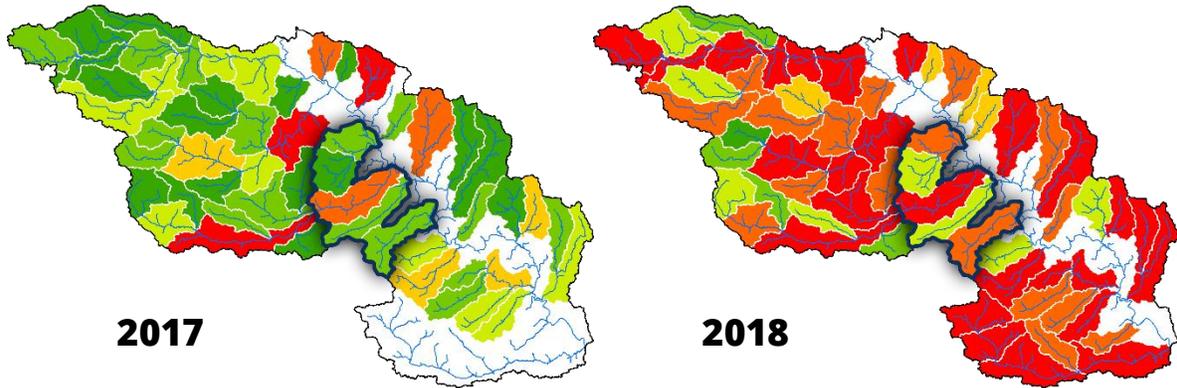
Two samples were conducted per site in 2017. In 2018, a more robust set of data (five samples per site) is available and additional sites were sampled.

In 2018, sediment concentrations were variable over the sampling season, responding to rain events and changes in discharge. Both the May and July 2018 sample events came after periods of receding flow, while the June and August 2018 measurements were sampled after rain events. Higher concentrations of sediment exist in the larger watersheds like Beaver Creek, Blackhawk Creek and Wolf Creek. These streams are lined by more woodlands rather than grass, and may therefore have less ground cover to hold sediment in place during surface and stream bank wet conditions.

Sampling data provided through partnerships with Iowa Soybean Association and Coe College.

DATA

PHOSPHORUS



Dissolved Reactive Phosphorus as P (mg/L)

- 0.03
- 0.04
- 0.05
- 0.06
- 0.07
- 0.08 - 0.18

Sampling data from snapshots taken at sites in the Middle Cedar Watershed. MCPP region distinguished by thick outline.

Two samples were conducted per site in 2017. In 2018, a more robust set of data (five samples per site) is available and additional sites were sampled.

Phosphorus results in 2018 were similar to 2017 in the early months, but significantly higher during the August 2018 sampling, increasing the overall average. Spatially, the data suggests higher concentrations may be localized to areas with increased surface runoff due to rainfall or human activity.

Sampling data provided through partnerships with Iowa Soybean Association and Coe College.

PROGRESS

OBJECTIVE 3: CONDUCT OUTREACH

OVERVIEW

Conduct outreach activities with landowners and producers in the five HUC 12 watersheds.

PERFORMANCE

Outreach activities performed to-date include:

- On-farm contacts with individual farmers and landowners.
- On-farm field days.
- Client-focused webinars; social media posts and blogs; and direct mailings.
- Media releases on project activities and outreach topics that support project goals.
- Watershed tours for stakeholders, local leaders and media.
- Project administration and reporting.

NUTRIENT MANAGEMENT PLANS



Managing the rate, timing, source, and stability of nutrient applications can improve not only the return on investment through increased yields, but also water quality through decreased nutrient loss.

IMPLEMENTATION

A total of 357 acres of nutrient management are under contract with the MCPP. Water quality models estimate these acres of cover crop have reduced nitrogen loss by 1,040 pounds per year.

	FY 15	FY 16	FY 17	FY 18*	TOTAL
Contracted through MCPP	-	-	357 acres	-	357 acres

**All MCPP funding from USDA obligated in prior years*

Data from the Iowa Department of Agriculture and Land Stewardship show annual total acres of additional management practices active in the MCPP area via other funding sources.

	FY 15	FY 16	FY 17	FY 18
Residue Management — NT/ST	1,165 acres	4,210 acres	5,481 acres	5,030 acres
N Application Management	600 acres	3,530 acres	2,435 acres	1,964 acres
P Application Management	378 acres	578 acres	291 acres	709 acres
TOTAL ABOVE + MCPP CONTRACTS	2,143 acres	8,318 acres	8,564 acres	8,060 acres

COVER CROPS



Crops planted during or after harvest sequester nitrogen when cash crops are not actively growing. Cover crops reduce soil erosion and phosphorous loss, increase water retention, and improve nutrient uptake.

In the Middle Cedar, fields with cover crops have averaged **32% lower nitrate concentrations** than fields without, as measured over three growing seasons (2014–16) and a variety of weather conditions.

Data provided by the USDA Agricultural Research Service and Iowa State University. Photo courtesy Iowa Soybean Association.

IMPLEMENTATION

A cumulative total of 17,382 acres of cover crop are under contract with the MCPP, with contractual commitments extending to FY20. Water quality models estimate 9,958 acres of cover crops reduced nitrogen loss by more than 40,000 pounds in FY17.

	FY 15	FY 16	FY 17	FY 18	TOTAL
Contracted through MCPP	527 acres	2,190 acres	7,241 acres	7,424 acres	17,382 acres

Data from the Iowa Department of Agriculture and Land Stewardship show annual total acres of additional cover crops planted in the MCPP area via other funding sources.

	FY 16	FY 17	FY 18
Other funding source	5,735 acres	6,146 acres	5,445 acres

Estimate of total acres in cover crops (contracted through MCPP + other source)

FY 16	FY 17	FY 18
2,717 acres	16,104 acres	22,827 acres

PRACTICE INSTALLATION & ADOPTION

BIOREACTORS



Drainage water is routed through trenches filled with woodchips, reducing the amount of nitrates delivered downstream.

In the Middle Cedar, bioreactors **reduce nitrate concentration by 42%** on average for tile water flowing through woodchips.

Data provided by the USDA Agricultural Research Service and Iowa State University. Photo courtesy Iowa Soybean Association.

IMPLEMENTATION

Two bioreactors have been installed in the MCPP area.

SATURATED BUFFERS



Control structures can be installed to divert drainage water, which raises the water table. Nitrates filter out through soil in the buffer when the drainage water interacts with plants and microbes.

In the Middle Cedar, saturated buffers **reduce nitrate load by 39%** on average.

Data provided by the USDA Agricultural Research Service and Iowa State University. Photo courtesy Iowa Soybean Association.

IMPLEMENTATION

A total of 5 saturated buffers have been installed in the MCPP area.

WETLANDS & WETLAND EASEMENTS



Drainage water is routed through wetlands, providing wildlife habitat and other benefits. Wetland plants take in nutrients from the drainage, reducing nitrates downstream.

In the Middle Cedar, monitoring of water flowing through wetlands showed **nitrate concentrations 84% lower** than stream observations over the same period.

Data provided by the USDA Agricultural Research Service and Iowa State University. Photo courtesy Iowa Soybean Association.

IMPLEMENTATION

Work to identify and install wetlands or contract wetland easements is ongoing. Wetland development is a complex, highly personalized process. While we have evaluated several promising opportunities, we have not yet been successful in creating any new practices in this category.

PRACTICE INSTALLATION & ADOPTION

NO-TILL / STRIP-TILL



Reducing or eliminating tillage improves soil health, reduces soil erosion and decreases phosphorus loss. No-till does not reduce nitrogen losses. Both no-till and strip-till were already common practices in the watershed prior to the MCPP.

IMPLEMENTATION

A total of 1,010 acres are under contract with the MCPP.

	FY 15	FY 16	FY 17	FY 18
No-Till	-	800 acres	-	-
Strip-Till	-	-	-	210 acres

Operations continue to transition away from tilling, however many producers are doing this at their own initiative, without MCPP project funding. A 2016–17 survey of the whole project area showed **37,518 acres of no-till** and **12,260 acres of strip-till** in practice.

THE NATURE CONSERVANCY: OXBOW RESTORATION



Remnants from river and creek paths that have disconnected from the main channel can be restored and reconnected to the watercourse, providing habitat, flood storage capacity, and reducing sediment and nutrient loads.

In 2017, with the help of The Nature Conservancy, both Linn County and Cedar Rapids restored oxbows.

WETLAND PROPOSALS — LINN COUNTY, CRCSD, CITY OF CEDAR RAPIDS



Preliminary discussions and design has begun for a wetland and pond on the edge of Morgan Creek Park, in City of Cedar Rapids parkland, and on Cedar Rapids Community School District grounds. Wetlands and ponds provide water quality benefits and slow stormwater runoff. Such an installation could be used as an outdoor classroom for students in nearby schools.

PAY FOR SUCCESS DISCUSSION



Iowa Soybean Association and partners Quantified Ventures and Land O'Lakes SUSTAIN are developing a Pay-For-Success Feasibility Study Project with the cities of Des Moines, Cedar Rapids, and Clive. The Pay-For-Success model would create a framework for cities and farmers, along with private investors, to work together to solve water quality and flood-related problems through outcomes-based financial incentives. This model is unlike anything tried before in Iowa. If it is cheaper for cities to invest in outcomes delivered upstream than to invest in more expensive infrastructure within city limits, a Pay-For-Success project has merit.

MINNESOTA RURAL WATER ASSOCIATION CONFERENCE



The Cedar River watershed extends into portions of southern Minnesota. Projects in our neighboring state can create water quality and quantity benefits in Cedar Rapids.

City staff will present at the MN Rural Water Association Conference with the hopes of sharing lessons learned through the MCPP and inspiring RCPP grant applications in Minnesota.

LESSONS LEARNED

The City of Cedar Rapids has earned national recognition and drawn attention from farmers and landowners across the State of Iowa and beyond for its collaborative approach with agricultural partners in the watershed.

Cedar Rapids has a manufacturing economy that focuses, in part, on adding value to the corn and soybeans that grow in the region. These deep ties create an interdependence between producers, industry, residents, and the municipality through raw materials produced in the watershed, a clean and cost-attractive water supply, efficient water pollution control, and strong economic output that provides fuel and food to people around the world.

The Middle Cedar Partnership Project shows how urban and rural communities can work together toward shared goals. The City, agricultural producers, landowners, farmers' associations, and conservation entities have all yielded common benefits through their innovative, cross-sector collaboration. The sharing of resources has unlocked additional funding toward the implementation of in-field practices. Technical assistance, which would have been unavailable to landowners without this partnership, has provided the documentation required to spend federal dollars on private land.

Practices that reduce nitrates in the Cedar River can simultaneously protect the City's drinking supply and create soil health benefits. Practices can slow water runoff, both reducing flood intensity and erosion. Many of the practices that work to hold nutrients in the fields and prevent pollution in the Cedar River also help to condition the soil.

Through this process, we have become aware of the critical importance of a project coordinator position. Ideally, the coordinator is trusted in the local agricultural community and able to work on the ground in the region daily. A coordinator serves as an essential bridge between project partners and front-line farmers/landowners, providing education and assistance from project conception to practice installation.

NEXT GENERATION

The Middle Cedar Partnership Project is an initial step toward Cedar River watershed improvements that benefit the Cedar Rapids community and all other communities connected to the river. Each dollar invested in the watershed upstream produces multiple benefits for the City of Cedar Rapids' residents, industries, Utilities Department, and producers and residents up- and downstream.

The MCPP will continue to assist partners in the project area until 2020. Data will continue to educate partners on best practices and implementation methods. The City of Cedar Rapids is already investigating additional potential watersheds in which to continue this work after RCPP funding expires.

Funding remains a crucial element to inspire practice adoption. City staff have been encouraged to continue a collaborative approach and hope to leverage similar partnerships in the future to secure additional grants.

More states are implementing regulatory changes for agricultural producers. We expect a continued evolution in regulatory practices for wastewater outfalls. Should future changes regulate nutrient and phosphorus levels, we are hoping to earn credit for our work with upstream entities in the form of a potential exchange program or offset credit.

Everyone has a stake in water and soil quality improvement. Opportunities to work together toward these common goals only make the overall efforts stronger. Water stewardship must start with teamwork in our watershed. MCPP has shown how that is possible.