Cedar Rapids Improves Water Quality

Cedar Rapids, Iowa Implements Best Management Practices to Improve Water Quality, Soil Heath, and Flood Mitigation

Summary

Due to extreme flooding events and excessive nitrogen levels in the Cedar River Watershed, the City of Cedar Rapids led the Middle Cedar Partnership Project to reduce nutrient runoff and improve soil health. The partnership collaborated with local farmers, landowners, and conservation organizations to implement strategies to reduce nutrient runoff, mitigate flood risk, and improve soil health and water quality with technical and financial assistance. Additionally, the partnership's outreach efforts provided educational content through webinars, field days, social media campaigns, direct mail campaigns, and one-on-one consultations.

A crew implementing one of the practices to improve water quality. Photo courtesy of the City of Cedar Rapids

How did they do it?

Action	Applicable Resources

Action	Applicable Resources
Developed watershed plans to prioritize placement of best management practices • With the assistance of the Iowa Soybean Association, project partners identified areas in the watershed where best management practices would have the greatest effect. • Project partners developed plans for sub-watershed areas that included maps, landscape characteristics, and other information to determine best management practices for specific areas.	• The US Department of Agriculture Agricultural Research Service's Agricultural Conservation Planning Framework <https://www.ars.usda.gov/midwest-area/ames/nlae/news/the-agricultural-conservation-planning-framework/> provides a watershed approach and set of GIS tools to find conservation opportunities across different landscapes. • The Iowa Nutrient Reduction Strategy <http://www.nutrientstrategy.iastate.edu/documents> is a framework to assess and reduce nutrients entering waterways from point and non-point solutions in a cost-effective manner.

Action	Applicable Resources
Implemented strategies using financial and technical assistance. • The project provided landowners and farmers assistance to improve the use of conservation practices such as cover crops, reduced tillage, saturated buffers, bioreactors, and wetland creation.	• The Iowa Soybean Society Online Tools for Land Management <https://www.iasoybeans.com/programs/isa-research/tools-services/> provides various tools to examine different best management practices. • The Whole Farm Conservation Best Practices Manual <https://store.extension.iastate.edu/product/15823> provides recommendations for farmers and landowners getting started with conservation and water quality practices.
Conducted outreach activities to support landowners and farmers. • The City of Cedar Rapids hired a local outreach coordinator to work with farmers and provide one-on-one consultations and technical assistance.	• 4R Plus: Nutrient management and conservation for healthier soils <https://4rplus.org/> uses nutrient management and conservation practices to provide nutrients where they are needed to enhance soil health and improve water quality. • The US Department of Agriculture National Resources and Conservation Service offers a programs portal <https://www.nrcs.usda.gov/programs-initiatives> with financial and technical resources for conservation programs.

Background

The City of Cedar Rapids draws drinking water from shallow wells near the Cedar River, a part of the Middle Cedar and Cedar River watersheds. There is a high demand for clean water in the watershed where flooding and nutrient runoff often pollute the water supply. Excessive nitrogen and phosphorus from agricultural fertilizers and manure have caused an overgrowth of algae in the region, which negatively impacts aquatic ecosystems and human health. Elevated nitrate levels in drinking water are a threat to human health, and can lead to public water supplies being shut down for a period until nitrate concentrations decrease to acceptable levels. Some cities, such as Des Moines, Iowa, have had to build expensive systems to remove nitrates from drinking water supplies.

The Iowa Water Resources Coordinating Council identified the Middle Cedar watershed as a priority under the Iowa Nutrient Reduction Strategy due to high annual averages of nitrogen and phosphorus runoff. The runoff caused an overgrowth of algae in the region and threatened drinking water supplies, negatively impacting the aquatic ecosystems and human health. Due to the increasing threat to its drinking water supply, combined with severe flooding in 2008, a drought in 2012, and increasingly frequent flash flood events, the City of Cedar Rapids decided to take action to protect its residents, water, and soil health.

Implementing agricultural conservation practices is one of the most effective ways to reduce polluted runoff and decrease the use of soil amendments, such as fertilizer and manure. After the passage of the 2014 federal Farm Bill – which contained an initiative that enabled private entities and municipalities to partner with the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS) on watershed work – the City of Cedar Rapids began collaborating with local partners and organizations to work directly with landowners and farmers on soil conservation.

Implementation

The partnership focused on implementing strategies to reduce nutrient levels and flooding in the 2,417-square-mile Middle Cedar watershed. Specifically, the project covers a total of 135,000 acres in five watersheds located in Benton, Tama, and Black Hawk Counties.

During 2014 and 2015, before the project officially launched, the Benton/Tama Nutrient Reduction Demonstration Project and Miller Creek Water Quality Initiative Project worked on educating farmers on agricultural conservation practices. The City of Cedar Rapids then identified community and agricultural partners to assist the project through funding and educational resources. A total of 16 entities joined the partnership, including key stakeholders such as the Natural Resources Conservation Service, Iowa State University, and the Iowa Soybean Association.

The Iowa Soybean Association produced watershed plans, identified sub-watershed areas, and mapped landscape characteristics to determine which strategies would be most effective and produce the greatest impact for the surrounding communities. The watershed plans also outlined monitoring and evaluating processes of the strategies for future analysis, including nitrate and phosphate levels in the Middle Cedar River watershed. The City used the watershed plans and maps to prioritize locations to use the strategies to optimize the benefits and effectiveness of the project. The strategies the partnership decided to implement and analyze included cover crops, nutrient management, wetland creation, and other water quality improvement practices.

The City then worked with partners to implement the strategies in the designated areas by providing landowners and farmers with financial and technical assistance. The Linn County NRCS office established contracts with local landowners and farmers to implement the conservation practices.

The project also incorporated outreach activities and technical assistance, including webinars, field days, social media campaigns, and direct mail campaigns. To support community engagement, the project hired an outreach coordinator who was responsible for engaging local farmers on the issue and identifying individuals who were willing to implement the strategies. The coordinator also provided direct technical assistance, supporting farmers with on-farm conservation planning and funding applications. The coordinator used the funding opportunities and technical assistance as incentives for participation in the project, which increased community buy-in and long-term sustainability. Throughout the process, the City collaborated with its partners to provide the relevant educational content and information on the strategies to landowners and farmers in the Middle Cedar River watershed.

Funding

The project was awarded $1.6 million from the federal USDA-NRCS Regional Conservation Partnership Program <https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/rcpp/> . Pledges made by each of the 16 partners provided additional funding totaling over $1.9 million. These funding sources covered the project for five years, beginning in June 2015, through June 2020. The funding provided technical and financial cost-share assistance to help landowners and farmers to implement the strategies.

Timeline

The City of Cedar Rapids began discussing the project in 2014. The project started in June 2015 and ended in June 2020. However, the City of Cedar Rapids hopes to continue the project and intends to submit a proposal for future RCPP funds.

Outcomes and Conclusions

Since June 2015, the partnership has monitored and evaluated the impacts of the strategies on nutrient levels in the Middle Cedar watershed. In the project watersheds, tile and in-stream nitrate concentrations have shown a decreasing trend since 2015. Fields with bioreactors—or buried pits filled with a carbon source such as wood chips, through which water is diverted—showed the greatest decrease in nitrate levels. Tile nitrate concentration varied for fields with and without cover crops, which highlighted that field-scale management is very important.

City staff participating in a bioreactor installation. Photo courtesy of the City of Cedar Rapids

According to the 2018 annual report, a total of 17,382 acres used cover crops that were under contract with the partnership. Water quality models estimated 9,958 acres of cover crops reduced nitrogen by 40,000 pounds in 2017. Water monitoring showed that bioreactors decreased nitrate load by an average of 42 percent, while fields with saturated buffers resulted in an average decrease of 32 percent.

The project resulted in three returns: reduction in nutrient runoff and improved soil health, flood mitigation and stormwater storage, and anticipated long-term tax dollar savings with lower utility costs due to reduced demands on water treatment plants and decreased flood damage.

Over the span of five years, the Middle Cedar Partnership Project achieved the following:

- Treated more than 37,561 acres

- Had over 350 individual contacts with farmers to provide technical assistance on farm conservation activities
- Hosted over 25 field days with farmers on agricultural topics
- Presented five webinars to local and national audiences
- Presented at over 20 conferences, meetings, and outreach events
- Resulted in:
  - social media posts on Facebook, Twitter, and YouTube by a variety of partners
  - 20 mailings to farmers and Cedar Rapids residents
  - 60 media releases and articles about the project
- Hosted five tours with local conservationists, farmers, elected officials, and out-of-state visitors

The City is seeking funding to continue this project beyond 2020 and plans to continue efforts to educate landowners and farmers on management practices, reduce city nutrient runoff, and improve flood mitigation practices.

Takeaway Message

It was essential to build initial community trust and develop meaningful relationships with community members to adopt the strategies. The outreach coordinator played a critical role in bridging the communication gap between agricultural experts and farmers. In addition, it was important to conduct meetings and outreach in the community by traveling to various counties, farms, and field day events to further connect with the farming communities and establish long-term partnerships. The partnerships were crucial to the success of the project as they pledged significant funding in the form of financial and/or technical assistance. During the project, it was determined that direct financial assistance was a powerful motivator in getting community buy-in. The City anticipates that future initiatives will rely on direct funding more than technical assistance funds.

Project managers highlighted the importance of “one water”, meaning that communities are all connected by water and need to work together by moving outside city boundaries to protect water.

Additional resources

- The Middle Cedar Partnership Project website <http://www.cedar-rapids.org/residents/utilities/middle_cedar_partnership_project.php> hosts the report and chronicles perspectives from some of the participants.

For more information on Cedar Rapid's efforts, contact:

- Mary Beth Stevenson
  Watershed & Source Water Coordinator
  City of Cedar Rapids

319- 286- 5942
mb.stevenson@cedar-rapids.org

- Michael Kuntz
  Utilities Environmental Manager
  City of Cedar Rapids
  319-286-5282
  mikek2@cedar-rapids.org
- Tariq Baloch
  Water Utility Plant Manager
  City of Cedar Rapids
  319-286-5283
  tariqb@cedar-rapids.org

Start preparing your community

Adaptation strategies

Learn how your community can prepare for flooding and algal blooms.
<../strategies/index.html>

Tools

See what tools are available to help your community prepare for flooding and algal blooms.
<../tools/index.html>

Funding

See the funding opportunities available to support your resilience strategies.
<../funding/index.html>

ENVIRONMENTAL RESILIENCE INSTITUTE TOOLKIT (ERIT) <HTTPS://ERI.IU.EDU/ERIT/>

HOOSIER RESILIENCE INDEX <HTTPS://HRI.ERI.IU.EDU/>

DONATE <HTTPS://ERI.IU.EDU/SUPPORT-OUR-WORK/WAYS-TO-GIVE.HTML>

WEBINARS <HTTPS://ERI.IU.EDU/WHO-WE-WORK-WITH/LOCAL-GOVERNMENTS/WEBINARS.HTML>