

US EPA ARCHIVE DOCUMENT

# COLDWATER-PALMER CREEK WATERSHED PROJECT

## ABOUT COLDWATER/PALMER CREEK

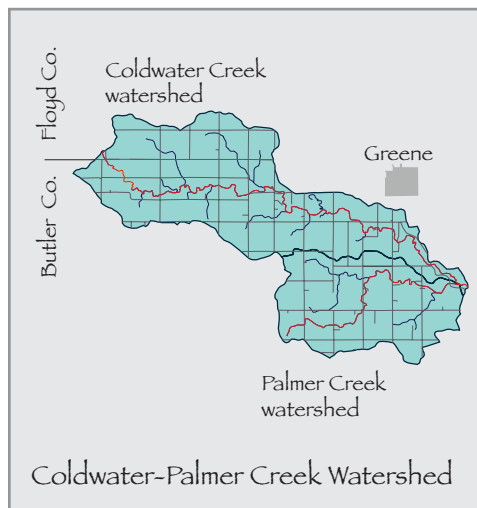
Lower Coldwater and Palmer Creeks are adjacent tributaries of the Shell Rock River, which in turn flows into the Cedar River near Cedar Falls. Between them they encompass a 39,120-acre watershed.

In June 2006, the Iowa Department of Natural Resources (IDNR) released a 61-page assessment and plan to improve water quality in the Cedar River. Although the plan didn't include Coldwater and Palmer Creeks, they were on Iowa's 303(d) list of impaired water bodies. The 303(d) impairment of designated use (aquatic life) was attributed to organic enrichment that restricted normal biological life (usually due to nitrogen (N) and phosphorus (P) levels that result in excessive algae growth) resulting in low dissolved oxygen and

compounded by high ammonia levels. The assessment score for fish population and diversity in Coldwater Creek was relatively low compared to similar streams in the region but was a target of watershed project goals for improvement.

Cedar River Snapshot monitoring, led by U.S. Geological Survey staff, sampled over 80 stream locations in the Cedar River watershed from 2000 thru 2005 and revealed that Coldwater Creek ranked near the highest for delivery of nitrate nitrite nitrogen.

Based on these issues, the primary goal for the watershed improvement council when it was formed in 2006 was to reduce nutrient loading to levels that meet IDNR water quality standards.



## HISTORY, MISSION AND TARGETED ACTIVITIES

For over four years, producers in Lower Coldwater and Palmer Creeks in Butler and Floyd counties worked to develop a community-based approach for improving water quality in their watershed. Their effort was initially funded by a grant from the Iowa Corn Growers and subsequently by a grant from the Iowa Watershed Improvement Review Board (WIRB).

Grant funds were used primarily for small incentives for cooperating producers to adopt nutrient management and soil management practices that improved stream water quality in measurable ways.

A watershed council, composed of watershed residents, developed and modified a performance-based watershed management program to reflect the different issues in Coldwater-Palmer. The program was based on the Hewitt Creek model, named after a small watershed near Dyersville in the Maquoketa River watershed and initiated by watershed residents and Iowa State University Extension staff. The Hewitt model emphasizes community involvement and decision-making and has been used in several other Iowa watersheds.

As noted above, the primary goal for the watershed improvement council when it was formed was to reduce nutrient loading

to levels that meet IDNR water quality standards.

Coldwater-Palmer watershed project worked something like this. All watershed residents or landowners who attended meetings became part of the council and following organizational meetings they elected officers to serve for three years: Scott Bruns, council chairman, Dave Muth, vice chairman, Ted Pitzenberger, secretary, and Dennis Cassman, treasurer.

The council was formed as an Iowa non-profit corporation to apply for grant funds, such as WIRB. The council met five to six times a year, generally winter and summer, to review budgets, set yearly watershed goals and evaluate progress, and prioritize producer incentives for the participants.

In 2006, the first year, C-P watershed council leaders adopted a performance-based program similar to the new CSP using the Iowa Phosphorus Index, soil conditioning index and fall cornstalk nitrate-nitrogen test to quantify agricultural production and environmental management for improved watershed performance. More than 70 percent of watershed farmers participated.

The council offered cooperators a set of incentives for sustainable stewardship and bonus rewards for improving environmental performance. Specific incentives were for cornstalk nitrate analysis, phosphorus index performance, soil conditioning index improvements, manure application calibration, grid

### WATERSHED COUNCIL OBJECTIVES

- Develop a program of performance rewards and community support that motivates at least 60 percent of watershed producers to adopt performance measurements and rewards improvements in controlling agricultural contaminants, especially N.
- Reduce N inputs by 35 percent over 3 years by adoption of Late Spring Nitrate Test.
- Reduce P transport to surface water by 35 percent over 3 years by using the Iowa P index and soil conditioning index to improve fertilizer and P-based manure application rates and soil conservation in high-delivery areas.
- Evaluate outcomes and document lessons learned.

sampling, and other practices. The goal was to accomplish improved performance while improving net farm income (in 2006, individual producer incentives ranged from \$400 to \$1,876).

The Rockford High School FFA chapter was engaged to collect cornstalk nitrate samples and yield estimates from cooperator corn fields soon after crop maturity. Baseline results revealed a need to better determine the nitrogen contribution from manure applications, and commercial nitrogen application timing and rates that could reduce nitrate loss to tile drainage and to the stream. A FFA advisor said the chapter participation was a very valuable public service and educational experience for the students.

Also in 2006, a portion of the Iowa Corn Growers funding was used to monitor stream segments within Coldwater and Palmer watersheds. Lloyd Stauffer collected rain event and normal flow samples for testing and some split samples were analyzed at no cost by Dr. Marty St. Clair, chair of the Department of Chemistry at Coe College. The monitoring confirmed quite high P and

seasonally very high nitrate analyses. The sampling continued through 2010, with testing by the Iowa Hygienic Lab in Iowa City, providing four years of monitoring data.

Over the four years of the program, nitrate concentration at the four sites decreased by an average of two parts per million (ppm) annually, from 20 ppm in 2006 to 14 ppm in 2009.

#### Bioreactor demonstrations

A long term demonstration of denitrification of tile drainage on the Ted Pitzenberger farm is sponsored by the Coldwater-Palmer Project with cooperation and funding from the Iowa Corn Growers Association. The drainage control structure and woodchip bioreactor was installed on November 1, 2006.

In 2009, the council used approximately \$15,000 of project funding from the Iowa Corn Growers Association to support the construction of a new bioreactor. The 15-foot wide by 120-foot long bioreactor was installed and equipped with automatic monitoring equipment at Northeast Iowa Research Farm, Nashua.

#### What was learned

Key to the Hewitt model was the flexibility it offered the council, something the council learned early.

“There is no one set program to farming to environmentally conscientious farming,” says Cassman. “No one giant program that fits all.” As an example, the council started the project using the model but made changes to the baseline incentive list. Phosphorus proved easier to deal with in Coldwater than in Hewitt, Cassman says, so the council changed the incentives.

The council also learned that change takes time, Cassman says, “We go sideways some times.” And sometimes the changes are modest, even unexpected. For example, he recalls that a neighbor stopped by his house one evening and the two had an extended discussion, including tillage. Not long after, the neighbor switched to chisel plowing. “So he learned, which is all we ask.”

“At least some people are listening,” he continues. “We didn’t go around and point fingers. Everyone had a choice on whether or not to participate.”

Iowa State University sociologists conducted producer surveys in 2006 and 2009, which showed changes in attitude about water quality, such as awareness in water quality issues and the threat of N.

Project cooperators also indicated an appreciation in the flexibility of the incentive program and the ability of the council to make adjustments to the incentive program based on cooperator response and performance results. They were also glad to have the opportunity to participate in watershed planning and goal setting.

Although the WIRB funding has been exhausted, the council had approximately \$25,000 in Iowa Corn Growers funding that allowed it to continue with a refined program in 2010. The funds were used primarily for incentives for N management (late spring nitrate, end-of-season nitrate and reduced N application) and continued water monitoring. The council met four times the last year.

### WATER MONITORING IN COLDWATER-PALMER



A portion of the Iowa Corn Growers funding was used to monitor stream segments within Coldwater and Palmer watersheds. Lloyd Stauffer, left, collected rain event and normal flow samples for testing at several labs, including the Iowa Hygienic Lab in Iowa City.

The monitoring confirmed quite high phosphorus and seasonally very high nitrate analyses.

Stauffer got involved after attending the council meeting: “I’m kind of interested in conservation,” he said. After discussing the issue with his wife, who had a background in biology and chemistry, he volunteered.

Since then, he traveled the blacktops and gravel roads April through September, from the top of the watershed to the bottom, to gather samples. He averaged eight trips each year.