In-Depth NONPOINT SOURCE SUCCESS STORY

Highlighting the People Behind the Progress

Communitywide Effort to Convert to Sprinkler Irrigation Reduces Selenium and Yields Environmental and Economic Benefits

NORTH PLATTE RIVER, WYOMING

Natrona County farmers near Casper, Wyoming, banded together to reduce levels of selenium in local waters by switching from flood irrigation to sprinkler irrigation. By 2018, thanks to the example of a few enterprising landowners and the leadership of the local conservation district, more than 65 percent of the farms had switched to sprinkler irrigation and added other management practices. Water quality improved, field production increased, and water and labor costs were reduced. Plus, local stakeholders and government officials formed lasting partnerships.

Partners in Success

Lisa Ogden, Natrona County Conservation District (NCCD)

Local Leader Creates Change

Lisa spearheaded efforts to use irrigation best management practices (BMPs) throughout the area.

Kelly Burch, Farmer

Neighbor Leads by Example

An early adopter of sprinkler irrigation, Kelly told others about the financial and environmental benefits.

Andy Anderson, Farmer and NCCD Board of Supervisors

Local Leader Inspires Others

Andy highlighted cost savings when encouraging operators of small farms to use sprinkler irrigation.

Jennifer Zygmunt, Wyoming Department of Environmental Quality

State Staff Serves as a Resource

Jennifer helped the NCCD access Clean Water Act (CWA) section 319 funds to support the project.

Success Story *Highlights*

- **Pollutant of concern:** Selenium
- **Practices implemented:** Converting flood irrigation to sprinkler irrigation reduced the mobilization of selenium into surface water
- **Waters restored/improved:** 36.8-mile segment listed as impaired in 1998 and delisted in 2018
- **Key elements of success:**
  - » Strong local leadership
  - » Landowners were willing to take risks to gain long-term benefits
  - » Practices offered economic advantages

Problem

Selenium is a water-soluble mineral that naturally occurs within the Cody Shale underlying Natrona County soils. Groundwater and irrigation water readily dissolves selenium, which can then be carried to surface waters in runoff and can also accumulate on agricultural fields as water pools and evaporates on the surface. Elevated selenium levels are particularly harmful to waterfowl, fish, and aquatic insects. Livestock can be affected if they consume too much selenium by eating plants that absorb selenium.

Background

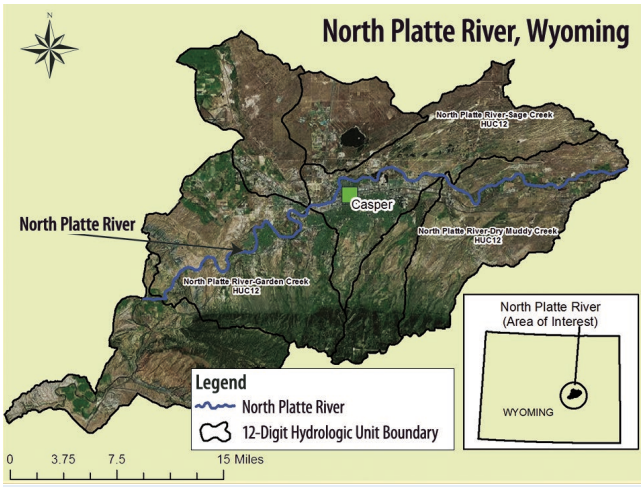
After widespread fish mortality and animal deformities occurred in 1983 at California's Kesterson National Wildlife Refuge, the U.S. Bureau of Reclamation identified 26 areas in western states that were hydrologically similar to Kesterson (i.e., presence of Cody Shale), including the Kendrick Project Area near Casper, Wyoming. The Wyoming Department of Environmental Quality (WDEQ) found that the aquatic life, coldwater fisheries, and wildlife designated uses in the North Platte River within the Kendrick Project Area were impaired by selenium and added a 36.8-mile segment to the CWA section 303(d) list in 1998.

Key Accomplishments

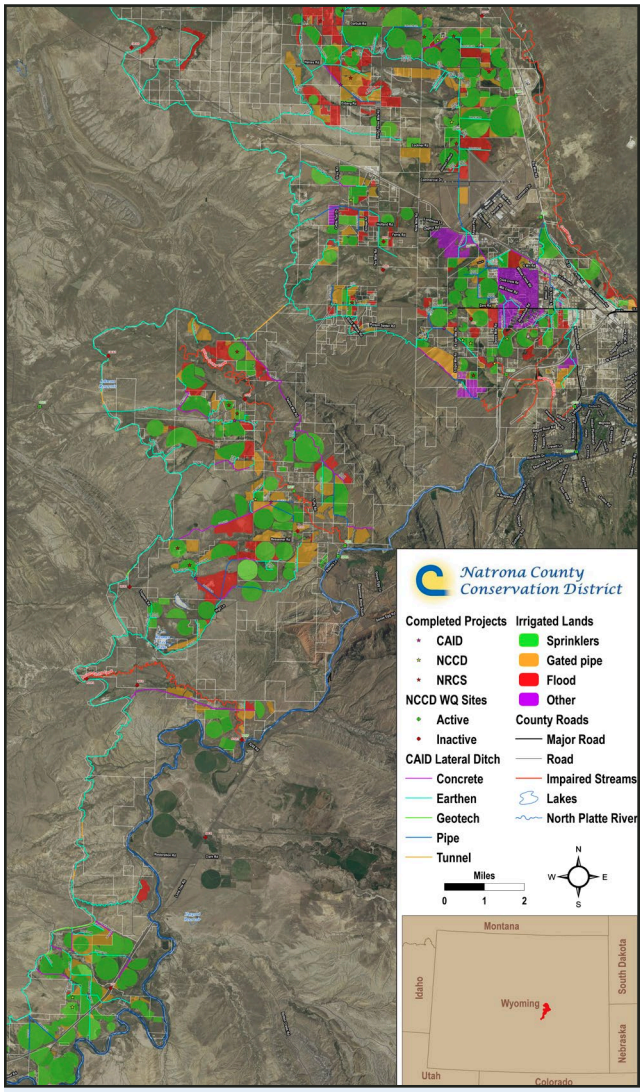
To reduce the amount of selenium in surface waters, stakeholders implemented numerous BMPs including replacing dirt ditches with pipeline, adding stage-control structures and automation, and replacing flood irrigation with more efficient sprinkler systems (see map for location of BMPs). Water quality has improved as a result. The 2018 North Platte River *NPS Success Story* provides additional technical details. The following pages identify the key project elements that contributed to success and the dedicated individuals who helped drive the work forward.

Want More Information?

- *Selenium Management Booklet*
- *North Platte River Watershed TMDL Implementation Project: Section 319 Final Report*



Map of the North Platte River watershed.



By 2018, many selenium-reducing BMPs had been installed throughout the North Platte River watershed in the Kendrick Project area.

THE PEOPLE BEHIND THE PROGRESS

Lisa Ogden, District Manager, NCCD

A Local Leader Creates Change

Lisa grew up in Casper, Wyoming, and has worked at the NCCD since 2010. She is the only paid staff member. Lisa works directly with landowners and leads implementation of irrigation BMPs.

- ***What is the history of the selenium problem?***

Lisa: Local residents have known about the selenium issue since the early 1950s. In the 1990s, the University of Wyoming studied selenium concentrations in the North Platte River and its tributaries. In the early 2000s, the Casper Alcova Irrigation District (CAID), the Natural Resources Conservation Service (NRCS), the NCCD, and landowners began a focused effort to address the problem by switching from flood irrigation to sprinkler irrigation and adding other BMPs.

- ***What was your biggest obstacle?***

Lisa: Getting to know the landowners, gaining their trust, and assuring them that I'm here for the long-haul. My background was not in agriculture, so I listened and learned from the landowners to fully understand the issues.

- ***What role did the CWA section 319 program play?***

Lisa: The 319 funding provided a "foot in the door" to build strong relationships. It provided the funds to complete the projects and offered flexibility. For example, when NRCS had a staff shortage and could no longer provide engineering assistance, the 319 grant allowed NCCD to hire outside help.

- ***What should people know?***

Lisa: Selenium will always be a part of the geologic makeup of much of Natrona County due to the Cody Shale. People's concerted efforts to work together for a common goal has made the watershed healthier. The delisting of the North Platte River from the 303(d) List of Impaired Waters is a tremendous "feather in the cap" of the landowners and the partners who have worked together.

"I love my job. I get to work every day with the some of the best stewards of our land: the farmers and ranchers."

Lisa Ogden

NCCD staff collect water quality data in the watershed.

Landowners began using more pivot sprinkler irrigation systems in the North Platte River watershed.

"Good things can happen at the grassroots level."

Kelly Burch

Kelly Burch, Farmer/Rancher

A Neighbor Leads by Example

Kelly, a retired agriculture teacher, works on his ranch full time. An early adopter of sprinkler irrigation, Kelly has been encouraging other farmers in the North Platte River watershed to do the same. Kelly served on the NCCD Board of Supervisors for 8 years.

- ***What inspired you to get involved?***

Kelly: I knew the selenium had to be cleaned up—and that overwatering contributed to the problem. I began converting my land from flood irrigation to sprinkler irrigation in 2004. I cut water usage in half and doubled my production. I no longer need to purchase additional water, which has helped the pocketbook.

- ***What inspired other farmers to join in?***

Kelly: Once others saw the economic benefits, they got on board. By installing sprinkler irrigation, they could water uniformly across both low-lying and elevated areas, which increases production. In addition, NRCS provided cost-share funding to purchase the pivots [a type of sprinkler irrigation system that rotates on a central axis], which can cost approximately $100,000. Local banks supported the community's efforts and provided low-interest loans because they knew this practice increased landowners' income and allowed them to pay back the loan. Because funding was available, it was pretty easy to convince other landowners to switch.

Andy Anderson, Farmer and NCCD Board of Supervisors

A Local Leader Inspires Others

Andy grew up on a small Wyoming farm. He holds professional engineering and geology licenses and worked in consulting for a number of years. He and his wife currently operate a ranch near Casper. He has served as the NCCD Chair for 8 years. Andy encourages operators of small local farms to convert from flood irrigation to sprinkler irrigation.

- ***What inspired farmers to participate?***

Andy: Farmers were enthusiastic because the project offered benefits for the river, community, and their farms. The new pivots helped address the selenium issue, increased production, and reduced labor costs. The larger-acreage producers were more invested at first, but in the past few years the smaller-acreage farmers have seen the larger farms doing well and also began applying for cost share to convert to sprinkler irrigation.

"Farmers saw that using sprinkler irrigation practices was more efficient and saved money."

Andy Anderson

Jennifer Zygmunt, WDEQ

State Staff Person Serves as a Resource

Based in Cheyenne, Jennifer is the WDEQ's Nonpoint Source Program Coordinator. Jennifer helped the NCCD access CWA section 319 funds.

- ***What impressed you about this nonpoint source success story?***

Jennifer: Thanks to the community's hard work, over 36 miles were officially delisted from Wyoming's impaired waters list. The scope of BMPs implemented is impressive! The project is also notable because of its monitoring program. NCCD's data has not only shown that the chronic water quality criterion for selenium is being met, it has also helped correlate water quality improvement and reduced selenium loading with BMP implementation. The NCCD was proactive in developing a strong monitoring component to their projects.

- ***What role did CWA section 319 program play in this project?***

Jennifer: Section 319 was a key funding element. Funds from both CWA section 319 and NRCS EQIP [Environmental Quality Incentives Program] were used to accomplish what was needed. The 319 funds helped spotlight the water quality issues and covered a lot of ground that EQIP couldn't have.

- ***Is this project serving as an example for others?***

Jennifer: Yes! NCCD's long-term monitoring program to document project effectiveness is a good model for others in the state. NCCD's positive attitude, persistence, and commitment to partnerships are also traits worth emulating.

"This project promoted dialogue and raised awareness that addressing water quality problems is a community-wide effort."

Jennifer Zygmunt

Watershed landowners collaborate on land management.

Widespread Participation Was Key

NCCD led the selenium-reduction project, including managing landowner contracts and administrative reporting and budgeting. To ensure success, NCCD turned to diverse stakeholders throughout the watershed and beyond for information, funding, encouragement, and engagement:

- **Watershed landowners** participated in the project and shared information with others.
- **City of Casper, Casper Public Utilities Board**, and the **Natrona County Commissioners** offered local leadership and funding for projects.
- **Natrona County Weed and Pest** supplied conservation recommendations.
- **Wyoming Association of Conservation Districts** offered leadership and information to NCCD.
- **University of Wyoming Extension Service** provided outreach assistance.
- **USDA National Resource Conservation Service** provided program assistance and technical support.
- **Casper Alcova Irrigation District** partnered on projects.
- **USDA Farm Service Agency** helped landowners.
- **Wyoming Department of Agriculture** provided guidance and water quality grant funding.
- **WDEQ** provided project leadership, supervision, and financial support.
- **Wyoming Department of Game and Fish** provided technical assistance on issues regarding watershed wildlife.
- **U.S. Environmental Protection Agency Region 8** provided grant and project support.

A Community-Based *Success*

Both environmental and financial considerations played motivating roles in the project. Farmers knew that reducing selenium was important for protecting wildlife and livestock health, and that the placement of the North Platte River on the CWA section 303(d) list of impaired waters had raised concerns of possible increased water treatment costs. As described in the NCCD's *Selenium Management booklet*, if landowners and local agencies did not make a documented effort to reduce selenium loading to surface waters, it was possible that local municipalities within the county could eventually be required to treat excessive selenium concentrations at the local wastewater treatment plant. If required, the expensive upgrades needed to treat the selenium-laden water would substantially increase water costs for consumers.

Private citizen John Lawson offered his unique insight into the project. "At first, the project was not getting much attention. With the 303(d) listing, the larger community began to take notice because concerns about selenium had the potential to increase utility bills if water treatment became necessary," he said. "Plus, less labor is needed with sprinkler irrigation, so costs are lower. There were not many obstacles once the community understood the economics. They clearly saw the benefits of reducing selenium levels in the river."

U.S. Environmental Protection Agency
Office of Water
Washington, DC

EPA 841-F-19-001R
August 2019

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