

BWSR engineering tour offers insights to help overcome design challenges



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The Minnesota Board of Water and Soil Resources' (BWSR) 2024 spring engineering tour showcased engineering projects throughout southwestern Minnesota. Tour attendees, which consisted of BWSR engineering staff, visited 14 sites, all of which featured projects that provide enhanced water quality, wildlife habitat and water storage. At some stops, soil and water conservation district staff, watershed district staff and landowners joined them to discuss project details.

Tour sites included restored wetlands and uplands on Reinvest in Minnesota (RIM) and Minnesota Conservation Reserve Enhancement Program (MN CREP) easements. The tour featured a variety of projects such as wetland restorations, riverbank restorations and a visit to see a Wetland Conservation Act (WCA) violation on a recently restored easement.

BWSR engineering staff planned the

annual three-day tour, which began on April 29 at Haala Industries manufacturing plant in Sleepy Eye and then continued throughout six southwestern counties — Redwood, Lyon, Murray, Nobles, Cottonwood and Watonwan.

“It’s a really cool way to see our work on the ground and walk it a bit,” said Dave Weirens, BWSR assistant director for programs and policy, who attended the tour. “It’s more real, more tangible, in what we’re actually doing.”

The tour’s goal was to give BWSR engineering staff opportunities to observe and discuss project successes and challenges. The tour also gave them a chance to view the results of their work in the field and brainstorm ways to overcome design challenges.

“One goal (of the tour) is getting engineering staff together. Our staff are (located) statewide and do a lot of work

BWSR senior engineering technician Scott Santjer (in front center) and BWSR senior water resources engineer Tom Wenzel (left of Santjer) presented at the Horseshoe Lake site in Redwood County and discussed the site’s long history of maintenance issues and the recent repairs that have been done to address those issues. In an effort to prevent future clogging, a ring of large diameter rock riprap was constructed in front of the intake structure.

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Left: Tour attendees viewed a recently constructed MN CREP project, which restored a 106-acre floodplain wetland that connects to Three-Mile Creek in Lyon County. They discussed restoration processes and how to address the site's existing drainage systems. **Middle:** Attendees checked out an outlet in Nobles County, while they discussed the restoration of this large shallow lakebed and what factors influenced the type of structure used for the outlet. **Right:** On the final tour day, attendees visited a RIM and MN CREP project in Murray County that restored two large wetlands that were previously being drained by Murray County Ditch 30 drainage system. The group discussed design challenges and necessary coordination with road authority and public drainage authority staff.

through Microsoft Teams, but they don't necessarily see each other often. It's nice to have folks from different parts of the state come together for a few days," said Rita Weaver, BWSR chief engineer, who attended the tour.

The tour provided opportunities for attendees to discuss the ways they tackle engineering work.

For example: BWSR engineering staff typically follow a standard approach when designing a wetland restoration project, however every project site is different and comes with its own set of challenges.

"It's good to visit these sites and talk about the design or construction issues that may have come up," Weaver said. "We might also discuss a design element or a construction technique that isn't used very often. It is good for our staff to discuss these things as a group so we can apply what we've all learned on future projects."

A stop at the Horseshoe Lake project in Redwood County offered an example of a project where engineers had to implement a design technique that deviates from BWSR's traditional approach. This wetland restoration

project was completed in 1989 and since then there has been a regularly occurring issue of wetland vegetation plugging the outlet structure, which is a water level control structure housed in a concrete box. Since the primary outlet releases wetland waters to a subsurface drainage tile system, once the intake structure clogs, the wetland pool tends to rise, causing flood impacts on adjacent properties.

"We have certain techniques to stop vegetation from clogging the outlet, but the lake's size and the types of vegetation that grew there resulted in the outlet continuing to be choked. So, staff modified our design and put rock farther away from the outlet, to function somewhat like a berm that allowed water, but not vegetation, to pass through," Weaver said.

The stop provided an opportunity for engineering staff to discuss how they might implement that design in the future if a similar circumstance came up.

Weirens said the stop in Cottonwood County was among his favorite stops on the tour. The project features a recently constructed MN CREP project with various design components, one

being a washout repair using root wads to stabilize an eroding bank of the West Fork Des Moines River that was threatening to compromise part of the site. This commonly used technique uses locally sourced trees of about 18 inches in diameter, the main trunk is cut off at least 10 feet tall and the trees are pulled out of the earth with the root wad intact. Once prepared, the tree trunk and stump are driven horizontally, using heavy equipment, into the eroding stream bank one next to another in a row with the root wads facing out toward the river. The root wads then act to dissipate the energy of the flowing water and secure the earth around them.

Other construction activities on the site include constructed earthen embankments, strategic tile blocks to disable the subsurface drain tile, sediment removal scrapes and installation of a rock weir and pipe outlet to control water surface elevations in one of the larger restored basins. Additionally, an inline weir structure that ties into existing subsurface drain tile was installed to allow for partial drawdown of that same basin.

Tour attendees also discussed the design implemented to

help reuse wetland runoff for the landowners' irrigation system. Weirens said he also enjoyed hearing from the landowners about their goals.

"The other thing that I thought was interesting was the last stop. It was a site that's still being restored," Weirens said. "It's near a closed landfill. The MPCA (Minnesota Pollution Control Agency) has a closed landfill program. So, our staff are working with other agencies on restoring this area that's adjacent and downhill in terms of water flow. How do we manage that site in a way that is complementary to the closed landfill that's going to be there forever?"

The tour allowed attendees to see how different landscapes impact design.

"There's the way the water flows. There are the different soils that are conducive for different kinds of plant species. And then there's each landowner and each landowner has their own interests. So, you have to kind of fit all those things in together when our staff are working on a restoration design," Weirens said. "You have to satisfy all those things to be successful."