

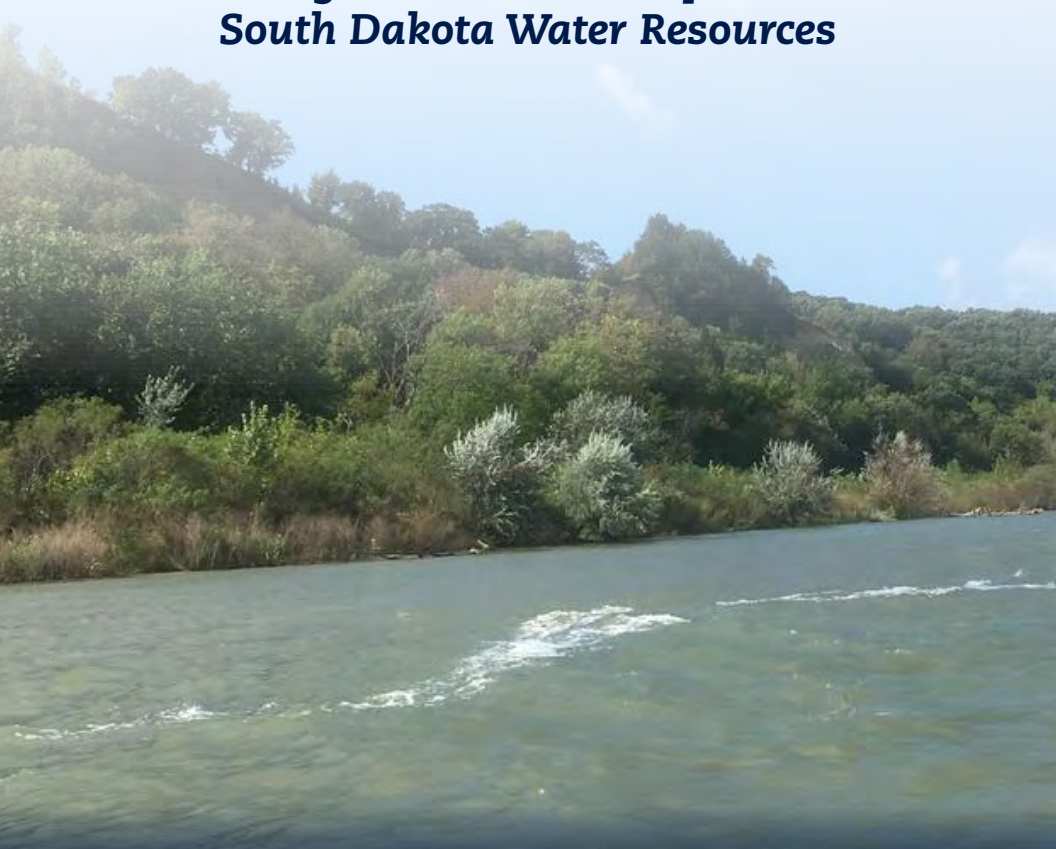


SOUTH DAKOTA STATE UNIVERSITY

Water Resources Institute

2026 Eastern South Dakota Water Conference

***Balancing Economic Development with
South Dakota Water Resources***



Hosted by: The South Dakota Water Resources
Institute at South Dakota State University

Wednesday, October 7, 2026
McCrary Gardens Education and Visitor Center

Welcome to the Eastern South Dakota Water Conference!

This booklet was produced in conjunction with the
2026 Eastern South Dakota Water Conference

Balancing Economic Development with South Dakota Water Resources

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About South Dakota Water Resource Institute

The South Dakota Water Resources Institute (SD WRI) at South Dakota State University provides leadership on evolving water concerns and problems being faced by South Dakota citizens through research, educational opportunities for students and professionals, and community outreach.

The Institute is a federal–state partnership that:

- Plans, facilitates, and conducts research to aid in the resolution of State and regional water problems.
- Provides the training and education of scientists and engineers through their participation in research and outreach.
- Promotes technology transfer and the dissemination and application of water related information.
- Provides competitive grants for students and researchers.

Authorized by Congress as one of the nation's 54 water resources research institutes, we also connect the research expertise at South Dakota State University to water related problems at the local, regional, or national levels. The Institute is affiliated with the University's College of Agriculture and Biological Sciences, Department of Agricultural and Biosystems Engineering and the South Dakota Agricultural Experiment Station.



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Water Resources Institute

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EDWDD takes a proactive approach to water resource management through a broad range of activities. EDWDD, individually or in collaboration with other entities, monitors the condition of rivers, lakes and streams within its coverage area; promotes the protection of critical water resources, including groundwater, for the benefit of current and future constituents; and supports efforts to address existing impairments so as to restore full use of waters within its area. EDWDD also supports a range of public education and outreach efforts, including children's water festivals each which all elementary students may attend. EDWDD also supports, technically and financially, public water systems (both existing and in development) to assure its residents of safe and plentiful drinking water.

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District projects:

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- Removing contaminants in streams to provide safe drinking water
- New construction of sanitary sewer projects (when impairing water quality)
- Infrastructure development to improve stream flow or water quality
- Lake improvements that improve water quality
- Drainage improvements
- Water-based recreation
- Engineering or environmental studies to bridge information gaps

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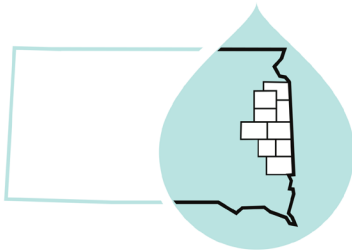
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**EAST DAKOTA
WATER
DEVELOPMENT
DISTRICT**

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Conference Schedule

Time	Speaker
8:00 - 9:00 a.m.	Registration
9:00 - 9:10 a.m.	Welcome – Dr. Ryan Lefers
9:10 – 9:30 a.m.	Jared McEntaffer , Dakota Institute
9:30 – 9:50 a.m.	Rachel Kloos , ISG
9:50 – 10:10 a.m.	Daniel Ostrem , SD NRCS
10:10 – 10:30 a.m.	Break
10:30 – 11:00 a.m.	Bryce Tellmann , South Dakota School of Mines & Technology
11:00 – 11:20 a.m.	Jay Gilbertson , East Dakota Water Development District
11:20 – 11:40 a.m.	Darrell Raschke , Upper Missouri Water Association
11:40 – 12:00 p.m.	Ryan Lefers , South Dakota State University
12:00 – 1:00 p.m.	Lunch
1:00 - 1:20 p.m.	Chuck Brandel , ISG
1:20 - 1:40 p.m.	Nate Anderson , SD DANR
1:40 – 2:00 p.m.	Kyle Werning , Houston Engineering, Inc.
2:00 - 2:20 p.m.	Stu Geza , South Dakota School of Mines and Technology
2:20 - 2:40 p.m.	Break
2:40 - 3:00 p.m.	Matthew Sanders , South Dakota State University
3:00 - 3:20 p.m.	Clinton Powell , Pinpoint Corporation
3:20 - 3:40 p.m.	Sushant Mehan , South Dakota State University
3:40 p.m.	Closing Remarks

Morning Session

9:00 a.m. – 12:00 p.m.

Time	Speaker
9:00 – 9:10 a.m.	Welcome – Ryan Lefers South Dakota Water Resources Institute Director
9:10 – 9:30 a.m.	Jared McEntaffer , Dakota Institute <i>2050 Water Demand Outlook</i>
9:30 – 9:50 a.m.	Rachel Kloos , ISG <i>Water as a Competitive Advantage: Innovative Industrial Strategies for Managing Water Scarcity and Reducing Environmental Footprint</i>
9:50 – 10:10 a.m.	Daniel Ostrem , SD NRCS <i>Watershed Opportunities for Tomorrow: Utilizing the NRCS Watershed Operations Program</i>
10:10 – 10:30 a.m.	Break
10:30 – 11:00 a.m.	Bryce Tellmann , South Dakota School of Mines & Technology <i>One River, One Region? The Missouri Valley Authority vs. The Pick Sloan Plan</i>
11:00 – 11:20 a.m.	Jay Gilbertson , East Dakota Water Development District <i>The Mighty Missouri: An Overview of River Management and Water Rights</i>
11:20 – 11:40 a.m.	Darrell Raschke , Upper Missouri Water Association <i>One River, Many Ideas: Finding Common Cause in the Missouri River Basin</i>
11:40 – 12:00 p.m.	Ryan Lefers , South Dakota State University <i>South Dakota's Water in Context: Agriculture, Natural Resources, and Economic Development</i>

2050 Water Demand Outlook

Jared McEntaffer, Dakota Institute

Abstract: Dr. McEntaffer will share recent work forecasting water demand through 2050. He will report a baseline forecast for South Dakota built on the USGS's recently released 2020 water demand estimate. McEntaffer will then show how increased demand from Dairy and other industries could impact the forecast and the need for future investment in developing water resources.

Water as a Competitive Advantage: Innovative Industrial Strategies for Managing Water Scarcity and Reducing Environmental Footprint

Rachel Kloos, ISG

Abstract: Water availability is increasingly becoming a critical factor influencing industrial growth, operational resilience, and long-term economic sustainability. Across the Midwest and Great Plains, industries face growing challenges related to water supply limitations, increasing treatment costs, regulatory requirements, and stakeholder expectations for environmental stewardship. As a result, water is no longer viewed merely as a utility but as a strategic resource that can directly impact profitability, expansion opportunities, and community relations.

This presentation will explore the economic significance of water in industrial operations and highlight innovative approaches that leading industries are implementing to reduce water consumption, improve water efficiency, and minimize wastewater generation. Case studies from food and beverage processing, dairy manufacturing, and other water-intensive sectors will demonstrate how organizations are leveraging technologies and operational strategies such as water reuse and recycling, process optimization, condensate recovery, resource recovery, advanced treatment systems, and digital water management.

Attendees will gain insight into the business drivers behind these investments, including reduced operating costs, mitigation of water supply risks, improved regulatory compliance, and support for sustainability goals. The presentation will also discuss how communities and industries can work together to balance economic development with responsible water resource management.

Through practical examples and lessons learned, this session will demonstrate how innovative water management strategies are helping industries lower their environmental footprint while maintaining competitiveness in an era of increasing water constraints. The discussion will provide valuable perspectives for municipal utilities, regulators, industrial facility owners, and consulting engineers seeking to support sustainable economic growth across South Dakota and the region.

Watershed Opportunities for Tomorrow: Utilizing the NRCS Watershed Operations Program

Daniel Ostrem, South Dakota Natural Resources Conservation Service

Abstract: Watershed Sponsors have an opportunity to benefit from federal support to improve or solve the issues that exist within their watersheds. The South Dakota Natural Resources Conservation Service (NRCS) wants sponsors within the state to be informed about Public Law 83-566, Watershed Flood Protection and Operations (WFPO) program, and how it functions. This presentation will give a general overview of the program and provide updates on 3 very different watershed plans currently being developed within the state. Efforts are currently being made in:

Flood Protection – Vermillion River Basin

Watershed Protection – Firesteel Creek

Agricultural Water Management – Angostura Irrigation District

One River, One Region? The Missouri Valley Authority vs. The Pick Sloan Plan

Bryce Tellmann, South Dakota School of Mines & Technology

Abstract: In the middle of the 20th century, the Pick-Sloan Plan transformed the Missouri River from North America's longest free-flowing river to a series of massive dams and reservoirs. The development of this ambitious engineering program was contentious. In particular, supporters of Pick-Sloan opposed proponents of the Missouri Valley Authority, a separate scheme for river development patterned on the much-celebrated Tennessee Valley Authority. Dr. Bryce Tellmann will explain the history of this struggle, its impact on the river system, and what it reveals about how the Missouri Basin sees itself as a region.

The Mighty Missouri: An Overview of River Management and Water Rights

Jay Gilbertson, East Dakota Water Development District

Abstract: As South Dakota's population and economy continue to expand, the demand placed on its water resources grows as well. Historically, local or regional water sources, be they surface waters (lakes and streams) or sub-surface reserves (aquifers), have been able to meet demands, although at times that meant that water had to be moved from areas of abundance to areas of scarcity. Unfortunately, none of these resources are inexhaustible, and we are approaching a time when simply drilling another well, or opening the tap a little wider, are no longer options.

Fortunately for us, the Missouri River, retains tremendous potential for addressing our growing needs. While by no means limitless, the amount of water it contains is substantial, and could go a long way toward meeting future needs. However, tapping this resource presents a variety of logistical, financial and legal challenges.

In anticipation of the likely growing demands on the river, in 2023 the SD Legislature commissioned a white paper on the subject. The report provided a background on the historic management of the river, summarized the statutory and regulatory framework that govern water rights, summarized the current water allocations and considered future water projects. This talk will update the report to reflect conditions in 2026. [Spoiler alert - The demand for water isn't going away!]

One River, Many Ideas: Finding Common Cause in the Missouri River Basin

Darrell Raschke, Upper Missouri Water Association

Abstract: The Missouri River, the nation's longest, rises in the eastern Centennial Mountains of the Bitterroot Range of the Rocky Mountains of southwestern Montana, then flows east and south for 2,341 mi (3,767 km) before entering the Mississippi River just north of St. Louis, Missouri. The river drains a semi-arid watershed of more than 500,000 square miles (1,300,000 km²), which includes parts of ten U.S. states and two Canadian provinces. Although a tributary of the Mississippi, the Missouri River is slightly longer, and when combined with the lower Mississippi River, it forms the world's fourth-longest river system.

The Missouri River serves many critical functions to the people who live along its shoreline and beyond. From the earliest times, it provided both sustenance and a critical passageway. Today, the river is a source of water for a range of municipal, agricultural and industrial consumers; earthen dams that span parts of its upper watercourse provide flood control and hydroelectric power; barge traffic in the lower basin moves agricultural and commercial products up and down the river; and it fosters a wide range of recreational activities along its length.

Unfortunately, this myriad of interests frequently results in conflict. Entities that use the river for transport get upset when consumptive uses, like drinking water or irrigation, are proposed, as they are viewed as diminishing the resource. Power generation functions best with regular (read predictable) releases of water from dams along the river and tributaries, while flood control or wildlife interests might call for sporadic and fluctuating discharges. Bringing these disparate users together presents an ever increasing challenge, but one that must be pursued if we are to protect and preserve this critical water resources for future generations.

South Dakota's Water in Context: Agriculture, Natural Resources, and Economic Development

Dr. Ryan Lefers, Griffith Endowed Chair in Agriculture and Water Resources
South Dakota Water Resources Institute Director & SDSU State
Water Extension Specialist

Abstract: South Dakota's economy, environment, and agricultural productivity are closely tied to the availability and management of water resources. The presentation will examine current and emerging water nexus issues in South Dakota while providing a perspective on opportunities for sustainable water management in support of South Dakota agriculture and economic development.

Afternoon Session

1:00 pm – 3:50 pm

Time	Speaker
1:00 – 1:20 p.m.	Chuck Brandel , ISG <i>Keeping Water on the Landscape: A Path Toward Agricultural Economic and Environmental Resilience</i>
1:20 – 1:40 p.m.	Nate Anderson , SD DANR <i>Riparian Buffer Initiative</i>
1:40 – 2:00 p.m.	Kyle Werning , Houston Engineering, Inc. <i>No-Rise, No-Project? The Economic Impact of Floodplain Management</i>
2:00 - 2:20 p.m.	Stu Geza , South Dakota School of Mines and Technology <i>iBMP Solver: A Planning-Level Tool for Co-Benefit-Informed Urban Stormwater Management</i>
2:20 – 2:40 p.m.	Break
2:40 – 3:00 p.m.	Matthew Sanders , South Dakota State University <i>The South Dakota Mesonet: Total Water Monitoring</i>
3:00 – 3:20 p.m.	Clinton Powell , Pinpoint Corporation <i>From Availability to Deliverability: Turning a Regional Water Source Into a Reliable Supply</i>
3:20 – 3:40 p.m.	Sushant Mehan , South Dakota State University <i>Water Priorities in South Dakota: What Residents Know, Value, and Expect</i>
3:40 p.m.	Closing Remarks

Keeping Water on the Landscape: A Path Toward Agricultural Economic and Environmental Resilience

Chuck Brandel, ISG

Abstract: Agriculture is central to South Dakota's economy, but producers face increasing financial risk from both excess moisture and drought. As tile drainage expands to protect farmland and crop value, direct discharge can also contribute to nutrient loss and downstream water quality concerns. Balancing profitability, economic development, and water resource protection requires practical strategies that keep water working within the landscape.

Drainage Water Recycling (DWR) offers one such strategy by capturing and storing excess drainage water and runoff for later use during the growing season or dry periods. This approach can reduce production risk, protect yield potential, improve returns on drainage investments, and support more resilient farm operations.

At a broader scale, DWR can strengthen rural economic resilience by improving local water use and reducing water and nutrient losses from fields. This presentation will discuss DWR opportunities, challenges, and implementation considerations in South Dakota, with emphasis on producer profitability, environmental stewardship, and long-term agricultural sustainability.

Riparian Buffer Initiative

Nate Andersen, SD DANR

Abstract: A riparian zone is land along the edges of rivers, streams, lakes and other waterbodies. Vegetation within the riparian zone of waterways serves as a natural buffer providing numerous water quality benefits. Establishing healthy riparian buffers is a common conservation practice used to improve and protect water quality and overall ecological health of aquatic resources. Riparian buffers also provide valuable habitat, additional forage for livestock and increase the value of marginal crop lands. Riparian buffers have been proven to be effective in combating nonpoint source pollution. Nonpoint source pollution can be difficult to control, measure, and monitor, and has a major effect on our rivers and streams. In South Dakota, common nonpoint source pollutants include sediments, nitrogen, phosphorus, and bacteria. These contaminants reach our surface waters primarily through runoff and erosion; thus, riparian buffers are an effective way to filter out pollutants by slowing down runoff and allowing sediments to filter out, allowing nutrients to be taken up by plant tissues before entering waterbodies.

No-Rise, No-Project? The Economic Impact of Floodplain Management

Kyle Werning, Houston Engineering, Inc.

Abstract: Growth and economic development are critical for communities in South Dakota and across the country, helping to support long-term prosperity and wealth creation. Historically, natural resource preservation was often secondary to development priorities. However, over the past century, there has been a growing emphasis on balancing economic development with the protection and stewardship of natural resources.

One persistent challenge has been managing flood risk and addressing the concerns associated with this natural phenomenon. A common approach to development within a floodplain is demonstrating a No-Rise, where modeled flood elevations remain at or below existing conditions. While this method is effective in maintaining current floodplain characteristics and minimizing the potential for adverse impacts, the process can involve costs and challenges that may surprise even experienced water resources engineers.

This presentation will explore the No-Rise process from an engineering perspective, highlighting how hydraulic modeling and analysis results can influence development opportunities and, in some cases, create the need for variances to support community growth. The discussion will then transition to floodplain management practices that can enhance economic development potential through streamlined processes and the use of the best available data for each community.

iBMP Solver: A Planning-Level Tool for Co-Benefit-Informed Urban Stormwater Management

Stu Geza, South Dakota School of Mines and Technology

Abstract: Urban stormwater management requires planning tools that can identify effective best management practice (BMP) portfolios while balancing hydrologic and water-quality goals, costs, site constraints, and broader community benefits. This study presents iBMP Solver, a web-based, planning-level decision support tool for watershed-scale BMP selection, sizing, and spatial allocation. iBMP Solver integrates life-cycle costs, BMP performance, stakeholder-informed co-benefits, and user-defined constraints within an optimization framework. A key feature is its ability to simultaneously determine BMP type, number of BMPs, and locations where BMPs should be placed without repeatedly rerunning a hydrologic model, enabling rapid evaluation of alternative management scenarios. The tool was demonstrated in the Meade-Hawthorne watershed in Rapid City, South Dakota, using a historical 10-year, 2-hour design storm to identify BMP portfolios based on either cost alone or both cost and co-benefits. Incorporating co-benefits shifted the type and spatial distribution of BMPs with no substantial change in life-cycle cost, demonstrating that broader watershed and community priorities can be incorporated without materially increasing overall costs. The results highlight iBMP Solver as an efficient and accessible platform for comparing BMP portfolios, evaluating performance-cost trade-offs, and supporting transparent, multi-objective urban stormwater planning.

The South Dakota Mesonet: Total Water Monitoring

Matthew Sanders, South Dakota State University

Abstract: The South Dakota Mesonet is South Dakota's statewide network of over one hundred weather stations operated by South Dakota State University. A major focus of the Mesonet is total water monitoring: precipitation, snowpack, evapotranspiration, and soil moisture.

From Availability to Deliverability: Turning a Regional Water Source Into a Reliable Supply

Clinton Powell, Pinpoint Corporation

Abstract: South Dakota's water challenge is increasingly shifting from identifying where water exists to determining how safe, treated, reliable water can be delivered where it is needed. The Santee Sioux Nation Water Capacity & Infrastructure Improvements Project provides a practical example of that transition. While a regional source may be available, making that water dependable requires much more than identifying supply. Infrastructure, storage, land, funding, permitting, agreements, operations, and partnerships must all come together before a community can rely on it.

Using the Santee project as a case study, this presentation will examine what it takes to move from water availability to true deliverability and why regional projects increasingly cross utility, Tribal, state, and agency boundaries. The discussion will highlight how these projects can also influence the way future capacity, regional connections, and long-term water needs are considered as South Dakota's water systems continue to evolve.

Water Priorities in South Dakota: What Residents Know, Value, and Expect

Sushant Mehan, South Dakota State University

Abstract: Water resources are central to South Dakota's economy, ecosystems, and quality of life, yet little empirical evidence exists on how residents understand water issues, what concerns they prioritize, and who they believe is responsible for water protection. This study examined public water knowledge, concerns, preferred management actions, and perceived responsibility using the South Dakota Water Resources Survey. From July 2024 to August 2025, 461 adults from rural and urban communities participated. Responses were analyzed using descriptive statistics, demographic comparisons, and multivariate techniques. Clean and safe drinking water emerged as the highest priority. Respondents identified local and state governments as having primary responsibility for water protection, while individuals, rural communities, and businesses were viewed as supporting partners. Water knowledge increased with age, while concerns varied by issue and demographic group. Respondents strongly supported water-quality monitoring, enforcement of existing laws, and rain gardens for stormwater management. The findings provide practical guidance for extension educators, communities, and decision-makers to design targeted outreach and management strategies aligned with public priorities. This study provides the first statewide assessment of water perceptions in South Dakota and offers a transferable survey-based framework for water-resource education and community-based governance in rural regions.