



Ripples of Change White Paper

Increasing Awareness of South Dakota's Water Resources

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This White Paper is prepared by:



With significant contributions from other stakeholders and collaborators.

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Executive Summary

Due to extreme water shortages across the western United States, many states have been looking for alternative water sources to supplement their water needs. The Colorado River has a structural deficit of 1.5 million acre-feet. States are looking to import water, and the Missouri River Basin is the closest source with the scale required to meet the need. To build a more resilient South Dakota, we must identify, plan and implement the beneficial use of our existing resources for future drinking water, agricultural irrigation development, and industrial growth.

To secure South Dakota's water future, foresight is required. Policy makers need to understand where the resources are currently at and where they are going. Quantifying South Dakota's water resources will require detailed studies to be created and updated to determine water availability throughout the state. This includes analyzing the water generated within the state, water flowing into the state from outside sources, and ground water sources. Unmet obligations from the development of the Pick-Sloan projects also needs to be quantified and documented. In addition to understanding the water resources, the current demand from each water source needs to be quantified to determine what remains.

Developing infrastructure will make the best use of available water for the benefit of South Dakota. Rehabilitation of existing infrastructure is required to maintain South Dakota's current economic condition at a minimum. Additionally, new infrastructure is key to promoting growth. Several new businesses have selected other states over South Dakota due to lack of available water. South Dakota is fortunate to have access to one of the longest rivers in the United States, with three of the five largest reservoirs in the country sitting within the state to promote prosperity. These opportunities must not be overlooked.

Recognizing that infrastructure development requires investment, identifying new funding avenues while leveraging existing sources is crucial. Infrastructure rehabilitation and construction of new systems requires revenue streams beyond what is currently available in South Dakota. One of South Dakota's main opportunities is to leverage existing funding sources to provide a match for federal funds. This combination provides the sizable financing required for large-scale water projects that benefit significant portions of the state's economy.

Funding for water development projects must be managed by a governing authority. The governing authority needs to provide proactive support for economic development with a governmental structure that evaluates and prioritizes the needs of the state. Evaluation of best practices from neighboring states along with understanding the current responsibilities of various South Dakota Agencies and Boards will provide a clear vision for how water projects should be overseen in our state.

Throughout this white paper, we describe the growth opportunities available for South Dakota and the water needs associated with those opportunities. We discuss a policy framework that proactively foster beneficial use of the water to facilitate economic growth. Finally, we focus on the funding mechanisms required to address the present and future needs necessary to promote sustainable water supply and

prosperity in South Dakota. The key recommendations developed from this review and documented in this report are as follows:

- **Funding for the Future:** Create or expand mechanisms for the state to leverage funds as a match for federal funding opportunities is critical. Funding mechanisms may include reallocating existing taxes or fees and require support and a clear vision for the funding.
- **Future Needs and Growth:** Economic development in the state is very dependent upon the available water to foster such development. Establishing the future needs and growth opportunities for the state is paramount for setting the stage to maximize use of the Missouri River and other available sources. South Dakota must work as a proactive partner when regional water systems are being developed to expand those systems beyond existing need to provide future unobligated water.
- **Policy Framework to Initiate Beneficial Use:** Finally, the success of implementation rests in the hands of those who will be responsible for its success. Empowering a governing body to facilitate water development in the state is the cornerstone for this success. Modifications to the mission statement of the Department of Agriculture and Natural Resources to promote resource development or create a new cabinet level agency that promotes the development of water is the starting point. The new cabinet level agency will be created by separating the Office of Water from the Department of Agriculture and Natural Resources and changing its mission to reflect the needs of water development. Demonstrating the need will help reinvigorate the Pick-Sloan Plan and kick-start a focus on using water to foster prosperity throughout the state.

Purpose and Need

To actively manage the water resources in the State of South Dakota to meet the needs of the citizens in the future.

Water Scarcity

Due to extreme water shortages across the western United States, many states have been looking for alternative water sources to supplement their water needs. Examples of this are the Colorado River with a structural deficit of 1.5 million acre-feet and the Kansas Aqueduct Coalition looking to reserve 4 million acre-feet annually. In comparison, the Missouri River flow rate at Sioux City averages 14.4 million acre-feet annually, of which only 3.3% is appropriated. Figure 1 illustrates a volumetric comparison of rivers in South Dakota. Based on this graphic, it is clear that the Missouri River is South Dakota's most valuable water asset in terms of water surplus. It is only a matter of time before other states look to utilize that surplus.

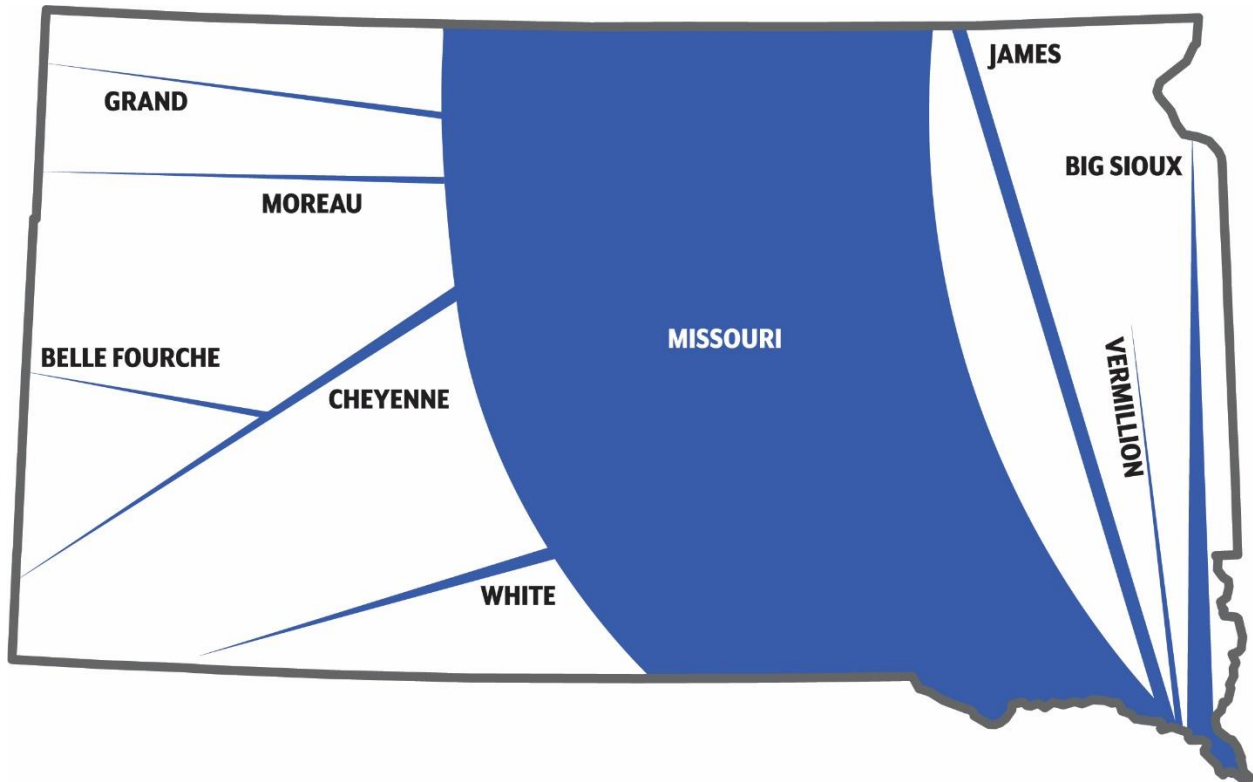


Figure 1: Volumetric comparison of South Dakota’s rivers.

The American writer Mark Twain is famous in the water world for his quote “Whiskey is for drinking and water is for fighting.” This quote is largely overused in the world of water resources, but it rings true for water scarce periods throughout history. Overuse and longstanding drought have caused many states utilizing the Colorado River for a drinking water supply to look to the east. Studies are currently being conducted regarding utilizing Missouri River water to supplement the Colorado River. The Rio Grande River is also experiencing shortages due to overuse, drought, and contentious water rights. The Missouri River and desalination (which is expensive) are the two most likely options for states that are facing shortages.

Congress promised substantial water allocations to South Dakota as part of the development known as the Pick-Sloan Plan, which was authorized in the Flood Control Act of 1944. These waters were meant to provide large scale irrigation opportunities due to the inundation footprint of the Pick-Sloan reservoirs removing prime agricultural lands from production. To date, South Dakota has only allocated 2.1% of the maximum storage capacity for current and future use.

Beyond shortages in the western states, the Ogallala aquifer has been experiencing shortages and is another vital water source for the central United States. Figure 2 illustrates the extent of the Ogallala Aquifer, also known as the High Plains Aquifer, and the depletion experienced from pre-development in 1950 to 2015. As can be seen, most of the aquifer has been in a decline especially in Kansas which is driving projects like the Kansas Aqueduct Coalition.

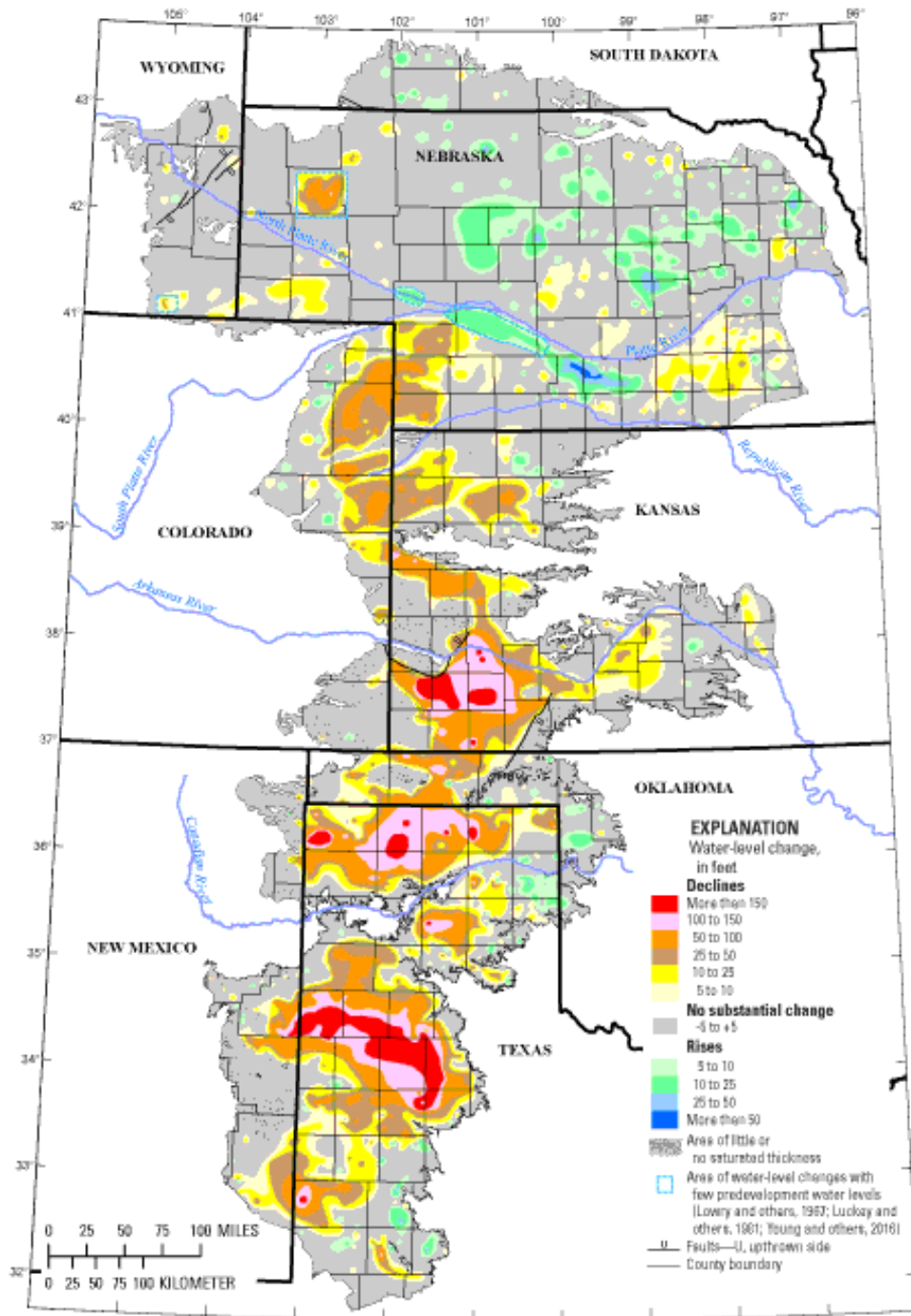


Figure 2: High Plains Aquifer Water-Level Changes, Predevelopment (about 1950) to 2015 from USGS SIR 2017-5040

Drivers for Demand and Lost Economic Opportunity

The primary drivers for usage in South Dakota include irrigation, drinking water, agricultural, and industrial.

Water Supply

Currently, several regional water systems are in planning stages across the state including the Dakota Mainstem Regional Water System, Western Dakota Regional Water System, and Water Investment in Northern South Dakota – aka WINS (see Figure 3). The existing Lewis and Clark Regional Water System is continuing to expand and grow to help meet the needs of southeastern South Dakota. Development and planning of these projects illustrate the large demand for water within the state and the need to dedicate attention and resources for water production.

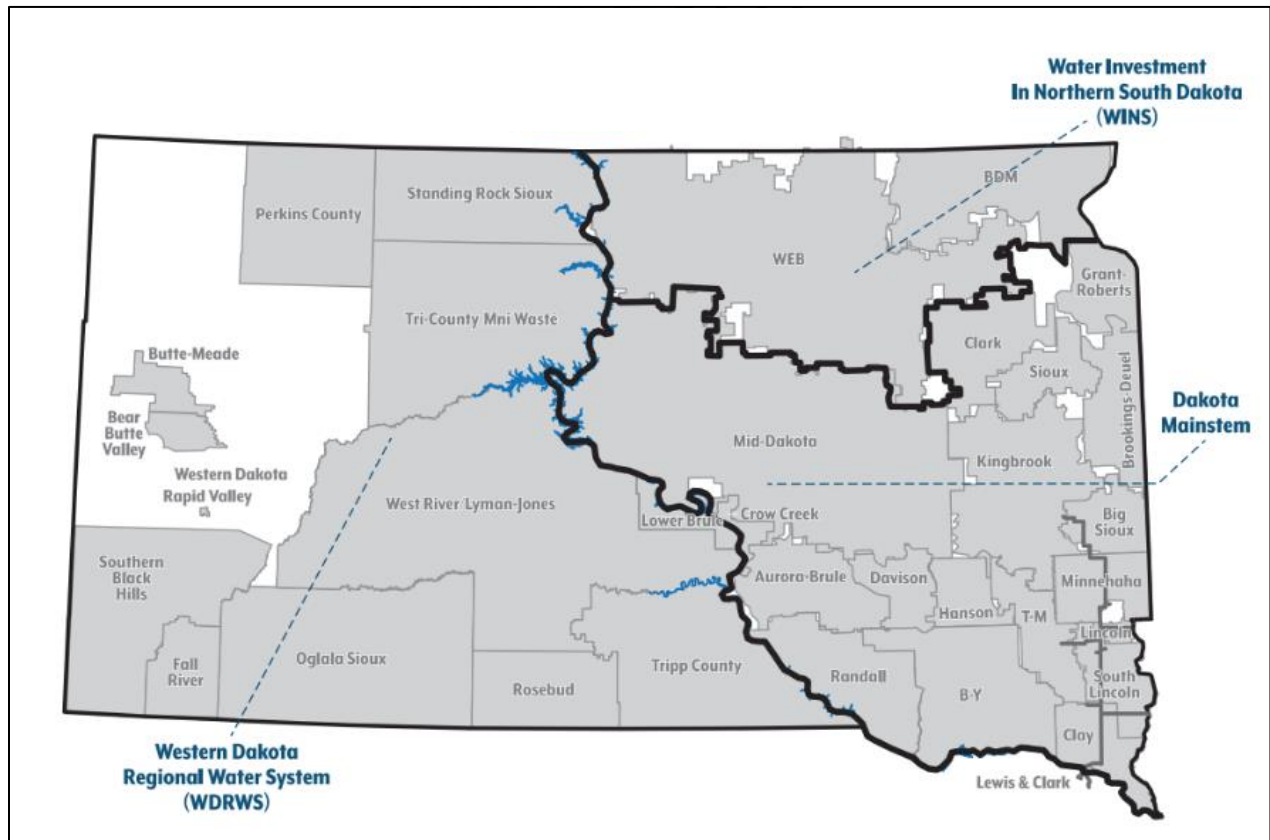


Figure 3: Regional Water Systems Being Proposed Throughout the State

Agriculture – Irrigation

Agricultural development as it relates to water use can be quantified in many ways; however, possibly most important for long-term prosperity in South Dakota is irrigation. The United Nations Water Report for 2021 estimates that agriculture requires 69-percent of the world’s freshwater resources (UN, 2021). Additionally, the report states that global agricultural food demand will grow by approximately 50-percent by 2050 (UN, 2021), illustrating the need to develop reliable water supply for irrigation and other agricultural purposes.

Development of irrigation requires a reliable water supply and soils that are conducive to flood or pivot irrigation, with pivot irrigation being the preferred method due to its efficiency. In many agricultural states, irrigation is the largest water use.

Agriculture – Agriculture Production

Another primary driver for agriculture as it relates to water development is water supply for livestock and agriculture production. Agriculture processing has the potential to significantly impact the state’s economy.

In the last couple of years, Sioux Metro Growth Alliance reported the denial of six agricultural development projects with a total combined water use of 4.5 million gallons per day (MGD) due to lack of available water. These projects range from processing to dairy production. The South Dakota Governor’s Office for Economic Development (GOED) reported denial of three agricultural development projects requesting a total of 1.28 MGD due to lack of available water. If implemented, these projects had the potential to provide significant tax base to the state; however, that tax revenue will not be realized.

Industry

Nearly every manufactured product uses water at some point in the production process. Industrial water use includes water used for the purposes of fabricating, processing, washing, diluting, cooling, or transporting products.

Many commodities require large amounts of water for production. If projects are denied due to lack of water, there is potential for significant loss of economic development for the region.

Current Water Rights

Understanding water rights and the amount of water available to be put to beneficial use is crucial to understand where future development can take place. The United States Geological Survey publishes self-reported industrial water use for each state. The majority of the industrial water use from states comes from surface water sources. The 2015 USGS report for industrial water use (UGSS, 2015) indicates that South Dakota’s total water withdrawals are approximately 1,230 acft/day, with 730 acft/day from groundwater and 500 acft/day from surface water sources (1acft = 325,861 gallons). The breakdown of these 1,230 acft/day was reported by category and is provided in Table 1 below.

Table 1: Estimated Water Use by Category in 2015 (1 MGD = 3.06 Acre Feet/Day)

	Public Supply	Domestic	Irrigation	Livestock	Aquaculture	Industrial	Mining	Thermoelectric Power	Total
Acft/day	220	17	646	147	87	75	26	7	1,225
%	18%	1%	53%	12%	7%	6%	2%	1%	100%

South Dakota State University also evaluated water usage in a separate study. Figure 4 illustrates the percent usage by category, developed by South Dakota State University (SDSU, 2021).

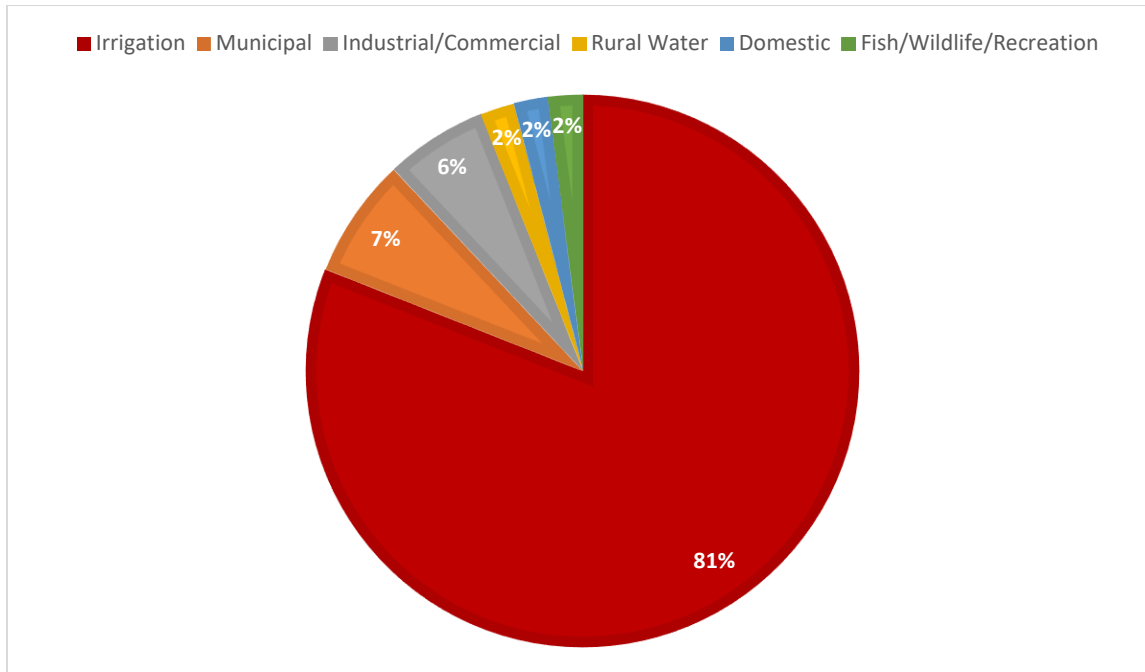


Figure 4: Estimated Percentage of Water Use by Category

Harnessing the Potential of the Flood Control Act of 1944 (Pick-Sloan Plan)

The Missouri River and unutilized congressional authorization from Pick-Sloan are great opportunities for South Dakota to secure its water future. Many promises were made in the authorization of the Pick-Sloan project, but many of them are unmet. Promises to South Dakota included approximately 952,510 acres of irrigated land, 5-percent of the projects power, and ability to have reliable water supply. Of this promise, South Dakota has only developed approximately 25,000 acres of irrigated land and is currently only using about 2.7-percent of the generated power. In 1988 the South Dakota legislature passed a law seeking the settlement of the State’s claim to damages and obligations of the Pick-Sloan project in South Dakota Codified Laws 46A-15-5 (Codified Laws, 1988). The legislative reduction of the original Pick-Sloan irrigatable acres was done under the assumption that the originally specified acreage of irrigatable soils did not exist within the state. Future studies west of the Missouri River to identify irrigatable soils should be done to prioritize growth within the state. Based on the lack of substantial development since 1988, reinvigorating the need to have the federal government keep their promises to South Dakota is warranted. Recently, South Dakota’s Legislative Research Council prepared a memorandum titled “The Mighty Missouri: An Overview of River Management and Water Rights” (Legislative Research Council, 2023). which shows the legislature understands the importance of utilizing this valuable natural resource.

South Dakota’s Oahe Unit was designed by the United States Bureau of Reclamation (Reclamation) to divert water to irrigate 750,000 acres of land in northeastern South Dakota. While the project was originally planned to irrigate 750,000 acres of land, the project was downsized to 190,000 acres and was largely accepted by South Dakotans. In the mid 1970’s the project was contested by United Family Farmers which lead to Congress discontinuing funding in 1977. It is important to note that this project

was not ‘deauthorized’, rather it was ‘defunded’; the authorization remains intact. (USBR-Report Oahe Unit James Division Pick-Sloan Missouri Basin Program – Adam R. Eastrum, BOR). While the project still has not had funding reauthorized, this still presents an opportunity to develop water use to benefit the people, particularly highlighting the original promise of irrigation to South Dakota.

Governance and Funding

Governance and funding are two primary drivers for water development. Having a governance structure that adequately highlights the need and fosters development is crucial for implementing projects, securing water appropriation, and developing the state’s economy. Governance is the vehicle through which the main driver, funding, can be implemented.

The President’s National Infrastructure Advisory Council (Preparing United States Critical Infrastructure for Today’s Evolving Water Crisis – August 2023) recently made two recommendations to create a national water strategy. The first recommendation is to elevate the importance of water in the national consciousness through a public awareness program. The second recommendation is to institute either a Department of Water or some other entity that stewards water at a policy level in addition to current regulatory structure at the cabinet level. With this emphasis on water management at that national level, it is imperative that South Dakota implement a similar level of effort at the state level to secure the state’s future.

Governance

Investigating Existing Structures - South Dakota’s Water Governance

The State of South Dakota currently has eighteen cabinet positions as part of its governance structure. South Dakota allocates most of its responsibilities related to water within South Dakota to Department of Agriculture and Natural Resources (Department). The Department is headed by a cabinet member appointed by the Governor. The Department covers a broad range of subjects and has agencies including Agriculture & Environmental Services, Resource Conservation & Forestry, Finance & Technical Assistance, and the Office of Water. The Department’s mission statement is included in the Figure 5 below.

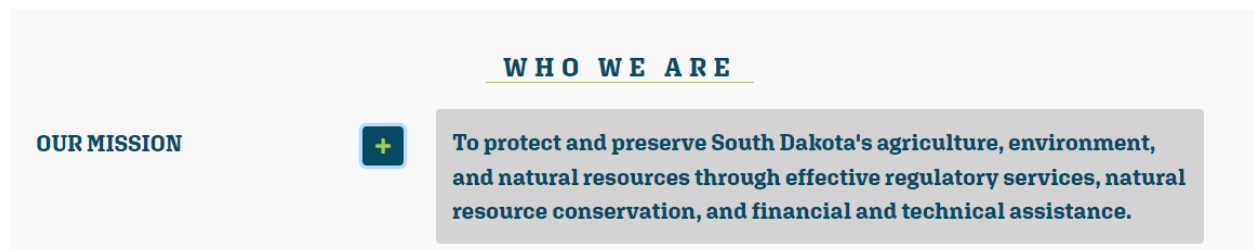


Figure 5: South Dakota Department of Agriculture and Natural Resources Mission Statement

In addition to its mission statement, the South Dakota legislature has passed legislation assigning responsibility by law to many of the agencies within the Department.

The South Dakota legislature established the State Water Plan in 1972. The State Water Plan is intended to implement state policy on water resource management, to serve as the principal guide for state policies and priorities, and to identify areas for project assistance. The South Dakota Legislature placed the responsibility for development of the State Water Plan with the Board of Water and Natural Resources (Board). The Board is attached to the Department of Agriculture and Natural Resources. The Board retains quasi-judicial, quasi-legislative, advisory, non-administrative, and special budgetary functions. The Board includes seven members appointed by the Governor, with selection criteria only including that members are not all from the same political party. Each member serves a term of four years, and the Board must meet five times per calendar year. The Board maintains internal control over the Drinking Water State Revolving Fund and Clean Water State Revolving Fund, in addition to developing the State Water Plan. Both The Clean Water and Drinking Water State Revolving Funds offer low interest loans for water development, and the potential for small grants and principal forgiveness. ***One of the limitations of the Drinking Water State Revolving Fund is that the funding cannot be used for growth.*** While the South Dakota state legislature has appropriated funds to critical projects in the past, there is not an apparent direct funding mechanism for the Board to administer nor an agency focused on promoting development that could also help guide funding to matching federal funding opportunities.

South Dakota Codified Law 46-1-1 (Codified Laws, 1955) declared that people of the state have paramount interest in the use of all the water of the state and that the state shall determine what water within the state can be converted to public use or controlled for public protection. In 1907, the South Dakota state legislature affirmed that water rights within the state would be administered using the prior appropriation doctrine by enacting legislation authorizing the State Engineer to administer the appropriation of water. In 1955, the legislature transferred the authority to issue water rights from the State Engineer to a citizen's board, known as the Water Management Board, with a Chief Engineer making recommendations to the board. The water management board consists of seven members appointed by the Governor.

Recommendations to Improve South Dakota's Governance Structure to Highlight the Need.

In many cases, bringing a spotlight to water issues can be extremely beneficial. Changes to governance or revamping agencies can help highlight the need and bring light to issues that have more recently entered the political landscape. Recently, North Dakota revamped their existing agencies, the State Water Commission and Office of the State Engineer, into the Department of Water Resources. While the North Dakota Department of Water Resources has largely the same functions as the previous two separate agencies, this revamp has prioritized making water issues more visible and increased the spotlight North Dakota felt was needed for their projects, in some cases, even changing their mission statements to highlight what they find important (utilizing the Missouri River).

While South Dakota's agencies appear to have the components required to facilitate successful regulatory functions, additional modifications could be made to promote water development and economic growth.

CREATION OF A NEW CABINET POSITION OR MODIFICATION TO DEPARTMENT OF AGRICULTURE AND NATURAL RESOURCES

Currently, the responsibility to protect and preserve natural resources falls within the South Dakota Department of Agriculture and Natural Resources (Department). The Secretary of the Department is a cabinet member appointed by the Governor with a vision statement that includes a South Dakota with a prosperous economy. Based on the mandate of the Department, the Department's objective is to foster development of water resources for the purpose of economic development as well as the prosperity of South Dakota. The Department currently has a lot within its portfolio. For the benefit of highlighting the importance of water within the State of South Dakota, one recommendation could be to split the Department into a few cabinet positions to highlight their importance within the state. A "Department of Water" could be included as one of these cabinet agencies and include a regulatory and development agency to promote water protection and development. The newly created "Department of Water" could envelope the Office of Water as the regulatory component of South Dakota water resources and create another agency to promote water development.

CREATION OF A SUPPORTING COMMISSION.

If a development board or commission is deemed to be needed beyond the Board of Water and Natural Resources (Board), one could be created, or the existing Board could be modified. A supporting commission could be organized by watershed in lieu of governmental boundaries and include groundwater representatives. Based on the Figure 6 below, a suggested 10-member commission as listed.

1. Northwest Region Commissioner (Grand, Moreau, and Little Missouri)
2. Belle Fourche and Cheyenne River Commissioner
3. South Central Region Commissioner (Bad, White, Niobrara)
4. Missouri River Commissioner
5. James River Commissioner
6. Vermillion Commissioner
7. Big Sioux Commissioner
8. Northeast Commissioner (Minnesota and Red basins)
9. West River Ground Water Commissioner
10. East River Ground Water Commission

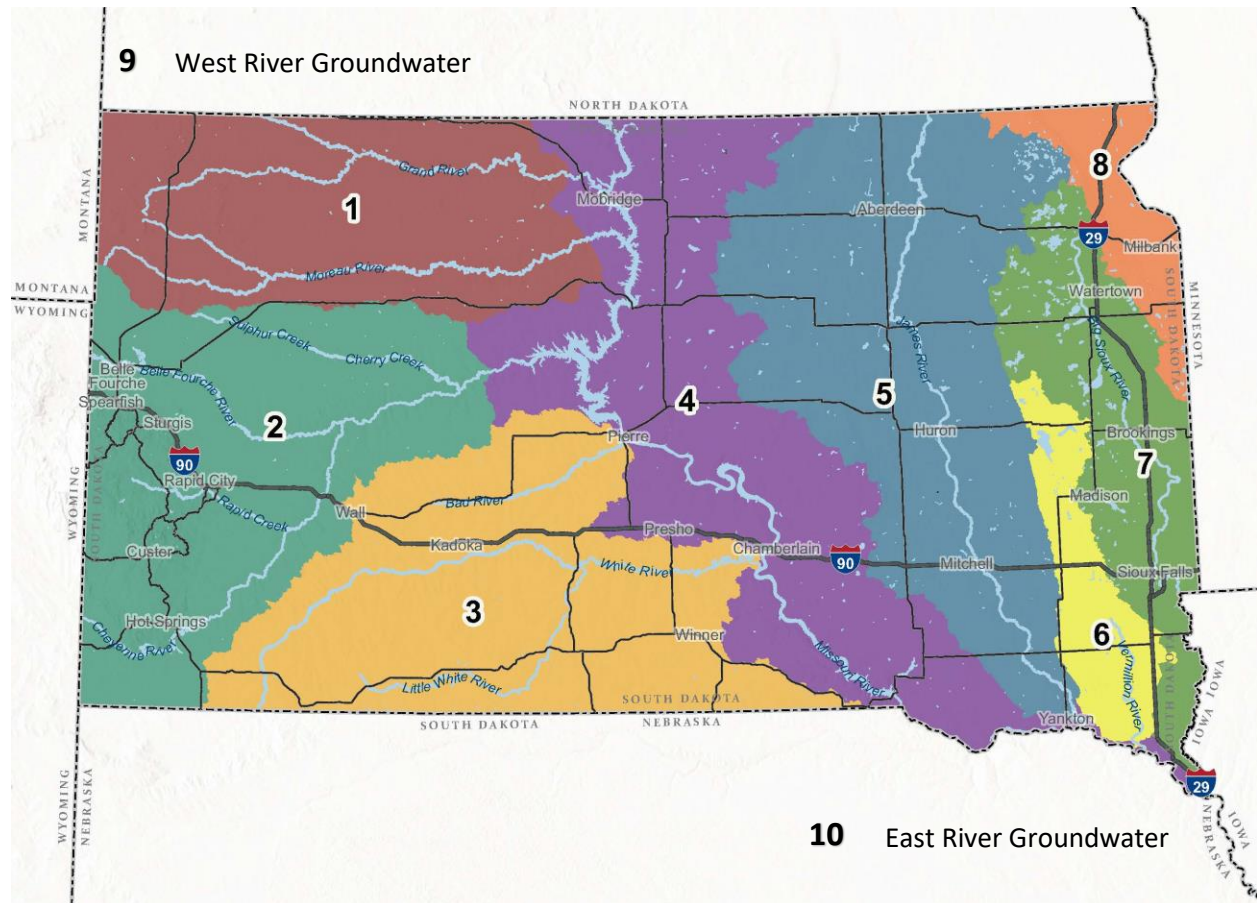


Figure 6: Drainage Basins in South Dakota that Could be Leveraged to Develop a Supporting Commission

Another consideration for this commission could include the addition of a member to specifically represent the Madison Aquifer.

Funding

Prioritization of funding can be difficult to manage when meeting the needs of the public. With many competing interests, state officials must prioritize funding to many major categories including education, health and human services, public safety/corrections, general government, natural resources, transportation, and economic.

Based on the Governor’s 2022 budget report (SD, 2022), Agriculture and Natural Resources is a broad category that caters to many different programs and interests, while only receiving 2.08 percent of South Dakota’s budget, accounting for a budget of \$42.2 million. Other states like Minnesota and North Dakota allocated significantly more on environment and natural resources in 2022 equating to approximately \$187 million and \$355 million, respectively. Wyoming had allocated 6.05 percent of their 2023 budget, \$163 million, on natural resources. These numbers highlight the vast prioritization other states are doing to secure and promote natural resources.

Development of a sustainable economic future for South Dakota requires additional expenditures for water infrastructure. Aging infrastructure and future economic development require robust revenue streams that continue to be allocated and grow based on the need. One-time funding bills do not sustain a reliable economic future.

Exploring New Revenue Streams

Growing concerns of water scarcity and loss of economic development highlight the importance of South Dakota putting its water resources to beneficial use. The development of large infrastructure projects to utilize Missouri River water is paramount to develop a working senior water right, which would lay claim to South Dakota's use of the resource. While other states may not have the ability to permit water from the Missouri River in South Dakota, congressional action could divert water from the state and limit South Dakota's potential without these established rights.

The following sections detail potential new revenue streams, models of collaborative financing, and funding sources outside of South Dakota that could be leveraged. In addition, it is important to note that these sources individually may not meet the needs of the state. To close the gap in infrastructure upkeep or develop new infrastructure to utilize the Missouri River, South Dakota could look to leverage federal funding avenues. Many of these require a local cost share, which could be the focus of state leadership. Generating revenue to fund local matches may require additional taxation. This could be accomplished, through state sales tax or increased taxing authority through water development districts. Any funding mechanism should explore the upfront cost of future sizing infrastructure. Current regional water systems having limited funding sources to only develop infrastructure to meet the current need of the system. To develop an economically prosperous South Dakota, right sizing infrastructure in advance will be economically advantageous.

SALES TAX

South Dakota's state sales and use tax rate dropped from 4.5% to 4.2% on July 1, 2023. It will return to 4.5% beginning July 1, 2027. The new rate of 4.2% will apply to all sales in the state previously subject to the higher rate. Applying the eventual 0.3% increase to water projects could generate \$100 million in annual funding.

TAX INCREMENT FINANCING (TIF)

Tax Increment Financing (TIF) is a financing tool that governments can use to fund public infrastructure in targeted areas to encourage private development and investment. The idea being that property tax values will increase after development of the infrastructure project and offset the increased tax that was collected to develop the infrastructure in the first place.

There may be an opportunity to implement a TIF associated with irrigation. The state could use a TIF to promote development of more irrigable land. For example, a non-irrigated parcel in West River would be assessed less than an irrigated parcel when the increased production is accounted for. Irrigating the parcel would increase the tax revenue that could be used towards funding for water projects. Only 25,000 acres of the promised 952,510 acres are currently irrigated as part of the Pick-Sloan project. There is significant opportunity to irrigate land and increase the tax base.

CONSTRUCTION EXCISE TAX (CET)

Currently South Dakota charges a 2.041% CET, but the funds do not go toward water infrastructure. For fiscal year 2023 the total CET generated was \$189 million. The portion of the CET for water, sewer, and utility lines was \$7.8 million. This is not a large sum of money but could still serve to help offset costs on certain prioritized projects. There is an opportunity to redirect water project excise taxes to a funding account that could be used as cost-share for federal funds. The CET is an option that requires further evaluation.

REVENUES GENERATED BY FEE

Another method to provide funding for water development would be implementation of fees. Fees could be collected based on water use. Examples of fee-based collections could be a fee based on the total usage, on having a water right, or based on the meters needed to monitor water usage. One benefit of fee-based revenues is they often only impact those utilizing and benefitting from the resource. South Dakota currently only receives about 2.7-percent of the 5-percent promised hydropower as part of the Pick-Sloan act. South Dakota could request that revenue from the remaining 2.3-percent generate a fee for the state or look to receive royalties on that amount.

WATER DEVELOPMENT DISTRICTS

As per South Dakota Codified Law, Water Development Districts were established to promote conservation, development and management of resources and serve as clearinghouse for water quality and supply projects. The water development district board of directors has the authority to levy taxes up to thirty cents per thousand dollars of taxable valuation in the district. This is another option to generate additional revenue for water projects. The structure already exists but the limit on the tax amount may need to be reconsidered.

Outside Funding Sources to Leverage.

Successfully funding multiple projects often requires local, state, and federal funding. Federal funding can come through many different funding sources through various agencies of legislation. In addition to federal funding sources, collaborative financing models can also be used to leverage a state's investment in water development.

FEDERAL FUNDING POOLS AND OPPORTUNITIES

United States Army Corps of Engineers

Section 22, Planning and Assistance to States (PAS)

Section 22, Planning and Assistance to States (PAS), is an authority granted to the Corps of Engineers to cooperate with states and Federally-recognized Native American tribes to provide planning assistance in matters related to water resources. Examples of projects that can be performed as part of this authority are data collection, master drainage planning, surveying, floodplain studies, and pipe network analysis. Any non-Federal government entity can serve as a sponsor to a Section 22 study. All study costs are shared fifty percent federal and fifty percent sponsor, but the sponsor may contribute their fifty percent as in-kind services if desired. There is a spending cap of \$5 million per fiscal year per study. More information regarding this program is available at [6- Planning Assistance to States Program Guidance.pdf \(army.mil\)](#).

Water Resource Development Act

While the Water Resource Development Acts are administered by the Corps, Congress often looks to their expertise in developing legislation. Proactive lobbying to get authorization and appropriation through the Congressional Water Resources Development Acts is another potential avenue to highlight the need to action or to procure funding to complete water projects.

United States Bureau of Reclamation

Water Reclamation and Reuse Program

The Title XVI Water Reclamation and Reuse program focuses on identifying and investigating opportunities to reclaim and reuse wastewater and naturally impaired ground or surface water. This is a grant program that is available for communities that has provided nearly \$240 million in funding since January 2021. Applicants may request federal funding up to \$500,000 for projects to be completed within two years, \$2 million dollars for projects to be completed within three years, and up to \$5 million for projects to be completed within three years that have a non-Federal cost share of fifty percent of the total project cost. More information about this program is available at [WaterSMART | Bureau of Reclamation \(usbr.gov\)](https://www.usbr.gov/water-smart/).

Drought Resiliency Projects

Reclamation also provides fifty/fifty cost share for drought resiliency projects through FOA. Projects receiving this funding are meant to increase drought resiliency supported by an existing drought resiliency plan. Projects must meet one of the following qualifications to receive this funding:

- Increasing the reliability of water supplies
- Improving water management
- Providing benefit for fish and wildlife and the environment

More information on this program is available at [FY19 Drought Response Program Framework \(usbr.gov\)](https://www.usbr.gov/drought-response-program-framework/). Another opportunity would be to encourage reauthorization of the Bureau's "Rural Water Supply Act" 2006, PL 109-451.

United States Environmental Protection Agency

The United States Environmental Protection Agency's (EPA) Water Infrastructure Finance and Innovation Act (WIFIA) program accelerates investment in water infrastructure by providing low-cost loans for projects. WIFIA works separately from State Revolving Fund programs to subsidize financing for large projects. WIFIA has delivered 172 loans for a total of \$29.1 billion (EPA, 2023). Eligible borrowers for WIFIA loans include:

- Local, state, tribal, and federal entities
- Partnerships and joint ventures
- Corporations and trusts
- Clean Water and Drinking Water State Revolving Fund (SRF) programs

NURTURING COLLABORATIVE FINANCING MODELS

Collaborative financing models or P3 are commonly referred to as Public-Private Partnerships, Public-Public Partnerships, and Performance Based Infrastructure project delivery models. Projects utilizing P3 models span the water sector in size, location, and financial profile. P3 models are more prevalent in other infrastructure sectors but are starting to gain popularity in the water sector. P3 projects typically have the government retaining ownership of the assets, while the private partner has control over a significant portion of the operation. Major benefits of P3 models include a reduction in risks associated with deferred maintenance and the governments' ability to limit reducing resources to other municipal needs. The U.S. Department of Treasury (Treasury) found that P3 partnerships represent a promising approach that can leverage the strengths of the private and public sectors to expand and improve our nation's infrastructure (Treasury, 2016). The Treasury also found that a key component to a successful P3 model is balancing risk in development of the contract. The United States Environmental Protection Agency's (EPA) Water Finance Center provides information to communities interested in establishing P3s.

Funding Opportunities for Regional Water Systems

Currently, regional water systems are funding their development through rates paid by their own users. This funding structure does not allow the regional systems to be "right-sized" for future demand, as it would put undue costs onto those who pay rates. The State of South Dakota could promote and foster future economic development by using a P3 model with these regional water systems to develop unobligated capacity for the future. South Dakota could provide funding through the GOED to help build excess capacity that was allocated for future development opportunities. This unobligated capacity for future economic development would ultimately help grow South Dakota's economy and tax base, without burdening the current end users of the regional systems. In addition, part of the P3 model could be that the State or GOED gets a percentage of the fees (if they so choose) for the unobligated use, once it is put to beneficial use. These funds could then be used to build excess capacity in another project. This would incentivize putting water to beneficial use in a way that is economically beneficial.

Identification and Inventory

Modernizing South Dakota's Water Data Repositories

Data centralization and accounting help with understanding where the water resource is currently and the availability for future growth. Many of the past and current studies are housed by the agencies that produced the reports, but a central clearing house would make understanding what has been completed much more efficient. In addition, a place to store future studies and data would also be beneficial for these purposes.

South Dakota Department of Agriculture and Natural Resources states that water rights are managed by monitoring ground water levels in over 1,550 observation wells (SD 1, 2023), monitoring stream flows with 164 gaging stations, and collecting water use data annually. South Dakota requires water use permits for all water uses excluding domestic water use if the use is less than 25,920 gallons per day or

the peak pump rate is less than 25 gallons per minute. The South Dakota Water Rights Database (SD 2, 2023) provides all permitted water rights, licenses, denied projects, and identified future uses. Figure 7 is a screenshot of the water rights database and legend.

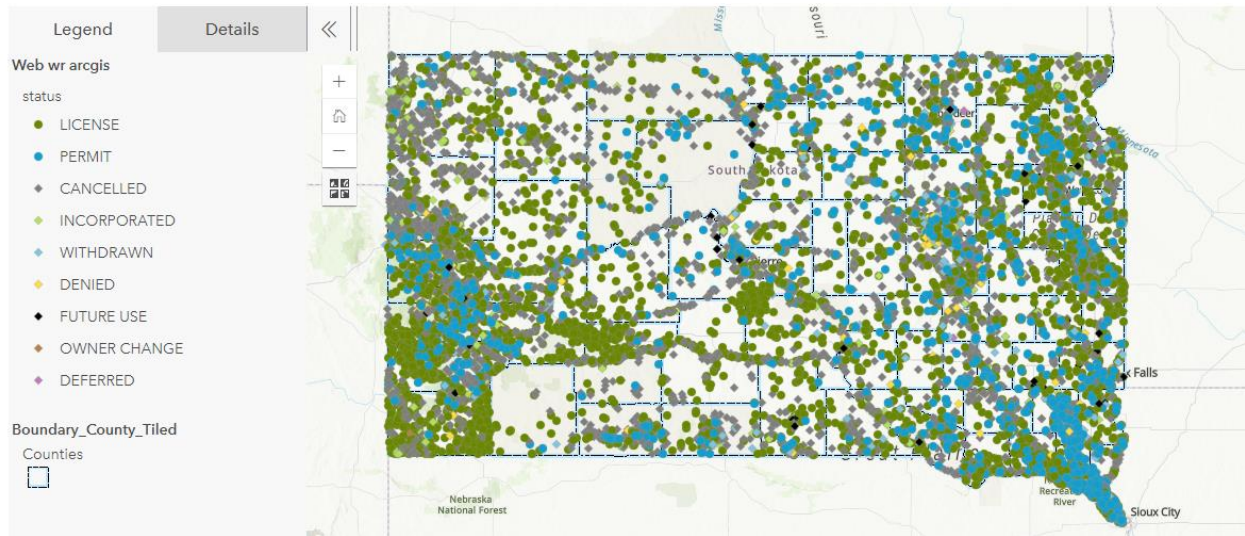


Figure 7: South Dakota Water Rights Database

Further development of a water resources data system like the water rights, observation well, or lake level database that could be further expanded to include water resources studies as well as other collected data would be ideal. South Dakota could utilize this information when making decisions about water rights and prioritization of funding when it comes to the development of water use projects. Additional efforts should be undertaken to develop a clearing house for all water resources data and studies.

One example of this in the neighboring state of Wyoming is the Water Resources Data System (WRDS). Their website states that the WRDS is a clearinghouse of hydrological and climatological data for the State of Wyoming. WRDS is funded by the Wyoming Water Development Office and is a part of the Department of Atmospheric Science at the University of Wyoming. South Dakota could consider a similar approach by partnering with the South Dakota School of Mines and South Dakota State University.

Past and Current Studies

As South Dakota moves forward with putting water to beneficial use, there are past and ongoing studies that could be useful.

South Dakota Geological Survey Studies

The South Dakota Geological Survey has developed a large portion of the data related to water in South Dakota. Assessment of Water Resources and Conceptual Evaluation of a Regional Water Supply for Southeastern South Dakota also known as “UR60” is one of these documents. UR60 evaluated water supply and water quantity for cities and rural water systems in southeastern South Dakota.

United States Geological Survey Studies

The United States Geological Survey (USGS) has completed many useful studies related to water resources within South Dakota and some national studies that help to better understand water availability and use in the state.

STATE-SPECIFIC STUDIES:

The USGS completed an assessment of streamflow trends analysis in eastern North and South Dakota in 2022. The report titled “Assessment of Streamflow Trends in the Eastern Dakota Water Years 1960-2019” (USGS 1, 2020) found that that hydrologic extremes, periods of drought or flooding, are occurring more frequently and with greater severity than in the past.

USGS is currently working on a water use trends study in the Black Hills region of South Dakota from 1990-2020. The report is expected to be completed in 2024 and should provide background data on how Black Hills water use has been changing and potentially lay out needs for additional water in the future to meet growth.

In addition to these studies, the USGS has completed many groundwater studies within the state (listed below). These studies can help the state identify the current availability of its groundwater resource.

- Revised Groundwater Flow Model of the Glacial Aquifer System North of Aberdeen, South Dakota, Through Water Year 2015 (USGS, 2015)
- Groundwater-Flow Model and Analysis of Groundwater and Surface-Water Interactions for the Big Sioux Aquifer, Sioux Falls, South Dakota (USGS, 2019)
- Trends in Groundwater Levels in and near the Rosebud Indian Reservation, South Dakota, Water Years 1956-2017 (USGS 2, 2020)
- Characterization of Factors Affecting Groundwater Levels in and near the Former Lake Traverse Indian Reservation, South Dakota, Water Years 1956-2017 (USGS 3, 2020)
- Black Hills Hydrology Study

NATIONAL STUDIES:

The USGS completed two HUC12 level studies were completed to understand irrigation, which may be beneficial as South Dakota explores this opportunity.

- “Irrigation water use reanalysis for the 2000-2020 period by HUC12, month, and year for the conterminous United States” (USGS 3,2023) and
- “Monthly crop irrigation withdrawals and efficiencies by HUC12 watershed for years 2000-2020 within the conterminous United States” (USGS 4, 2023)

These two documents could be the foundation for increasing the number of irrigated acres in South Dakota.

Imperative to Develop Up-to-Date Studies

Based on the ongoing and past studies regarding water use and availability completed within the State of South Dakota and on a national level, additional studies are required to understand resource availability within the state. Critical decisions are being made about the availability of water based on studies that are old and outdated.

One example is the Corps Report from 1985. This report is a comprehensive statewide water resource study. Obviously, the demand for water and climate impacts have changed over the last 40 years resulting in decisions being made with potentially inaccurate data. UR60 is another example that was written in 1989 and is the baseline for Lewis and Clark Regional Water System.

Beyond studies on water availability and use for these larger projects, basin-specific studies could be completed to yield higher confidence for the state to put water to beneficial use. In addition, development of studies that show limited resources in certain areas of the state would provide justification of the need to develop projects utilizing the Missouri River. It is paramount that infrastructure development from the Missouri River serve a need to provide beneficial use. Developing water rights without additional sources will serve to protect South Dakota's stake in the river.

As the Missouri River becomes the solution to a long-term water supply in South Dakota, we need to understand the river's ability to respond to the increased demand. Therefore, South Dakota needs to start assessing just how much water is available in the Missouri River, how much is committed, formally or informally, and what is available for future growth and development. One of the keys to this assessment is to understand the impact of tribal water rights that were established by the US Supreme Court in 1908(Winters Doctrine). South Dakota needs to move forward with determining how much Missouri River water is available for current and future use.

Conclusion

Water is a vital resource for future growth of states and current water scarcity is driving development of large water infrastructure projects throughout the west. South Dakota's unmet Pick Sloan authorizations present an opportunity to secure water supply that could greatly benefit South Dakota's economy.

Current challenges to develop South Dakota's water resources include data availability, understanding of water availability, funding, and governmental structure that proactively fosters development. These challenges are all tied together, with a dedicated funding source resolving many of the issues with data availability and development of studies to understand resource availability. Additionally, it is difficult to have a governmental structure that truly fosters water development if there is not substantial funding allocated to development.

All signs currently indicate that water scarcity in the western United States has brought attention to the Missouri River. It is imperative that South Dakota establish water rights and develop systems to put water to beneficial use before water is removed from the river by congressional action or deals between other Missouri River states. North Dakota is currently following this approach by developing regional

water systems like Northwest Area Water Supply Project, Eastern North Dakota Area Water Supply Project, and the Southwest Pipeline Project. While the allocations of these projects may not seem significant in regard to percentage of utilized water, they provide North Dakota with a sustainable water supply for the future. South Dakota requires additional funding to develop water projects from the Missouri, to secure our water future.

In summary, key recommendations outlined in this paper are as follows:

- **Funding for the Future:** Create or expand mechanisms for the state to leverage funds as a match for federal funding opportunities is critical. Funding mechanisms may include reallocating existing taxes or fees and require support and a clear vision for the funding.
- **Future Needs and Growth:** Economic development in the state is very dependent upon the available water to fosters such development. Establishing the future needs and growth opportunities for the state is paramount for setting the stage to maximize use of the Missouri River and other available sources. South Dakota must work as a proactive partner when regional water systems are being developed to expand those systems beyond existing need to provide future unobligated water.
- **Policy Framework to Initiates Beneficial Use:** Finally, the success of implementation rests in the hands of those who will be responsible for its success. Empowering a governing body to facilitate water development in the state is the cornerstone for this success. Modifications to the mission statement of the Department of Agriculture and Natural Resources to promote resource development or create a new cabinet level agency that promotes the development of water is the starting point. The new cabinet level agency will be created by separating the Office of Water from the Department of Agriculture and Natural Resources and changing its mission to reflect the needs of water development. Demonstrating the need will help reinvigorate the Pick-Sloan Plan and kick-start a focus on using water to foster prosperity throughout the state.

Secondary recommendations outlined in this paper are as follows:

- **Update on Water Resource Related Studies:** Update water resources studies that can be leveraged for projects throughout the state. These studies include identifying water scarcity/surplus regions, irrigatable acres throughout the state, and regions for water development.
- **Develop a Water Resources Data Clearinghouse/Datacenter:** Prioritize the development of a centralized clearinghouse or datacenter for water resources related data.

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