

**South Dakota**  
**Department of Agriculture and Natural Resources**

**Use and Value Demonstration**  
**Seasonal Criteria for Irrigation Waters**

**October 12, 2022**

## Introduction

Agriculture and forestry in South Dakota are a \$32 billion industry accounting for 29% of the state's total output. Crops and other agriculture including hay, account for nearly \$14 billion and 12% of South Dakota's total output (2021 Economic Contribution Study of South Dakota Agriculture, Ethanol and Forestry, July 2021). South Dakota agriculture consists of livestock including cattle, bison, sheep, hogs, poultry; crops including corn, soybeans, wheat, sunflowers; hay crops including alfalfa and sorghum for silage, grass hay, and many others. Approximately 850,000 acres of South Dakota hay and cropland are irrigated to maximize crop and hay yields. There are over five thousand active irrigation permits with roughly half of those permits are for surface water withdrawal. Air temperature, soil temperature, and hours of sunlight are other factors that affect the hay and crop growing season in South Dakota.

Statewide, South Dakota has about 10,094 miles of perennial rivers and streams and about 87,474 miles of intermittent and ephemeral streams. All these streams are assigned the (10) Irrigation waters beneficial use. These rivers and streams meander across the landscape and may be used for surface irrigation to provide water for hay land and cropland. South Dakota assesses the irrigation beneficial use against applicable water quality criteria. In the most recent 2022 South Dakota Integrated Report for Surface Water Quality Assessment, 78.9% of rivers and streams assessed (5,626 miles), met all associated water quality criteria for irrigation use waters. The remaining 21.1% of rivers and streams did not meet water quality criteria for specific conductance and/or sodium adsorption ratio and account for approximately 1,188 miles.

The purpose of this document is to consider the use and value of the 10) Irrigation waters beneficial use to South Dakota surface waters, the associated economic value and benefits of surface water irrigation to agriculture, and consider the attainability of surface water irrigation on a seasonal basis.

## Background

Under the Clean Water Act, 40 CFR 131.10(a):

"Each State must specify appropriate water uses to be achieved and protected. The classification of the waters of the State must take into consideration the use and value of water for public water supplies, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agricultural, industrial, and other purposes including navigation. If adopting new or revised designated uses other than the uses specified in section 101(a)(2) of the Act, or removing designated uses, States must submit documentation justifying how their consideration of the use and value of water for those uses listed in this paragraph appropriately supports the State's action. A use attainability analysis may be used to satisfy this requirement. In no case shall a State adopt waste transport or waste assimilation as a designated use for any waters of the United States."

Under the Clean Water Act, 40 CFR 131.10(f):

"States may adopt seasonal uses as an alternative to reclassifying a water body or segment thereof to uses requiring less stringent water quality criteria. If seasonal uses are adopted, water quality criteria should be adjusted to reflect the seasonal uses, however, such criteria shall not preclude the attainment and maintenance of a more protective use in another season."

Under Administrative Rules of South Dakota (ARSD) 74:51:03:01. Beneficial uses of South Dakota streams to include irrigation and fish and wildlife propagation, recreation, and stock watering. “All streams in South Dakota are assigned the beneficial uses of irrigation and fish and wildlife propagation, recreation, and stock watering. The classifications only designate the quality at which the waters are to be maintained and protected. Streams listed in this chapter may or may not be open to the public. Access to private property must be obtained from individual landowners.”

#### **Proposed Rule Change**

SD DANR is providing the following information to document consideration of the use and value of the proposed beneficial use change for 10) Irrigation use waters. The proposed rule will make the criteria for irrigation waters (proposed rule above) seasonal and only apply from April 1 through October 31. Below is the proposed modification.

**74:51:01:53. Criteria for irrigation waters.** The criteria of parameters for irrigation waters and their allowable variations that are not included under § 74:51:01:55 and Appendix B, unless set under § 74:51:01:24, are as found in the following table and only apply April 1 – October 31:

Parameter	Criteria	Unit of Measure	Special Conditions
Conductivity at 25°C	$\leq 2,500$	micromhos/cm	30-day average
	$\leq 4,375$	micromhos/cm	daily maximum
Sodium adsorption ratio	$\leq 10$		see definition

**Source:** SL 1975, ch 16, § 1; 4 SDR 32, effective December 4, 1977; transferred from § 34:04:02:43, effective July 1, 1979; 10 SDR 145, effective July 4, 1984; 13 SDR 129, 13 SDR 141, effective July 1, 1987; 14 SDR 86, effective December 24, 1987; 19 SDR 111, effective January 31, 1993; transferred from § 74:03:02:43, July 1, 1996; 24 SDR 10, effective July 20, 1997; 47 SDR 110, effective April 27, 2021.

**General Authority:** SDCL 34A-2-10, 34A-2-11, 34A-2-93.

**Law Implemented:** SDCL 34A-2-10, 34A-2-11.

Per ARSD 74:51:03:01, the 10) Irrigation beneficial use applies to all rivers and streams in South Dakota. Additionally, any lakes with the irrigation use are specifically listed in ARSD 74:51:02 Uses Assigned to Lakes. The proposed revision to apply criteria during April 1 through October 31 will apply to all South Dakota rivers and streams, the eight lakes and reservoirs specifically designated the irrigation use in ARSD 74:51:02:04, and any other waterbodies assigned the 10) Irrigation use in the future.

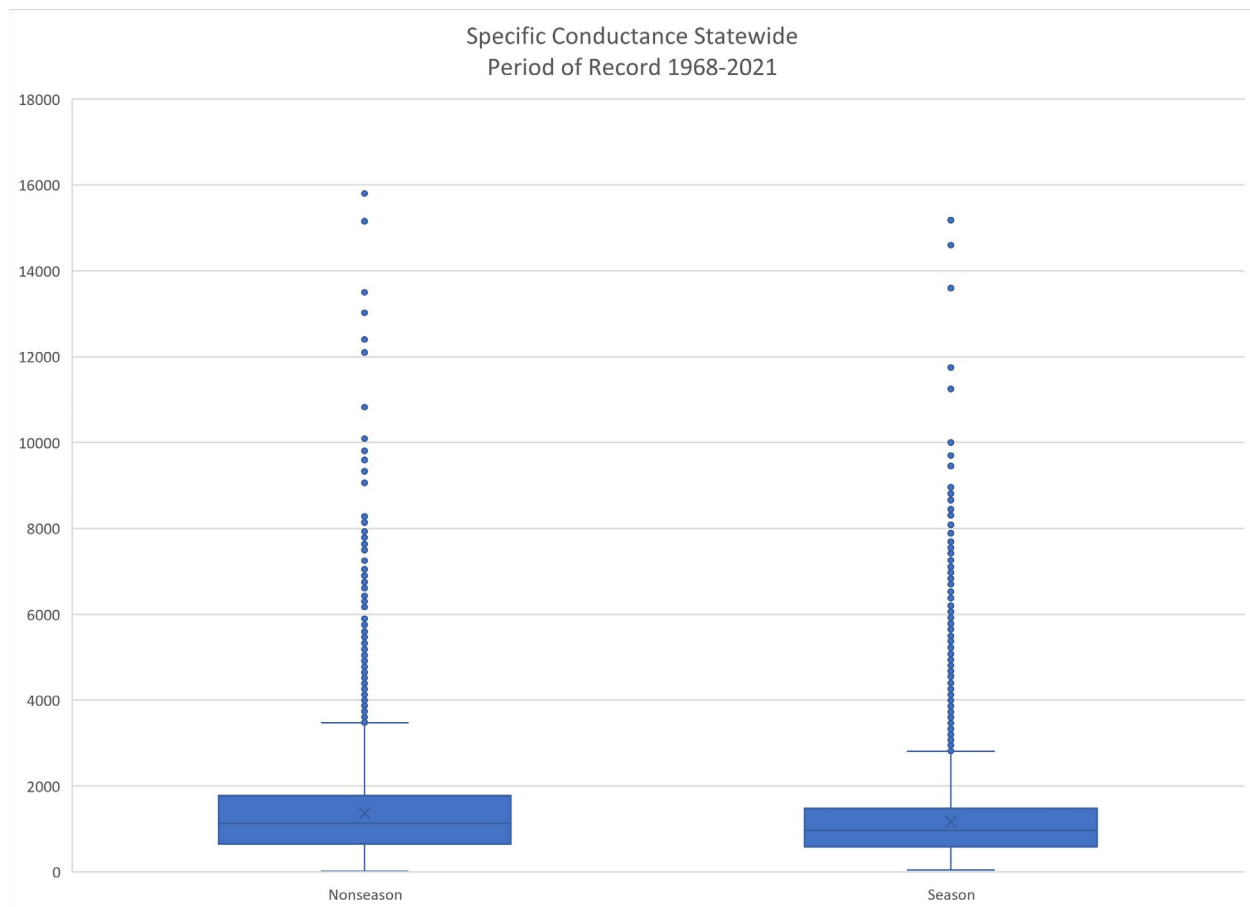
There are currently 2,479 active irrigation permits for surface water withdrawal throughout South Dakota. Surface water irrigation records maintained by the DANR Water Rights Program were reviewed for

irrigation activities occurring between 1994 through 2020 (2002 was unavailable), including 26,485 irrigator responses. The data indicates that 98.65% of surface water pumped for irrigation occurs during the proposed irrigation season of April 1 through October 31. Based on the irrigation surveys, most surface water irrigation that occurs outside of the proposed season occurs in November or March and accounts for 1.35% of surface water that is pumped for irrigation uses. None of the surface water irrigation permits are permitted to withdraw surface water during the months of January or February. Additionally, the DANR Water Rights Program maintains files of voluntary information dating back to 1968 and mandatory information dating back to 1983. This information was reviewed, and surface water irrigation uses on or after November 28, 1975, are similar to present day irrigation uses. The irrigation summaries from 1968 to 1979 identified the irrigation months as May through September and “other months.” Irrigation summaries in 1980 and after identified irrigation months as April through October and “other months.” None of the historical summaries break down irrigation use by month in the “other months” category. Therefore, it is unknown if any surface water irrigation had occurred during any of the winter months. The historical summaries do not support irrigation as a year-round existing use. The irrigator information supports the proposed rule change and seasonal applicability of the criteria.

Additionally, all South Dakota waterbodies are classified with the 9) Fish and wildlife propagation, recreation, and stock watering waters use. This use is applicable to all waters of the state on a year-round basis. Therefore, even when the irrigation use criteria is seasonal, the water quality criterion for conductivity of  $\leq 4,000$  micromhos/cm (30-day average) and  $\leq 7,000$  micromhos/cm (daily maximum) are in effect through the 9) Fish and wildlife propagation, recreation, and stock watering use, but at a level that is consistent with protecting the (9) use. SD DANR does not anticipate the proposed rule will have any impact on water quality or other designated uses.

#### **Water Quality and Air Temperature Information**

SD DANR evaluated specific conductance data for the period of record (1968 through 2021) for all SD DANR Water Quality Monitoring (WQM) sites. 36,220 specific conductance data results for all statewide WQM sites were grouped into “season” (April, May, June, July, August, September, October) and “nonseason” (November, December, January, February, March) categories based on the month that the measurement was recorded. The chart below is evidence that the “season” and “nonseason” data groups have similar means (1164.90, 1369.96), quartile distributions, standard deviations (608.29, 737.84), and range and distribution of outliers (maximum near 15,000). The nonseason specific conductance mean is slightly higher with a greater standard deviation. This is likely the result of groundwater influence on baseflow conditions beneath the ice.



The Sodium Adsorption Ratio (SAR) criterion is specific to the irrigation use and is not included in any other beneficial use criterion. DANR does not monitor SAR during the winter months therefore cannot provide any comparisons between season and nonseason SAR. Due to the flowing and/or flushing nature of South Dakota streams caused by snow melt and spring flows, DANR does not anticipate any type of accumulation or increase in SAR due to discharges during the non-irrigation months of November through March. Also, because South Dakota does not allow permitted discharges to lakes (74:51:01:27), SD DANR does not anticipate an increase in SAR in lakes with the irrigation use due to the proposed seasonal criteria.

For the non-irrigation months of November through March, average low ambient air temperatures in South Dakota are well below the freezing point and are not conducive to surface water irrigation. Statewide average monthly low air temperatures are 27°F in March, 26°F in November, 16°F in December and January, and 18°F in February (<http://www.worldclimate.com/climate/us/south-dakota>). Irrigation pumps and valves will easily freeze if attempting to convey water in sub-freezing temperatures. Additionally, water cannot be absorbed into the field or cropland when the ground is frozen, it would simply run off or pool and then freeze on the surface.

## Conclusion

Based on responses and data from surface water irrigators and documented average monthly low temperatures in South Dakota, surface water irrigation is not an existing use in South Dakota during the months of November through March. The Clean Water Act does not require states to adopt uses to

protect to a level beyond what is naturally occurring in the waterbody. SD DANR maintains that due to natural ambient air temperatures during South Dakota winter months, the irrigation criterion should be applied seasonally as proposed.

SD DANR has considered the use and value of revising the irrigation use to include the seasonal application of water quality criteria. SD DANR strives to protect water quality with protective, reasonable, and achievable water quality standards. SD DANR justifies adding a seasonal application to the criterion for the irrigation use because of frozen conditions and lack of existing use during the non-irrigation months. SD DANR acknowledges the use and value of the 10) Irrigation use to agriculture and the state's economy and does not anticipate any reduction in water quality or impact to agriculture. The proposed seasonal use of the water quality criterion for irrigation waters provides protection when the irrigation use is occurring. The proposed seasonal criterion will not preclude the attainment and maintenance of the more protective use during the irrigation season and will not have a negative impact on water quality or other designated uses.