



**DEPARTMENT of AGRICULTURE  
and NATURAL RESOURCES**

JOE FOSS BUILDING  
523 E. CAPITOL AVE  
PIERRE SD 57501-3182  
danr.sd.gov

**RECOMMENDATION OF ACTING CHIEF ENGINEER FOR WATER PERMIT  
APPLICATION NO. 9012-3, Roger Sieck**

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Acting Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 9012-3, Roger Sieck, 728 Appaloosa Lane, Spearfish SD 57783.

The Acting Chief Engineer is recommending APPROVAL of Application No. 9012-3 because 1) there is reasonable probability that there is unappropriated water available for the applicant's proposed use, 2) the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, 3) the proposed use is a beneficial use and 4) it is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water Management Board with the following qualifications:

1. The well approved under Water Permit No. 9012-3 is located near domestic wells and other wells which may obtain water from the same aquifer. The well owner, under this Permit must control withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.
2. The proposed well authorized by Permit No. 9012-3 must be constructed by a licensed well driller and construction of the well and installation of the pump must comply with Water Management Board Well Construction Rules, Chapter 74:02:04 with the well casing pressure grouted (bottom to top) pursuant to Section 74:02:04:28.
3. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Adam Mathiowetz, PE  
Acting Chief Engineer  
March 10, 2026

Report to the Chief Engineer

On Water Permit Application No. 9012-3

Roger Sieck

March 9<sup>th</sup>, 2026

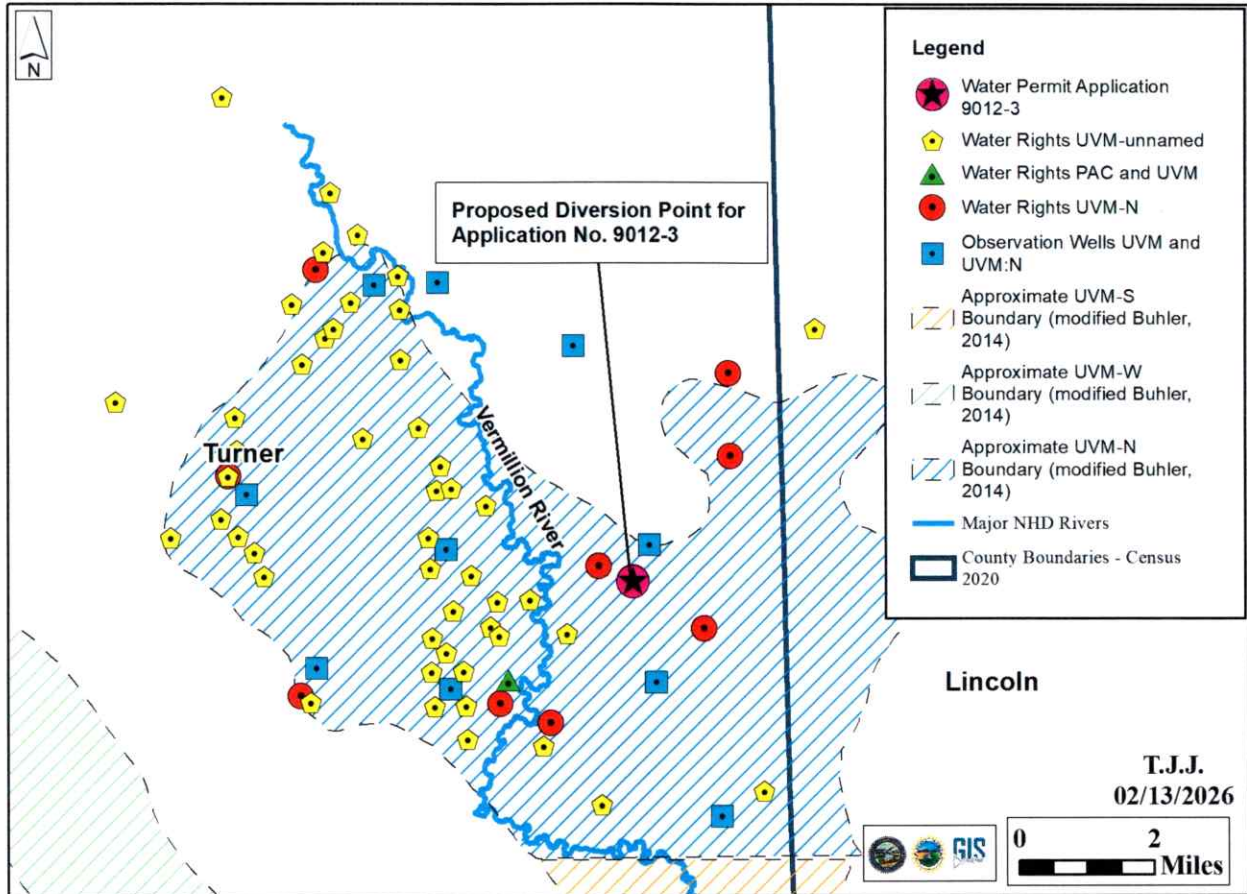
Water Permit Application No. 9012-3 proposes to appropriate 1.78 cubic feet of water per second (cfs) from one well to be completed into the North Management unit of the Upper Vermillion Missouri aquifer (approximately 210 feet deep) located in the approximate center of the E ½ Section 22 for the irrigation of 160 acres located in the S ½ NE ¼, N ½ SE ¼ Section 22; all in T98N-R52W. This site is located approximately six miles east northeast of Hurley, SD in Turner County.

**AQUIFER:** Upper Vermillion Missouri: North (UVM:N)

**HYDROGEOLOGY:**

The Upper Vermillion Missouri aquifer is a glacial outwash that is composed of fine sand to medium-pebble gravel (Lindgren and Hansen, 1990). The aquifer generally lays in a bedrock valley that trends north to south and underlies portions of Clay, Lincoln, and Turner Counties (Holmes and Filipovic, 2015). From 2013 to 2014, the SD DANR-Geological Survey completed a study to further understand the geologic and hydrologic conditions of the Upper Vermillion Missouri aquifer (Holmes and Filipovic, 2015). As a result, the aquifer is now considered as three management units (i.e., North, South, and West) that were adopted by the Water Management Board meeting on March 6, 2014 (Buhler, 2015; Holmes and Filipovic, 2015). The proposed diversion point for this application is located in the North management unit of the Upper Vermillion Missouri aquifer.

Most of the Upper Vermillion Missouri aquifer is overlain by till that can be up to 160 feet thick, (Holmes and Filipovic, 2015). The direction of groundwater movement in the Upper Vermillion Missouri aquifer is generally to the south/southeast (Lindgren and Hansen, 1990; Holmes and Filipovic, 2015). The areal extent of the Upper Vermillion Missouri: North aquifer is approximately 38,100 acres (Figure 1) (Buhler, 2014). The Upper Vermillion Missouri: North aquifer is generally buried and confined but can be locally unconfined in locations where the Parker-Centerville aquifer directly overlies it and is in hydraulic connection with it (Holmes and Filipovic, 2015; Kilts, 2023). The Upper Vermillion Missouri: North and Parker-Centerville aquifers are in direct hydraulic contact over approximately 2,930 acres (Figure 1) (Buhler, 2015). It should be noted that several Upper Vermillion Missouri aquifer Water Rights (listed as UMV-unnamed on Figure 1) were identified as part of the North Management unit most of which are to be redesignated to Upper Vermillion Missouri: North aquifer to reflect the most current understanding of the hydrology and naming convention. Additionally, there is one Water Right (No. 3832-3) which has two wells one each completed into the Parker Centerville aquifer and the Upper Vermillion Missouri: North aquifer.



**Figure 1.** Map of the approximate Upper Vermillion Missouri: North aquifer boundary estimated by Buhler (2014), the location of proposed diversion point for Water Permit Application No. 9012-3, Upper Vermillion Missouri: North aquifer observation wells, and Upper Vermillion Missouri: North aquifer water rights (Water Rights, 2026b and 2026c).

The test hole, submitted with this application, was completed into the Upper Vermillion Missouri: North aquifer on November 25<sup>th</sup>, 2025 (Water Rights, 2026b). The test hole geology suggests that aquifer material is heavily intermixed with clay layers near the proposed diversion point. Well completion reports near this application’s proposed diversion point will also be used to determine the hydrogeology of the Upper Vermillion Missouri: North aquifer in this area. Nearby reports show an approximate depth to the top of aquifer material of 151 feet below the ground surface and a saturated aquifer thickness of approximately 48 feet (SDGS, 2026; Water Rights, 2026b). Based on the submitted test hole and other nearby water well completion reports, the Upper Vermillion Missouri: North aquifer is expected to be confined at the diversion point (SDGS, 2026; Water Rights, 2026b and 2026d).

**South Dakota Codified Law (SDCL) 46-2A-9**

Pursuant to SDCL 46-2A-9, “A permit to appropriate water may be issued only if there is a reasonable probability that unappropriated water is available for the applicant’s proposed use, the proposed diversion can be developed without unlawful impairment of existing domestic water uses and water rights, the proposed use is a beneficial use, and the permit is in the public interest as it pertains to matters of public interest within the regulatory authority of the Water

Management Board as defined by SDCL 46-2-9 and 46-2-11.” This report will address the availability of unappropriated water and the potential for unlawful impairment of existing domestic uses and water rights within the Upper Vermillion Missouri: North aquifer.

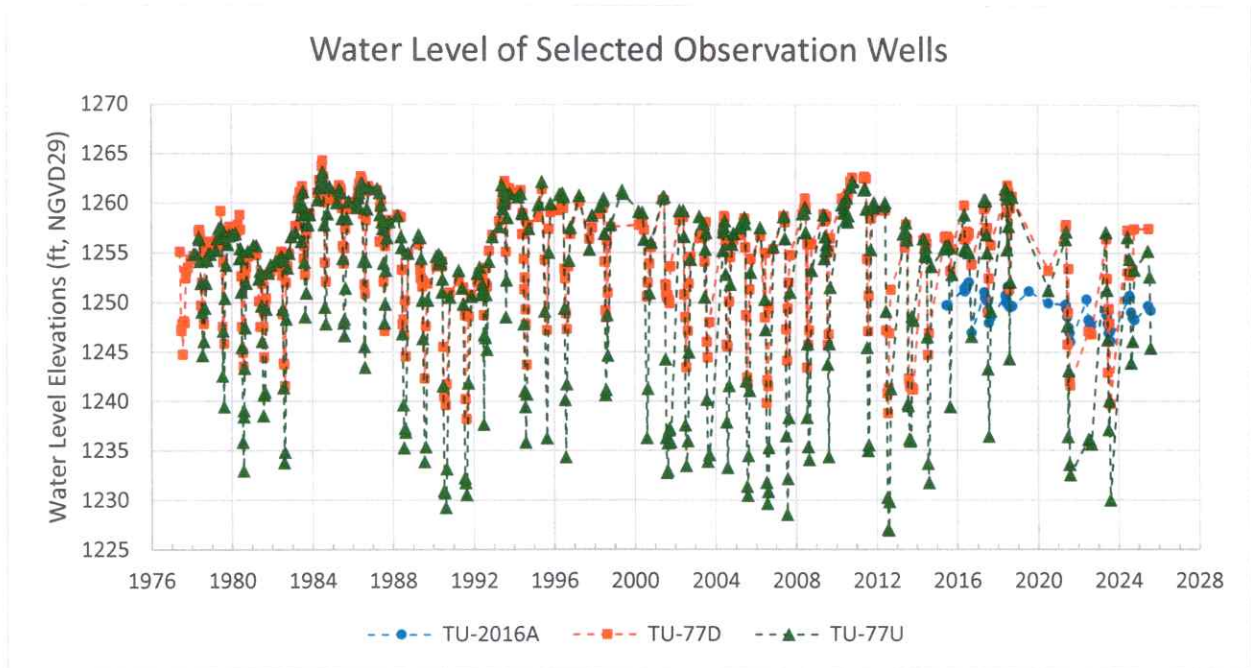
#### **WATER AVAILABILITY:**

Water Permit Application No. 9012-3 proposes to appropriate water from the Upper Vermillion Missouri: North aquifer for irrigation use. The probability of unappropriated water being available from the aquifer can be evaluated by considering SDCL 46-6-3.1, which requires “No application to appropriate groundwater may be approved if, according to the best information reasonably available, it is probable that the quantity of water withdrawn annually from a groundwater source will exceed the quantity of the average estimated annual recharge of water to the groundwater source. An application may be approved, however, for withdrawals of groundwater from any groundwater formation older than or stratigraphically lower than the Greenhorn Formation in excess of the average estimated annual recharge for use by water distribution systems.” The Upper Vermillion Missouri: North aquifer is not older than or stratigraphically lower than the Greenhorn Formation, and the applicant’s proposed use is not for use in a water distribution system as defined by SDCL 46-1-6(17). Therefore, the average annual recharge and average annual withdrawal rates to and from the Upper Vermillion Missouri: North aquifer must be considered.

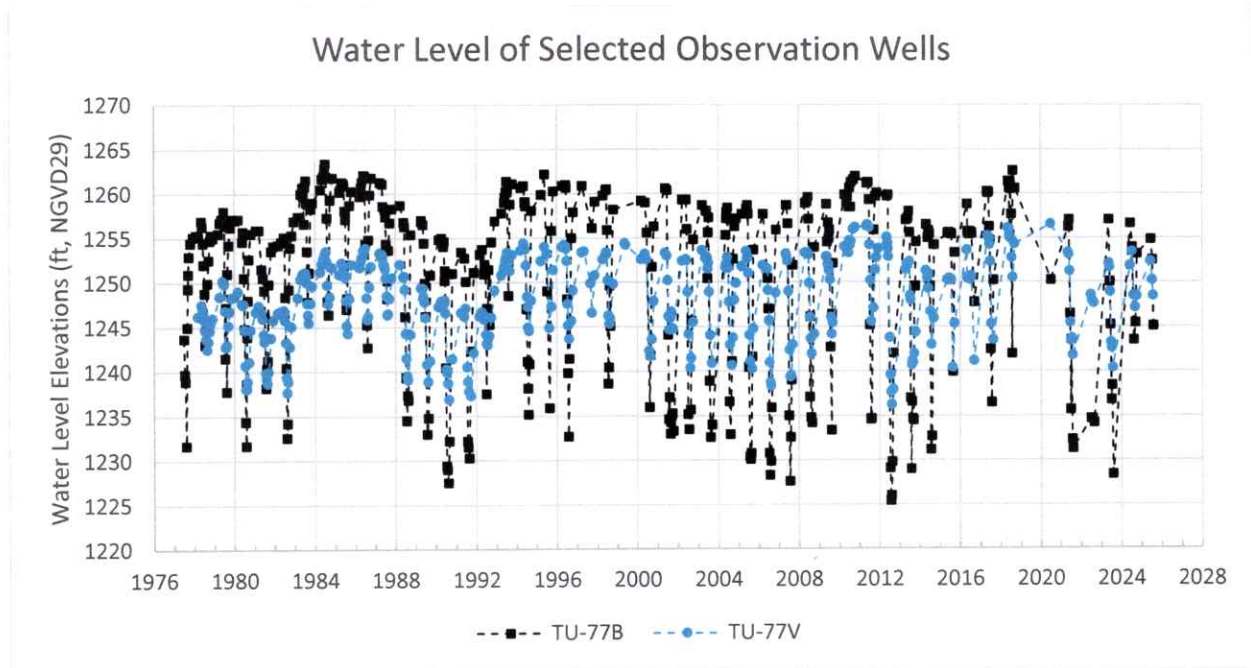
#### **OBSERVATION WELL DATA:**

Administrative Rule of South Dakota (ARSD) 74:02:05:07 requires that the Water Management Board shall rely upon the record of observation well measurements in addition to other data to determine that the quantity of water withdrawn annually from the aquifer does not exceed the estimated average annual recharge of the aquifer.

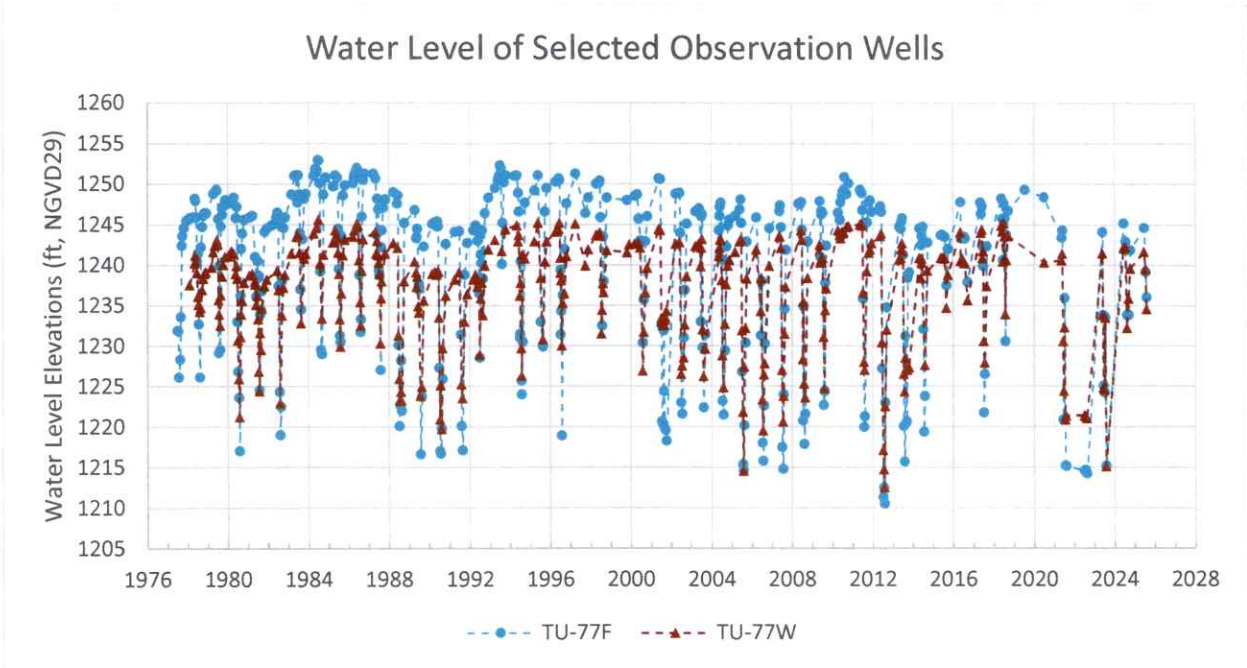
The DANR-Water Rights Program monitors ten observation wells completed into the Upper Vermillion Missouri: North aquifer with observation wells in the area of this application shown on Figure 1 (Water Rights, 2026b). These observation wells provide data on how the aquifer reacts to regional climatic conditions and local pumping. These observation wells, and distance to the diversion point are TU-2016A (approximately 4.4 miles southwest), TU-771 (approximately 2.8 miles southwest), TU-77H (approximately 2.8 miles southwest), TU-77G (approximately 2.3 miles west), TU-77F (approximately 2.3 miles west), TU-77D (approximately 5.3 miles northwest), TU-77Y (approximately 1.9 miles southeast), TU-77W (approximately 0.8 miles northeast), TU-77B (approximately 5.3 miles northwest), TU-77L (approximately 4.1 miles southeast), TU-77V (approximately 3.6 miles northwest), and TU-77U (approximately 5.3 miles northwest) (Water Rights, 2026b). The water level elevations for these observation wells are displayed in Figures 2 to 6 (Water Rights, 2026b). The data points utilized to construct the hydrographs are measurements of the static water level in the observation wells from the top of the well casing converted to feet from the NGVD29 datum.



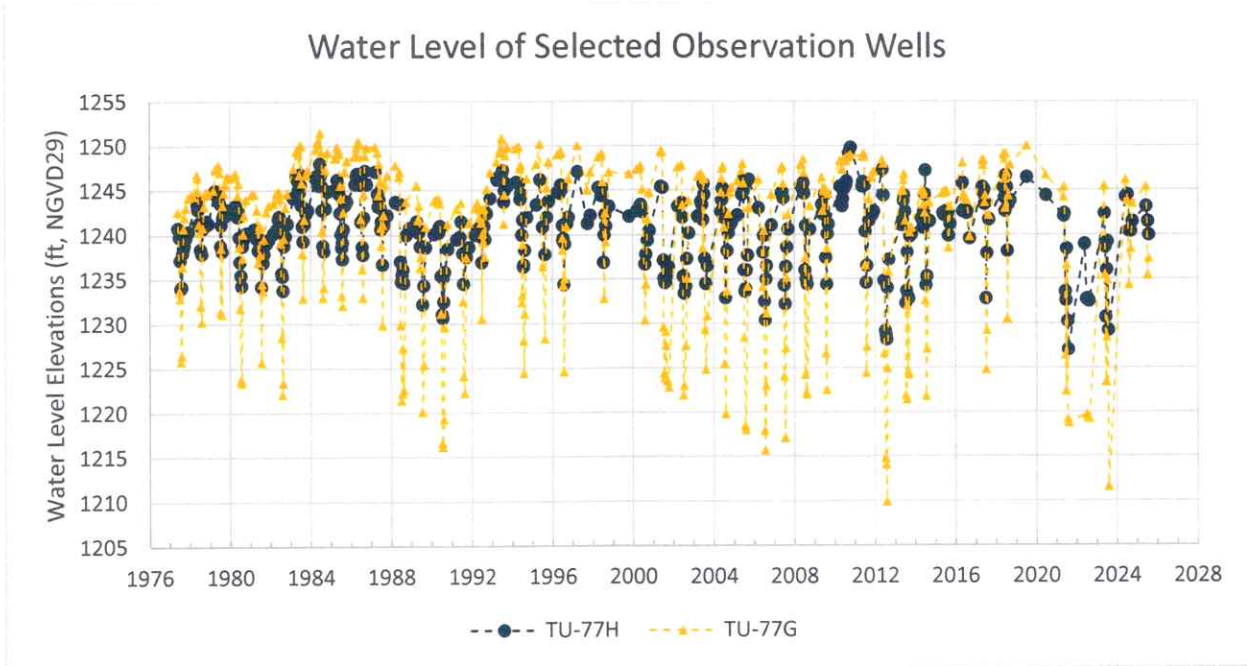
**Figure 2.** A hydrograph showing the elevation of water levels of observation wells TU-2016A, TU-77D, and TU-77U (Water Rights, 2026b)



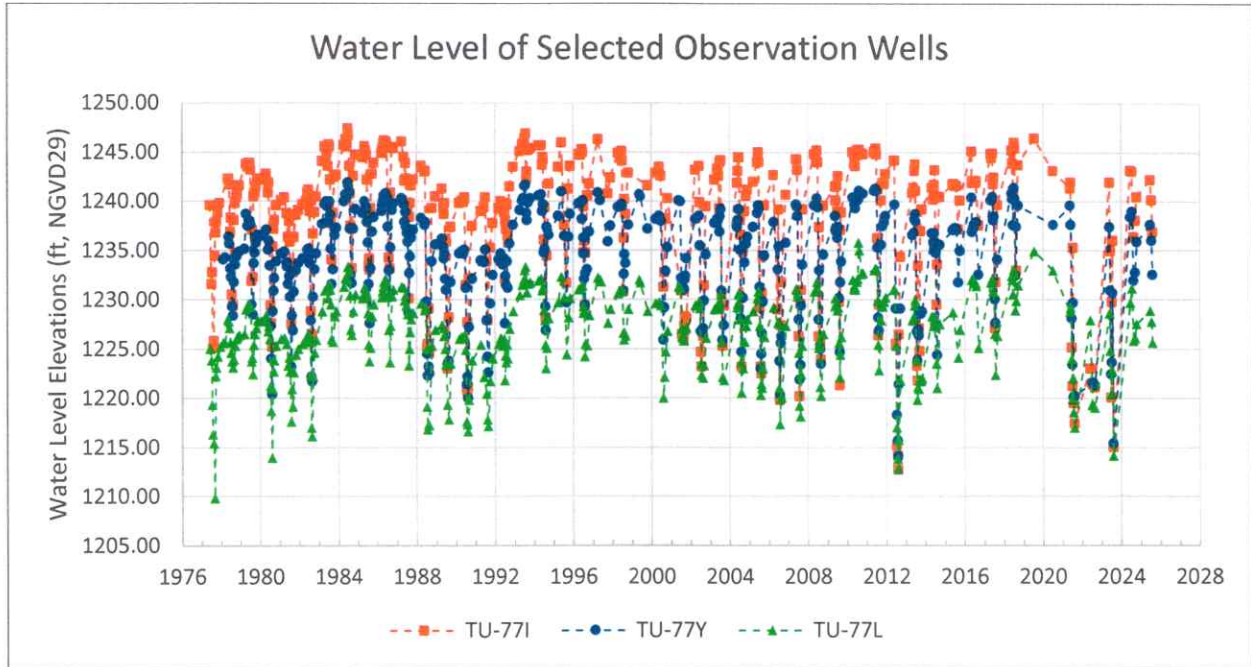
**Figure 3.** A hydrograph showing the elevation of water levels of observation wells TU-77B and TU-77V (Water Rights, 2026b)



**Figure 4.** A hydrograph showing the elevation of water levels of observation wells TU-77F and TU-77W (Water Rights, 2026b)



**Figure 5.** A hydrograph showing the elevation of water levels of observation wells TU-77H and TU-77G (Water Rights, 2026b)



**Figure 6.** A hydrograph showing the elevation of water levels of observation wells TU-77I, TU-77Y, and TU-77L (Water Rights, 2026b)

The observation wells in the Upper Vermillion Missouri: North aquifer have a relatively stable trend in the water level over their respective period of record, as seen in Figure 2. The first water level readings of each year are representative of the static conditions of the aquifer and are the best indicator of a decline or rise in water availability. The hydrographs for the Upper Vermillion Missouri: North aquifer observation wells indicate that the aquifer responds well to climatic conditions because water levels are rising during wetter periods (early spring snowmelt and precipitation) and declining to a stable water level during drier periods. The Upper Vermillion Missouri: North aquifer is generally under confined conditions, and the potentiometric surface in a confined aquifer is very responsive to pumping as a small change of water stored in the aquifer results in a fairly large change in the artesian head pressure in a well (Buhler, 2015; Holmes and Filipovic, 2015). Additionally, the water levels in the observation wells display that the amount of recharge to and natural discharge from the aquifer greatly exceeds pumping with the aquifer with water levels returning to pre-pumping conditions between irrigation seasons. Aquifer recovery indicates that climatic conditions and therefore, the effects of recharge to and natural discharges from the aquifer govern the long-term fluctuations of waters levels in the aquifer rather than the impacts of pumping from the Upper Vermillion Missouri: North aquifer. By recognizing that both recharge to and natural discharge from an aquifer can be captured for pumping, the observation well hydrographs demonstrate unappropriated water is available for the proposed appropriation.

## **HYDROLOGIC BUDGET:**

### **Recharge**

Recharge to the Upper Vermillion Missouri aquifer occurs primarily through the infiltration of precipitation. Additional recharge occurs through leakage from the overlying Parker-Centerville aquifer where the two aquifers are in direct contact (Figure 1) (Holmes and Filipovic, 2015). Buhler (2014) indicated there is not a reliable average annual recharge estimate for the North management unit of the Upper Vermillion Missouri aquifer. Therefore, comparison of the average annual recharge to the average annual withdrawal through a hydrologic budget specific to the North management unit of the Upper Vermillion Missouri aquifer is not feasible. However, for confined aquifers, Hedges and others (1985) recommended a recharge rate range of 0.15 to 0.60 inches per year for use by management and development programs. The areal extent of the Upper Vermillion Missouri: North aquifer is approximately 38,100 acres (Buhler, 2014); therefore, using the range from Hedges and others (1985) results in an average annual recharge rate to the Upper Vermillion Missouri: North aquifer of approximately 476 to 1,905 acre-feet per year. There is likely additional recharge (such as, where the aquifer is unconfined) that occurs to the aquifer that would not be accounted for by Hedges and others (1985) confined aquifer range. Observation well data show that the generalized recharge rate range estimated Hedges and others (1985) is likely much lower than the actual average annual recharge rate to the Upper Vermillion Missouri: North aquifer (Water Rights, 2026b).

### **Discharge**

Discharge from the Upper Vermillion Missouri: North aquifer primarily occurs through well withdrawals and natural discharge to the Upper Vermillion Missouri: South aquifer (Water Rights, 2026d). There are 53 water rights/permits authorized to appropriate water from the Upper Vermillion Missouri: North aquifer, 48 of which are currently identified as Upper Vermillion Missouri aquifer and are located near or within the northern management unit aquifer boundary (Water Rights, 2026c). There are no future use permits reserving water from the Upper Vermillion Missouri: North aquifer (Water Rights, 2026c).

Table 1 summarizes the four non-irrigation water rights/permits authorized to appropriate water from the Upper Vermillion Missouri: North aquifer with the estimated annual use for each water right/permit as determined by their limiting diversion rate or annual reported use. The amount of water withdrawn was estimated by assuming the non-irrigation water rights/permits limited by an annual volume will withdraw their entire appropriated volume every year. It is estimated that the non-irrigation water rights/permits limited only by a diversion rate will pump at their maximum permitted diversion rate for 60 percent of the time. This is a standard method developed by the DANR-Water Rights Program for estimating average annual withdrawals by non-irrigation appropriations limited solely by diversion rate. It is likely an overestimate of water withdrawn by water rights/permits only limited by diversion rate. The Town of Davis was identified as being connected to TM Rural Water District and likely maintains the well for standby purposes (Drinking Water Program, 2026); as such, the average annual water use for this water right has been estimated to be zero acre-feet per year on Table 1. Overall, the estimated average annual

withdrawal rate for the Upper Vermillion Missouri: North aquifer non-irrigation water rights/permits is approximately 48 acre-feet/year (Table 1) (Water Rights, 2026c).

**Table 1.** Estimated average annual use for non-irrigation water rights/permits authorized to appropriate water from the Upper Vermillion Missouri: North aquifer (Water Rights, 2026c).

Permit No.	Name	Uses	Status	Authorized Diversion Rate (cfs)	Annual Authorized Volume (acre-feet)	Estimated Use (acre-feet/year)
525-3*	Town of Davis	MUN	LC	0.45	NA	0
5833-3	Advanced Prescription	COM	LC	0.11	NA	48
6435-3**	South Lincoln RWS	RWS	LC	2.45	1,800	731
6727-3**	South Lincoln RWS	RWS	LC	1.95		
					<b>Total:</b>	<b>779</b>
LC Licensed Water Right, MUN Municipal, COM Commercial, RWS Rural Water System						
*Connected to another rural water system. **Reports annual use to the chief engineer.						

Table 2 summarizes average annual water use of non-irrigation water right from the Upper Vermillion Missouri: North aquifer (Water Rights, 2026f). Currently, non-irrigation water rights held by South Lincoln Rural Water System are the only water rights reporting their annual non-irrigation water use. Table 2 shows that the annual reported use is much less than the annual authorized volume and the annual reports have been relatively similar over the past ten years (Table 1 & 2) (Water Rights, 2026c & 2026f). To reflect more recent conditions, the reported average of the past ten years will be used for determining the reported non-irrigation withdrawal rate for the Upper Vermillion Missouri: North aquifer.

**Table 2.** Reported average annual use for non-irrigation water rights/permits authorized to appropriate water from the Upper Vermillion Missouri: North aquifer (Water Rights, 2026c).

Year	Reported Annual Use (acre-feet)	Year	Reported Annual Use (acre-feet)
2003	354	2014	763
2004	583	2015	810
2005	611	2016	776
2006	599	2017	849
2007	607	2018	808
2008	779	2019	664
2009	987	2020	326
2010	1095	2021	810
2011	1108	2022	825
2012	673	2023	671
2013	702	2024	771
<b>Average (2003-2024)</b>			<b>735</b>
<b>Average (2015-2024)</b>			<b>731</b>

Currently, there are 53 irrigation water rights/permits appropriating water from the Upper Vermillion Missouri: North aquifer (Water Rights, 2026c). Irrigation water rights/permits have been typically required to report their annual usage on an irrigation questionnaire since 1979. The estimated average annual withdrawal rate for the Upper Vermillion Missouri: North aquifer

irrigation water rights/permits that have reported over the period of record (1979 to 2024) is approximately 4,542 acre-feet per year (Table 3) (Water Rights, 2026a). To reflect the current development of irrigation water rights/permits more accurately, the average annual withdrawal rate for irrigation appropriations from 2015 to 2024 is approximately 5,172 acre-feet per year (Table 3) (Water Rights, 2026a).

Two irrigation water permits were approved in 2023 that do not have a significant history reported in the irrigation questionnaire (IQ) and need to be accounted for. Water Permit Nos. 8807-3 and 8809-3 are collectively authorized to irrigate 336 acres. Over the entire period of record, crop irrigators in the Tulare: East James aquifer of South Dakota applied, on average, 7.58 inches of water per acre per year (Drennon, 2025). However, the Tulare: East James aquifer is more than 100-miles northwest of the Upper Vermillion Missouri: North aquifer. To account for the fluctuation in wet and dry cycles from year to year and differences in percolation of local soils, an estimate of 10 inches (0.83 feet) of water per acre per year will be used to somewhat overestimate the annual withdrawal rate for these irrigation water permits. Assuming 0.83 feet of water per acre per year, the withdrawal rate for these water permits/applications is approximately 279 acre-feet per year. This pending application proposes to irrigate approximately 160 acres. Assuming 0.83 feet of water per acre per year, the withdrawal rate for this application is approximately 133 acre-feet per year. The average annual withdrawal rate for irrigation appropriations from 2015 to 2024 (Table 3) combined with recently approved 2023 permits and this application, is approximately 5,584 acre-feet per year (Water Rights, 2026a).

There are domestic wells completed into the Upper Vermillion Missouri: North aquifer that do not require a water right/permit, so the withdrawal amount from those wells is unknown (Water Rights, 2026d). Due to their relatively low diversion rates, withdrawals from domestic wells are not considered to be a significant portion of the hydrologic budget. Additionally, with the development of rural water systems in areas where the Upper Vermillion Missouri: North aquifer is the uppermost aquifer available, it is likely some domestic users may have transitioned to rural water. Therefore, the quantity of water withdrawn by domestic wells is estimated to be negligible to the hydrologic budget for the Upper Vermillion Missouri: North aquifer.

**Table 3.** Reported irrigation use from the Upper Vermillion Missouri: North aquifer from 1979 to 2024 (Water Rights, 2026a)

Year	Number of Permit/License	Annual Pumpage (ac-ft/yr)	Year	Number of Permit/License	Annual Pumpage (ac-ft/yr)	
1979	24	2,509	2002	37	5,933	
1980	24	3,652	2003	37	5,132	
1981	26	3,349	2004	37	6,116	
1982	26	2,516	2005	38	5,823	
1983	27	2,479	2006	38	6,599	
1984	27	2,320	2007	39	5,343	
1985	26	1,982	2008	42	6,335	
1986	28	3,066	2009	42	3,691	
1987	28	3,027	2010	43	150	
1988	28	4,956	2011	43	4,286	
1989	30	4,421	2012	44	9,685	
1990	35	5,269	2013	45	7,287	
1991	35	5,048	2014	45	4,976	
1992	37	4,475	2015	45	6,290	
1993	36	459	2016	47	5,885	
1994	34	4,014	2017	50	6,049	
1995	34	4,068	2018	50	2,363	
1996	35	4,093	2019	50	506	
1997	34	4,619	2020	50	5,428	
1998	36	4,877	2021	50	5,877	
1999	35	4,336	2022	51	8,401	
2000	35	5,235	2023	53	8,577	
2001	35	5,100	2024	53	2,346	
				<b>Average (1979-2024)</b>	38	4,542
				<b>Average (2015-2024)</b>	50	5,172

### Hydrologic Budget Summary

Using the range for confined aquifers for use by management and development programs from Hedges and others (1985) results in an average annual recharge rate to the Upper Vermillion Missouri: North aquifer ranging from 476 to 1,905 acre-feet per year. There is likely additional recharge (such as from the overlying Parker Centerville aquifer) that occurs to the aquifer that would not be accounted for by Hedges and others (1985) confined aquifer range. Observation well data shows that the generalized recharge rate range estimated Hedges and others (1985) is likely much lower than the actual average annual recharge rate to the Upper Vermillion Missouri: North aquifer (Water Rights, 2026b).

The average annual estimated withdrawal rate from the Upper Vermillion Missouri: North aquifer [the non-irrigation appropriations (779 acre-feet/year); the average annual withdrawal rate for irrigation appropriations from 2015 to 2024 (5,172 acre-feet/year); recently approved permits (279 acre-feet/year); this application, if approved (133 acre-feet/year)] is approximately 6,363 acre-feet per year, also shown on Table 4 (Water Rights, 2026a). Table 4 suggests estimated annual withdrawals from the aquifer exceed the average annual recharge. However, while the hydrologic budget suggests there is not a reasonable probability unappropriated water

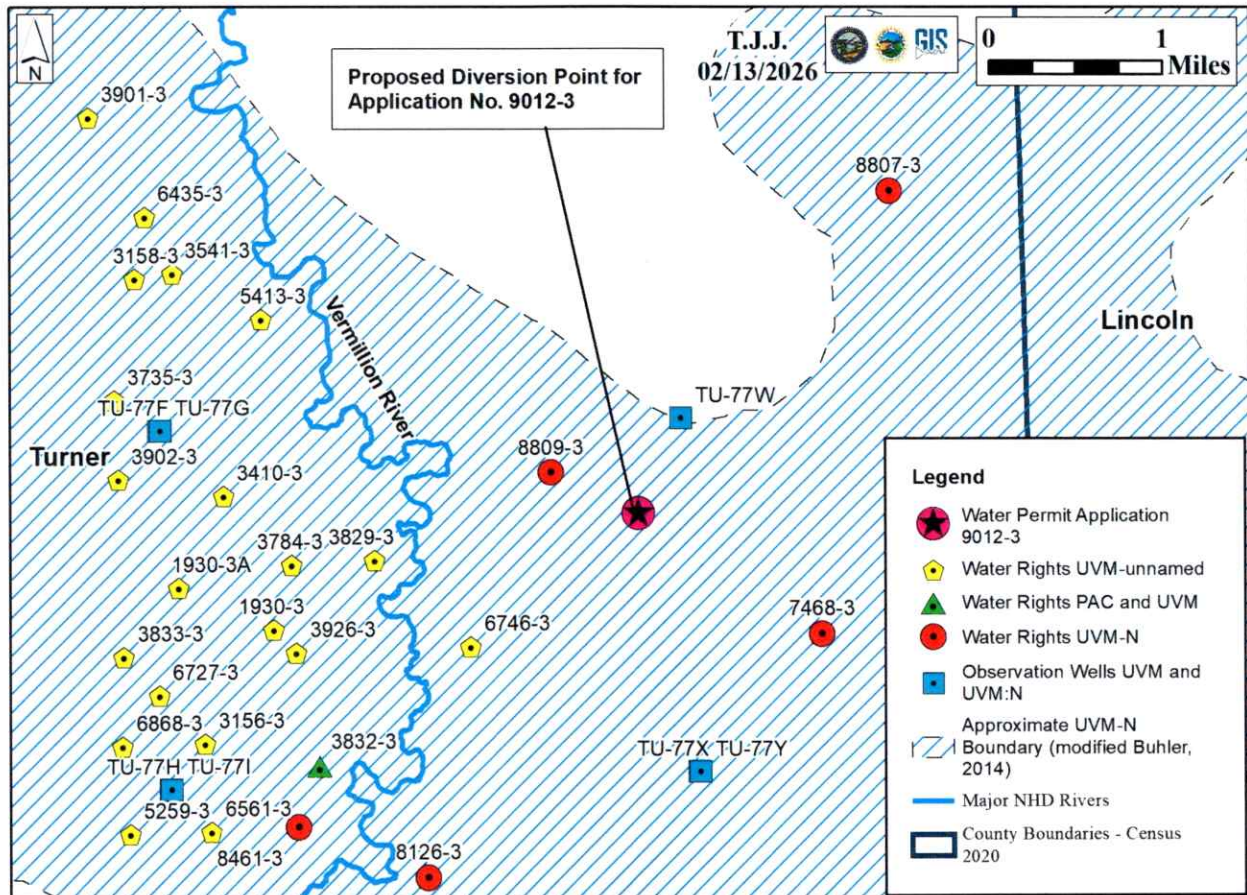
is available, physical measurements of water levels in observation wells show discharge does not exceed recharge. Consequently, there is a reasonable probability that unappropriated water is available.

**Table 4.** List of water rights/permits estimated withdrawals, recently approved permits, this application (if approved), and confined recharge of the Upper Vermillion Missouri: North aquifer (Water Rights, 2026a)

	<b>Estimated Withdrawal from the Upper Vermillion Missouri: North Aquifer (ac-ft/yr)</b>
Non-Irrigation Withdrawals	779
Irrigation Withdrawals (2015-2024)	5,172
Recent Permits (2023)	279
This Application	133
<b>Total Withdrawal</b>	<b>6,363</b>
Confined Recharge (Hedges and others;1985)	'476'-'1905'
<b>Estimated Recharge</b>	<b>'476'-'1905'</b>

**POTENTIAL FOR UNLAWFUL IMPAIRMENT OF EXISTING WATER RIGHTS:**

Water rights/permits in the general vicinity of the existing well site for this application are shown in Figure 7 and summarized in Table 5. The closest water right/permit to the proposed diversion point for this application, not held by the applicant, is Water Permit No. 8809-3 which is held by Darbi D. Bossman Limited Partnership. The diversion point for Water Permit No. 8809-3 is located approximately 0.6 miles northwest of the proposed diversion point for this application (Water Rights, 2026c). There are domestic wells on file with the DANR-Water Rights Program that are completed into the Upper Vermillion Missouri: North aquifer, with the closest domestic well on file (not held by the applicant) approximately 0.4 miles northeast of the diversion point based on the legal description provided by the well driller on the well completion report (Water Rights, 2026d). There could potentially be other domestic wells completed into the Upper Vermillion Missouri: North aquifer near the diversion point that are not on file with the DANR-Water Rights Program.



**Figure 7.** Map of the proposed diversion point for Water Permit Application No. 9012-3, nearby Upper Vermillion Missouri: North aquifer water rights/permits, and observation wells (Water Rights, 2026b and 2026c).

**Table 5.** List of water rights/permits shown in Figure 7 (Water Rights, 2026c).

Permit	Name/Business	Priority	Status	Use Type	CFS	Acres
1930-3	Mary G. Madsen	03/23/1972	License	Irrigation	2.00	132
1930A-3	Larohn Hagena	03/23/1972	License	Irrigation	1.56	132
3156-3	Glennis M. Tellinghuisen	09/03/1976	License	Irrigation	1.88	132
3158-3	Sheryl Fast	10/08/1976	License	Irrigation	0.50	35
3410-3	Horner Family LTD Partnership	12/09/1976	License	Irrigation	1.60	112
3541-3	Pine Knoll Mobile Home Park	02/01/1977	License	Irrigation	3.00	228
3735-3	Happy Acres LLC	02/11/1977	License	Irrigation	1.88	132
3784-3	Larohn Hagena	03/09/1977	License	Irrigation	1.88	132
3829-3	Gary R Knock	03/10/1977	License	Irrigation	1.29	90
3832-3	Smit Family Farm	03/10/1977	License	Irrigation	2.78	191
3833-3	Larohn & Dianne Hagena	03/10/1977	License	Irrigation	1.83	128
3901-3	Roger R. Ihnen	11/29/1977	License	Irrigation	4.23	311
3902-3	Roger R. Ihnen	11/07/1977	License	Irrigation	2.00	156
3926-3	Smit Family Farm	04/12/1977	License	Irrigation	1.88	132
5259-3	Gary R. Knock	12/16/1988	License	Irrigation	1.88	132
5413-3	Darlene Schriever	01/12/1990	License	Irrigation	1.40	134
6435-3	South Lincoln RWS	03/14/2002	License	Rural Water System	2.45	0
6561-3	Smit Family Farm	01/07/2005	Permit	Irrigation	1.89	136
6727-3	South Lincoln RWS	05/25/2006	License	Rural Water System	1.95	0
6746-3	Jarrod Hagena	08/03/2006	License	Irrigation	2.23	158
6868-3	Joe Hummel	07/02/2007	License	Irrigation	3.56	204
7468-3	Cleland Hagen Trust	10/18/2012	License	Irrigation	1.78	132
8126-3	Smit Family Farm	02/11/2015	License	Irrigation	3.78	198
8461-3	Jerome Hult	12/02/2020	License	Irrigation	1.78	136
8807-3	Daric D. Bossman Limited Partnership	10/26/2023	Permit	Irrigation	1.78	176
8809-3	Darbi D. Bossman Limited Partnership	10/30/2023	Permit	Irrigation	1.78	160

The Upper Vermillion Missouri: North aquifer is under confined conditions at the well site (Water Rights, 2026d). In a confined aquifer, drawdown from a pumping well can extend some distance from the well. The Water Management Board recognizes that putting water to beneficial use requires a certain amount of drawdown to occur (Water Rights, 1995). The Board has developed rules to allow water to be placed to maximum beneficial use without the necessity of maintaining artesian head pressure for domestic use. The Water Management Board defined an “adversely impacted domestic well” in ARSD 74:02:04:20(7) as:

“A well in which the pump intake was set at least 20 feet below the top of the aquifer at the time of construction or, if the aquifer is less than 20 feet thick, is as near to the bottom of the aquifer as is practical and the water level of the aquifer has declined to a level that the pump will no longer deliver sufficient water for the well owner’s needs.”

The Water Management Board considered the delivery of water by artesian head pressure versus maximum beneficial use during the issuance of Water Right No. 2313-2 for Coca-Cola Bottling

Company of the Black Hills. The Board adopted the Findings of Facts and Conclusions of Law that noted the reservation of artesian head pressure for delivery of water would be inconsistent with SDCL 46-1-4 which states, “general welfare requires that the water resources of the state be put to beneficial use to the fullest extent of which they are capable...” (Water Rights, 1995). Furthermore, the Water Management Board found if increased cost or decreased production as a result of impacts on artesian head pressure by legitimate users is to be considered as an unlawful impairment, it would also conflict with SDCL 46-1-4 (Water Rights, 1995). With that in mind, some existing well owners may need to install or lower pumps depending on the specific characteristics of the Upper Vermillion Missouri: North aquifer at their location. The SD DANR complaints database has no complaints on file about the Upper Vermillion Missouri: North aquifer in Turner County (Water Rights, 2026e). When considering the statutes (SDCL 46-1-4 and 46-6-6.1), rules (ARSD 74:02:04:20(6) and (7)), history of irrigation in the area without any complaints of well interference (Water Rights, 2026e), and the saturated aquifer thickness near the diversion point, any drawdown created from the diversion is not expected to cause an unlawful impairment on existing water right/permit holders or domestic users with adequate wells. Therefore, there is a reasonable probability that any interference from the proposed appropriation will not impose unlawful impairments on existing users with adequate wells.

#### CONCLUSIONS:

1. Water Permit Application No. 9012-3 proposes to appropriate 1.78 cfs from one well to be completed into the Upper Vermillion Missouri: North aquifer (210 feet deep) located in the approximate center of the E ½ Section 22 for the irrigation of 160 acres located in the S ½ NE ¼, N ½ SE ¼ Section 22; all in T98N-R52W. The site of interest is located approximately six miles east-northeast of Hurley, SD in Turner County.
2. Based on observation well data, there is a reasonable probability that unappropriated water is available from the Upper Vermillion Missouri: North aquifer to supply the proposed appropriation.
3. There is a reasonable probability that the diversion by Water Permit Application No. 9012-3 will not unlawfully impair adequate wells for existing water rights/permits and domestic uses.



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## References

- Buhler, K. A. 2014. Report to the Chief Engineer on 21 Water Permit Applications from the Upper Vermillion Missouri Aquifer. SD DANR – Water Rights Program, Joe Foss Bldg. Pierre, SD.
- Buhler, K.A. 2015. Report to the Chief Engineer on the North Management Unit of the Upper Vermillion Missouri Aquifer. SD DANR - Water Rights Program, Joe Foss Bldg., Pierre, SD.
- Drennon, K. 2025. Second Report on the Five-Year Review of Water Availability in the East James Management Unit of the Tulare Aquifer. File for Held Application No. 8082-3. SD DANR-Water Rights Program. Pierre, SD.
- Hedges, L.S., Allen, J., Holly, D.E., 1985. Evaluation of Ground-Water Resources Eastern South Dakota and Upper Big Sioux River, South Dakota and Iowa, Task 7: Ground Water Recharge; United States Army Corps of Engineers Contract DACW 45-80-C-0185.
- Hedges, L.S., Burch, S.L., Iles, D.L., Barari, R.A., and Schoon, R.A. 1982. Evaluation of Ground-Water Resources Eastern South Dakota and Upper Big Sioux River, South Dakota and Iowa, Task 1: Bed rock Topography and Distribution, Task 2: Extent of Aquifers, Task 3 Ground-Water Storage, Task 4: Computerized Data Base. United States Army Corps of Engineers Contract DACW 45-80-C-0185.
- Holmes, S.L., Filipovic, D. 2015. Hydrogeologic Investigation of the Upper-Vermillion-Missouri Aquifer. Open File Report 93-UR. Akeley-Lawrence Science Center, University of South Dakota. Vermillion, SD.
- Kilts, W., 2023. Report to the Chief Engineer on Water Permit Application No. 8742-3 - Larry Schmidt. SD DANR - Water Rights Program, Joe Foss Bldg., Pierre, SD.
- Lindgren, R.J., Hansen, D.S., 1990. Water Resources of Hutchinson and Turner Counties, South Dakota. U.S. Geological Survey Water-Resources Investigations Report 90-4093, 100p.
- SDGS, 2026. South Dakota Geological Survey Lithologic Logs Database. Accessed February 9, 2026. <http://cf.sddanr.net/lithdb/>.
- Water Rights, 1995. Findings of Fact, Conclusions of Law, and Final Decision in the Matter of Water Permit Application No. 2313-2, Coca-Cola Bottling Company of the Black Hills. DANR-Water Rights Program file for Water Right No. 2313-2. Pierre, SD.
- Water Rights, 2026a. "1979-2024 Irrigation Summaries by Aquifer", SD DANR-Water Rights Program, Joe Foss Building, Pierre, SD.
- Water Rights, 2026b. Observation Well Data, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.
- Water Rights, 2026c. Water Right/Permit Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

Water Rights, 2026d. Well Completion Reports, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

Water Rights, 2026e. County Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, SD.

Water Rights, 2026f. "2003-2024 Non-Irrigation Summaries by Aquifer", SD DANR-Water Rights Program, Joe Foss Building, Pierre, SD.