DANR
SOUTH DAKOTA

WATER MANAGEMENT BOARD
Remote Conference Meeting on October 2, 2024

Floyd Matthew Training Center
Joe Foss Bldg., 523 E Capitol Ave, Pierre SD

Any person(s) interested in speaking during the public comment period via remote connection can learn how at https://boardsandcommissions.sd.gov on the Water Management Board page.

Scheduled times are based on Central Time and are estimated start times.
Agenda items may be delayed due to prior scheduled items.
Live audio of the meeting is available at https://www.sd.net

October 2, 2024

9:30 AM Call to Order
Roll Call
Adopt Final Agenda
Conflicts Disclosures and Requests for State Board Waivers
Adopt July 10, 2024 Board Minutes
Set December 4 - 5, 2024 Meeting Dates and Location
Public comment period in accordance with SDCL 1-25-1
Status and Review of Water Rights Litigation
Administer Oath to Department of Agriculture and Natural Resources Staff

Cancellation Considerations – Amanda Dewell

Unopposed Water Permits Issued based on Chief Engineer's Recommendation

- Comment received concerning Water Permit Application No. 8858-3, Plainview Dairy, LLC

Consider Validation of Recognized Vested Water Right Claim No. 1844-3, SD Game, Fish & Parks for Richmond Dam – Ron Duvall

10:00 AM Consider Water Permit Application No. 8579-3, Brett Guthmiller – Whitney Kilts
Consider Water Permit Application No. 8616-3, Michael Schultz – Whitney Kilts

10:15 AM Draft report concerning James River water management – Brittan Hullinger

LUNCH

Continue any prior agenda items not yet completed.

ADJOURN

WATER MANAGEMENT BOARD
Meeting on October 2, 2024

Board members are reminded they are subject to SDCL 3–23-1 to 3-23-5 (Disclosure Laws) which address the disclosure of any conflicts of interest a member may have regarding contracts with the State of South Dakota. Board members should report any potential conflicts to the board and seek a waiver where appropriate.

Notice is given to individuals with disabilities that the meeting is being held in a physically accessible location. Individuals requiring assistive technology or other services in order to participate in the meeting or materials in an alternate format should contact Brian Walsh, Nondiscrimination Coordinator, by calling (605) 773-5559 or by email at Brian.Walsh@state.sd.us as soon as possible but no later than two business days prior to the meeting in order to ensure accommodations are available.

The audio recording for this meeting is available on the South Dakota Boards and Commissions Portal at https://boardsandcommissions.sd.gov/Meetings.aspx?BoardID=106

MINUTES OF THE 250TH MEETING
OF THE WATER MANAGEMENT BOARD
FLOYD MATTHEW TRAINING CENTER
523 EAST CAPITOL AVENUE
PIERRE, SOUTH DAKOTA
JULY 10, 2024

CALL TO ORDER AND ROLL CALL: Vice Chairman Hutmacher called the meeting to order at 9:30 a.m. Central Time. The roll was called, and a quorum was present.

The meeting was streaming live on SD.net, a service of South Dakota Public Broadcasting.

The following attended the meeting:

Board Members: Jim Hutmacher, Rodney Freeman, and Leo Holzbauer attended in person. William Larson, Tim Bjork, Chad Comes, and Peggy Dixon attended remotely.

Department of Agriculture and Natural Resources (DANR): Eric Gronlund, Chief Engineer, Ron Duvall, Amanda Dewell, and Nakaila Steen, Water Rights Program.

Attorney General's Office: David McVey, Board counsel; Jennifer Verleger, Water RightsProgram counsel.

Court Reporter: Carla Bachand, Capital Reporting Services.

Legislative Oversight Committee Members: Representative Mike Weisgram.

Other: Albert Keller, Lemmon, SD.

ANNUAL ELECTION OF OFFICERS: Motion by Freeman, seconded by Comes, to elect Jim Hutmacher as chairman, Peggy Dixon as vice chair, and Leo Holzbauer as secretary. A roll call vote was taken, and the motion carried unanimously.

APPOINTMENT OF PREHEARING OFFICER: Chairman Hutmacher appointed Rodney Freeman as the prehearing chairman and William Larson as the alternate prehearing chairman.

ADOPT FINAL AGENDA: Motion by Freeman, seconded by Bjork, to adopt the final agenda. Motion carried unanimously.

CONFLICT DISCLOSURES AND REQUESTS FOR STATE BOARD WAIVERS: None.

ADOPT MAY 8, 2024, BOARD MINUTES: Motion by Bjork, seconded by Larson, to approve the minutes of the May 8, 2024, Water Management Board meeting. Motion carried unanimously.

SET OCTOBER 2 - 3, 2024, MEETING DATES AND LOCATION: The October 2 - 3 Board meeting will be at the Matthew Environmental Training Center in Pierre.

PUBLIC COMMENT PERIOD IN ACCORDANCE WITH SDCL 1-25-1: None.

UPDATE ON DANR ACTIVITIES: Eric Gronlund, Chief Engineer, Water Rights Program, introduced Shannon Konst, new senior secretary for the Water Rights Program, and Austin Settje, new engineer for the Water Rights Program.

Mr. Gronlund discussed the Water Rights activities regarding flooding, monitoring dams, and the USGS gaging stations.

South Dakota received a $2,900,000 grant from FEMA for high hazard dams, which will be used toward the Richmond Dam project northwest of Aberdeen. The South Dakota Legislature has already appropriated $9,650,000 for this project. The project is anticipated to cost approximately $20,000,000.

Mr. Gronlund noted that the table of unopposed new water permit applications issued based on the Chief Engineer recommendations, which was included in the Board packet, should not have included No. 8754-3, Lewis and Clark RWS, and No. 8787-3, Cheryl E. Nelson. Both applications were addressed by the Water Management Board at its May meeting.

Chairman Hutmacher talked about silting in the Lake Wanalain Dam marina and flooding at the Chamberlain golf course due to what he believes is silting in the Missouri River near old Highway 16.

STATUS AND REVIEW OF WATER RIGHTS LITIGATION: David McVey reported that on July 2, 2024, the First Circuit Court issued a memorandum decision regarding the appeal of the Water Management Board's Order regarding the petition for a declaratory ruling and Water Permit No. 8744-3. The court affirmed the Board's decisions and stated that the Board correctly determined that no water right permit is required for Dakota Bay canal construction and properly allowed the intervention of Dakota Bay and the Chief Engineer and did not require disqualification of legal counsel. According to the Board's determinations, the declaratory ruling is affirmed. The court further found that the Water Management Board correctly determined Dakota Bay's water use proposed under Application No. 8744-3 is beneficial and in the public interest, the subpoenas were properly quashed, and the determinations in Application No. 8744-3 were affirmed.

Mr. McVey stated that this essentially means that all the Board's Orders were affirmed by the Circuit Court, but they can still be appealed to the state Supreme Court. The court directed Dakota Bay to file an Order that is consistent with court's memorandum decision, but an Order has not yet been filed.

ADMINISTER OATH TO DANR STAFF: The court reporter administered the oath to DANR staff who were present and intended to testify during the meeting.

CANCELLATION CONSIDERATIONS: A table listing the proposed cancellations, the notices of cancellation, and the Chief Engineer's recommendations were included in the packet the Board members received prior to the meeting.

Amanda Dewell reported that 13 water rights and water permits were scheduled for cancellation. The owners were notified of the hearing and the reasons for cancellation. The department received no comments or letters in response to the notices of cancellation.

The Chief Engineer recommended cancellation of the following water rights and water permits for the reasons listed.

Number	Original Owner	Present Owner(s) and Other Persons Notified	Reason
DIVISION I WATER RIGHTS/PERMITS			
RT 683-1	Murray Water Co	Mark Job	Abandonment/Forfeiture
DIVISION III WATER RIGHTS/PERMITS			
RT 2989A-3	Palmer Reinicke	Terwilliger & Sons Inc c/o Dale Terwilliger	Abandonment/Forfeiture
RT 3053-3	Brett Binger		Abandonment
RT 3749-3	Larry Jorgenson		Abandonment
RT 4687-3A	James L Sutton Jr		Abandonment/Forfeiture
RT 4687-3B	James L Sutton Jr		Abandonment/Forfeiture
RT 5439-3	Ross Ritchie	Estelline Grain Co-Op c/o Jennifer Loban	Abandonment/Forfeiture
PE 7322-3	Redhawk LLC c/o Duane Potts		Abandonment
PE 7833-3	Billy Boyer		BU/Abandonment
PE 7857-3	Casey & April Johnston		Non-Construction
PE 8043-3	Robert P Walsh		Non-Construction
PE 8072-3	Jesse & Tanya VanDestroet		Abandonment
PE 8423-3	City of Platte c/o Shauna Meyerink		Non-Construction

Motion by Freeman, seconded by Dixon, to accept the Chief Engineer's recommendations for cancellation of the 13 water rights and water permits for the reasons listed in the table. A roll call vote was taken, and the motion carried unanimously.

CONSIDER VALIDATION OF RECOGNIZED VESTED WATER RIGHT CLAIM NO. 1069-2, SD GAME, FISH & PARKS FOR CANYON LAKE: Mr. Gronlund reported that there was not a process or public notice associated with entities filing for vested water rights for uses pre-1955.

In 1983, the State Legislature set forth a process for validating recognized vested water right claims.

In 1988, the Water Rights Program published notices in all counties where the recognized vested water right claims were located. The public notice provided the opportunity for anyone to file a petition to oppose a claim. Outlet elevations for these dams were not available so John Hatch, the former Chief Engineer, opposed validation of all Game, Fish, and Parks vested water right claims to include better quantification of the water for the vested water right claims. Over time, when repairs are done by Game, Fish and Parks where they surveyed an outlet elevation, the Water Rights Program brings the vested water right claim back to the Board for validation.

Canyon Lake dam is owned by the City of Rapid City, but the vested water right claim is held by Game, Fish, and Parks for the impoundment of water. The city provided the Water Rights Program with as built plans for the dam reconstruction, which includes the spillway elevation; therefore, validation of the vested right claim can now proceed.

The Chief Engineer recommended validation of recognized Vested Water Right Claim No. 1069-2 for sufficient water to maintain the water level in Canyon Lake's spillway elevation of 3,360.0 feet mean sea level (fmsl) with a priority date of January 1, 1935.

Motion by Comes, seconded by Bjork, to validate recognized Vested Water Right Claim No. 1069-2 for sufficient water to maintain the water level to Canyon Lake's spillway elevation of 3360.0 fmsl with a January 1, 1935, priority date. A roll call vote was taken, and the motion carried unanimously.

UNOPPOSED NEW WATER PERMITS ISSUED BY THE CHIEF ENGINEER WITHOUT A HEARING BEFORE THE BOARD: Prior to the meeting, the Board received a copy of the table listing the unopposed new water permits issued by the Chief Engineer. See attachment.

NEW WATER PERMIT APPLICATIONS: The pertinent qualifications attached to approved water permit applications are listed below:

Well Interference Qualification
The well(s) approved under this permit will be located near domestic wells and other wells which may obtain water from the same aquifer. The well owner under this Permit shall control withdrawals so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

Well Construction Rule Qualification
The wells authorized by Permit No. ____ shall be constructed by a licensed well driller and construction of the well and installation of the pump shall 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.

Irrigation Water Use Questionnaire Qualification
This permit is approved subject to the irrigation water use questionnaire being submitted each year.

Low Flow Qualification

Low flows as needed for downstream domestic use, including livestock water and prior water rights must be by-passed.

CONSIDER WATER PERMIT APPLICATION NOS. 8859-3, 8860-3, 8861-3, 8862-3, AND 8863-3, NICK & SCOTT BEBO AND WATER PERMIT APPLICATION NOS. 8867-3, 8868-3, 8869-3, 8870-3, JIM OR COLLIN KLEBSCH: Ron Duvall stated included in the Board packet were the applications, the Chief Engineer's recommendations, and the Affidavits of Publication. The reports were prepared by Brittan Hullinger.

Nick and Scott Bebo submitted water right permit Application Nos. 8859-3, 8860-3, 8861-3, 8862-3, and 8863-3 for water from the James River in the total amount of 9.7 cfs to irrigate a total of 975 acres.

Jim or Collin Klebsch submitted water right permit Application Nos. 8867-3, 8868-3, 8869-3, and 8870-3 for water from the James River in the total amount of 9.57 cfs to irrigate a total of 612 acres.

The Chief Engineer recommended deferral of all nine applications until the fall/winter 2024 Water Management Board meeting to allow completion of a hydrologic analysis to determine whether the 300/200 cfs appropriation limit on the James River should be retained of modified and, if modified to allow appropriations in excess of the current limit, what qualifications should be attached to new water permits to protect existing James River water rights and domestic uses.

Mr. Duvall noted that all nine of the applications were public noticed, and in response to the public notice, no petitions in opposition were received. The Bebo's and the Klebsch's are not contesting the Chief Engineer's recommendations.

In 1965, the Water Rights Commission, the predecessor to the Water Management Board, set appropriative limits of 300 cfs from the James River, and of that, no more than 200 cfs can be appropriated from Huron to the North Dakota border. Currently, the amount of water that is appropriated by existing permits from the James River is right at these limits.

Mr. Duvall noted that rather than recommend denial of the applications, the Water Rights Program believes that now is a good time to look at the flow limits that were set in 1965.

Mr. Duvall stated that since the 1990s there has been a notable trend of increasing stream flows in the James River.

The Water Rights Program intends to present the results of the hydrologic analysis to the Board in December 2024.

Motion by Larson, seconded by Bjork, to defer Water Permit Application Nos. 8859-3, 8860-3, 8861-3, 8862-3, and 8863-3, Nick and Scott Bebo. A roll call vote was taken, and the motion carried unanimously.

Motion by Bjork, seconded by Dixon, to defer Water Permit Application Nos. 8867-3, 8868-3, 8869-3, and 8870-3, Jim or Collin Klebsch. A roll call vote was taken, and the motion carried

unanimously.

Board member Larson left the meeting at 10:10 a.m. due to a prior commitment.

CONSIDER MODIFICATION OF QUALIFICATION NO. 4 ON WATER PERMIT NO. 3053A-3, BRETT BINGER: Amanda Dewell reported that Water Permit No. 3053A-3 amended Water Right No. 3053-3 by transferring 130 of the irrigated acres and the point of diversion to a new location. Water Permit No. 3053A-3 was approved in January 2015. Qualification No. 4 was placed on the permit mandating that the original well approved under Water Right No. 3053-3 be plugged.

During the Water Rights staff inspection for the purpose of licensing the new permit, it was found that Mr. Binger was using the original well for livestock watering and he requested to continue use of that well for this purpose.

The Chief Engineer recommended modifying Qualification No. 4 on Water Permit No. 3053A-3 to read as follows:

1. The original well authorized by Water Right No. 3053-3 located in the center of the S ½ Section 19, T115N-R64W must be plugged in accordance with Water Management Board Rules, Chapter 74:02:04, if the well is abandoned.

Motion by Freeman, seconded by Holzbauer, to modify Qualification No. 4 on Water Permit No. 3053A-3, as presented. A roll call vote was taken, and the motion carried unanimously.

CONSIDER PERMIT APPLICATION NO. 8842-3, GREG & EVETTE RIHANEK: Jennifer Verleger, Assistant Attorney General on behalf of the Water Rights Program, stated that this is the hearing for Water Permit No. 8842-3. The application was contested by Clyde Olsen. No other comments were received. Neither the applicant nor the petitioner was present.

The Chief Engineer recommended approval of the application with three qualifications.

Ms. Verleger offered Exhibit 100, pages 133-160 of the pdf version of the Board packet. The exhibit includes the Chief Engineer's recommendation, the technical report, the Affidavit of Publication, Clyde Olsen's petition in opposition, and the notice of hearing.

The exhibit was admitted into the record.

Nakaila Steen, engineer with the Water Rights Program, presented her report on the application.

Water Permit Application No. 8842-3 was filed by Greg and Evette Rihanek proposing to divert water at a rate of 1.45 cfs, or 651 gpm, from one well already completed into the Dakota Aquifer for the irrigation of 120 acres. The water from the well will be diverted into a dugout and pumped from the dugout to irrigate. The site is in Aurora County approximately five miles northeast of Plankinton, SD. This location is approximately eight miles southeast of the petitioner's Dakota Aquifer well.

No water well or test hole completion report were submitted with the application. However, using geophysical log information, lithologic logs on file nearby, and the water levels from various aquifers measured in existing wells, South Dakota Geological Survey and Water Rights Program staff were able to come to the determination that the existing well proposed to be used is likely completed in the Dakota Aquifer.

Review of the hydrologic budget and observation well data for the Dakota Aquifer indicated that there is a reasonable probability unappropriated water is available for this proposed appropriation, and when considering the saturated thickness of the aquifer in Aurora County artesian head pressure seen in nearby observation wells and appropriative user's wells and the lack of well interference complaints for wells completed into the aquifer in Aurora County, there is a reasonable probability that the potential for unlawful impairment is unlikely for existing water right holders and domestic uses.

In response to questions from Mr. McVey, Ms. Steen stated that she reviewed the petition in opposition. Ms. Steen believes the petitioner's concerns pre-dated her back when there were concerns of drawdown in the Niobrara Aquifer in this area in the 1980s. The petitioner has three Niobrara wells and one Dakota Aquifer well on file with the Water Rights Program. The Niobrara Aquifer exists approximately 200 feet deep in this area, and the Dakota Aquifer is approximately 600 feet deep in this area. Ms. Steen believes the petitioner was concerned about unlawful impairment and drawdown. Nothing in Mr. Olsen's petition changed Ms. Steen's position in her recommendation.

There were no other questions of Ms. Steen.

Motion by Comes, seconded by Holzbauer, to approve Water Permit Application No. 8842-3, Greg and Evette Rihanek, subject to the qualifications set forth by the Chief Engineer. A roll call vote was taken, and the motion carried unanimously.

ADJOURN: Motion by Freeman, seconded by Holzbauer, to adjourn. Motion carried unanimously.

A court reporter was present, and a transcript of the proceedings may be obtained by contacting Carla Bachand, Capital Reporting Services, PO Box 903, Pierre SD 57501, telephone number (605) 222-4235.

An audio recording of the meeting is available on the South Dakota Boards and Commissions Portal at https://boardsandcommissions.sd.gov/Meetings.aspx?BoardID=106.

Approved October 2, 2024.

_____

Water Management Board

CANCELLATIONS – October 2, 2024

Number RT/PE	Previous Owner	Present Owner(s) & Other Persons Notified	County	Amount C.F.S.	Use	Reason	Source	Date Notified	Letters
DIVISION II									
PE 2751-2	City of Custer c/o Lauri Woodward	N/A	CU	N/A	REC FWP	N/C	Surface water runoff	8-22-24	
DIVISION III									
RT 1288-3	Filips Properties LLC c/o Cindy L Nordstrom	National Food Stores Inc	YA	0.16	IND	A/F	1 well (LJM)	8-22-24	
RT 3255-3	Oscar Inc c/o Floyd Peterson	N/A	SP	0.89	IRR	A/F	1 well (T:WSH)	8-22-24	
PE 3268B-3	Huron Colony c/o Joey Waldner	N/A	BD	1.56	IRR	N/C	1 well (T:EJ)	8-22-24	
PE 7285-3	Riverview Organics LLLP c/o Steve Bruere	N/A	HU	3.42	IRR	N/C	1 well (M:P)	8-22-24	
PE 7325-3	Coulson Land Company c/o Tom Coulson	N/A	YA	1.33	IRR	A/N/C	1 well (M:EP)	8-22-24	
PE 7690-3	Tim or Dave Ostrem	N/A	TU	1.78	IRR	N/C	1 well (UVM:S)	8-22-24	
PE 7706-3	Jerome Van De Stroet	N/A	LN	2.44	IRR	N/C	2 wells (BS:S)	8-22-24	
PE 8213-3	Bon Homme Colony c/o Samuel Waldner	N/A	BH	N/A	IRR	N/C	Missouri River	8-22-24	

ABBREVIATIONS			PAGE 1
N/C = NON-CONSTRUCTION	**A/F = ABANDONMENT OR FORFEITURE**	**A = ABANDONMENT**	**F = FORFEITURE**
FU = FUTURE USE PERMIT	**VR = VESTED WATER RIGHT**	**PE = WATER PERMIT**	**RT = WATER RIGHT**
IRR = IRRIGATION	**REC = RECREATIONAL**	**COM = COMMERCIAL**	**MUN = MUNICIPAL**
INS = INSTITUTIONAL	**FWP = FISH & WILDLIFE PROPAGATION**	**DOM = DOMESTIC**	**IND = INDUSTRIAL**

CERTIFICATION

The undersigned hereby certifies under the penalty of perjury that I have personally deposited a true and correct NOTICE OF CANCELLATION dated August 22, 2024, into the United States Mail in Pierre, South Dakota, first class postage prepaid to the following Water Permit and Right holders on August 22, 2024.

Water Permit No. 2751-2
City of Custer, c/o Lauri Woodward
622 Crook St, Custer SD 57730

Water Right No. 1288-3
Filips Properties LLC, c/o Cindy L Nordstrom
207 Douglas Ave, Yankton SD 57078

Water Right No. 3255-3
Oscar Inc., c/o Floyd Peterson
209 27th St NW, Huron SD 57350

Water Permit No. 3268B-3
Huron Colony, c/o Joey Waldner
40068 Huron Colony Ln, Huron SD 57350

Water Permit No. 7283-3
Riverview Organics LLLP, c/o Steve Bruere
12119 Stratford Dt, Ste B, Clive IA 50325

Water Permit No. 7325-3
Coulson Land Company, c/o Tom Coulson
1205 W 11th St, Yankton SD 57078

Water Permit No. 7690-3
Tim or Dave Ostrem
45924 300st St, Centerville SD 57014

Water Permit No. 7706-3
Jerome Van De Stroet
1401 290th St, Inwood IA 51240

Water Permit No. 8213-3
Bon Homme Colony, c/o Samuel & Jonathan Waldner and Alvin Stahl
31232 Colony Rd, Tabor SD 57063

Shannon Konst
Senior Secretary-Water Rights

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 22 day of August, 2024.

RACHEL RODRIGUEZ NOTARY Seal PUBLIC STATE OF SOUTH DAKOTA

Rachel Rodriguez Notary Public
My Commission expires May 16, 2029

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

August 22, 2024

NOTICE OF CANCELLATION

TO: City of Custer, c/o Lauri Woodward, 622 Crook St, Custer SD 57730

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 2751-2

Water Permit No. 2751-2 authorized the reconstruction of the Custer West Dam, originally authorized under Water Right No. 298-2, and increased the dam's authorized storage capacity by 47.5 acre-feet of water. Permit No. 2751-2 was approved by the Water Management Board on July 6, 2016, and issued to the applicant with construction to be completed on or before July 6, 2021. Construction of the dam was not completed by the deadline, therefore the City of Custer obtained Water Permit No. 2878-2 to reinstate Permit No. 2751-2, resetting the deadline for construction completion to June 24, 2029. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 2751-2 due to non-construction.

The Water Management Board will consider cancellation of Water Permit No. 2751-2 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 2751-2 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

This hearing is an adversarial proceeding. Any party has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

The time of the hearing will be automatically extended for at least twenty days upon your written request to the Chief Engineer after a petition has been filed to oppose the cancellation. If an extension is requested, the hearing on the cancellation will be continued until the next regular Board Meeting. Any request for extension must be filed with the Chief Engineer by September 3, 2024.

Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 2751-2, CITY OF CUSTER

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit No. 2751-2.

Water Permit No. 2751-2 authorized reconstruction of the Custer West Dam, originally authorized by Water Right No. 298-2, and increased the authorized storage capacity by 47.5 acre-feet. Permit No. 2751-2 was approved by the Water Management Board and issued to the City of Custer with construction to be completed on or before July 6, 2021. When the construction completion deadline lapsed, and construction had not been completed, the City of Custer obtained Water Permit No. 2878-2, reinstating Permit No. 2751-2.

The Chief Engineer is recommending cancellation of the above water permit due to non-construction.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of Water Permit No. 2751-2 has no bearing on Water Permit No. 2878-2.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

August 22, 2024

NOTICE OF CANCELLATION

TO: Filips Properties LLC c/o Cindy L Nordstrom, 207 Douglas Ave, Yankton SD 57078

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Right No. 1288-3

Water Right No. 1288-3, held by National Food Stores Inc., authorized the diversion of 0.16 cubic feet of water per second from one well for industrial use in air conditioning and refrigeration motors. During a recent review of appropriations from the Lower James Missouri Aquifer, conducted by Water Rights Program staff, it was questioned whether Water Right No. 1288-3 was still being used. When program staff contacted you, you were able to confirm that National Food Stores Inc. had not conducted business at your location in over 30 years and that water was no longer being put to beneficial use as described in the water right. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Right No. 1288-3 due to abandonment, or forfeiture, or both.

The Water Management Board will consider cancellation of Water Right No. 1288-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Right No. 1288-3 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water right. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

This hearing is an adversarial proceeding. Any party has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

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Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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RECOMMENDATION OF CHIEF ENGINEER

FOR WATER RIGHT NO. 1288-3, NATIONAL FOOD STORES INC.

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Right No. 1288-3.

During a review of appropriative permits and rights issued from the Lower James Missouri Aquifer, it was discovered that National Food Stores Inc. had been out of operation for over 30 years and that the property, now owned by Filips Properties LLC, is operating on water provided by the City of Yankton.

The Chief Engineer is recommending cancellation of the above water right due to abandonment, or forfeiture, or both.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of the water permit does not prohibit a new application for this location in the future.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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August 22, 2024

NOTICE OF CANCELLATION

TO: Oscar Inc., c/o Floyd Peterson, 209 27th St NW, Huron SD 57350

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Right No. 3255-3

Water Right No. 3255-3 authorizes the diversion of 0.89 cubic feet of water per second from the Tulare: Western Spink Hitchcock Aquifer, for irrigation of 59 acres located within the E ½ SE ¼ Section 28, T115N, R63W, Spink County. During a recent site visit conducted by Water Rights Program staff for the purpose of licensing nearby permits, it was discovered that the irrigation system for irrigation of the acreage covered by Water Right No. 3255-3 had been removed. When looking into prior Irrigation Questionnaire submissions, it was found that no irrigation had taken place since 2006, with the pivot system removed shortly thereafter. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Right No. 3255-3 due to abandonment, or forfeiture, or both.

The Water Management Board will consider cancellation of Water Right No. 3255-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Right No. 3255-3 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water right. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

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Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

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RECOMMENDATION OF CHIEF ENGINEER

FOR WATER RIGHT NO. 3255-3, OSCAR INC.

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Right No. 3255-3.

A Water Rights Program staff member was conducting inspections of permits authorized for appropriation from the Tulare: Western Spink Hitchcock Aquifer when he noted that there was no irrigation system in place for the acreage authorized for irrigation under Water Right No. 3255-3. Upon further review, it was found that the last reported irrigation of the property was in 2006, for 8 acres, and the pivot system had since been removed.

The Chief Engineer is recommending cancellation of the above water right due to abandonment, or forfeiture, or both.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

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August 22, 2024

NOTICE OF CANCELLATION

TO: Huron Colony, c/o Joey Waldner, 40068 Huron Colony Ln, Huron SD 57350

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 3268B-3

Water Permit No. 3268B-3 amends Water Permit No. 3268A-3 to move the diversion of 1.56 cubic feet of water per second from the Tulare: East James Aquifer for irrigation of 113 acres to the NE ¼ Section 24, T113N, R62W. Permit No. 3268B-3 was approved June 20, 2005, and issued to the applicant with all construction to be completed on or before June 28, 2009, and water to be put to beneficial use on or before June 28, 2013. During a recent inspection conducted by Water Rights Program staff, for the purpose of licensing the irrigation system, it was found that the system had not been developed. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 3268B-3 for non-construction.

The Water Management Board will consider cancellation of Water Permit No. 3268B-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 3268B-3 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

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Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

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RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 3268B-3, HURON COLONY

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit No. 3268B-3.

Water Permit No. 3268B-3 authorized the relocation of irrigated acres and diversion point authorized by Permit No. 3268A-3. Permit No. 3268B-3 was issued to the applicant with a construction completion date of June 28, 2009. When Water Rights Program staff made a site visit for the purpose of inspecting and licensing the irrigation system, it was found that the system was never constructed at the new location.

The Chief Engineer is recommending cancellation of the above water permit due to non-construction.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of the water permit does not prohibit a new application for this project in the future or have any effect on Water Permit No. 3268A-3.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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August 22, 2024

NOTICE OF CANCELLATION

TO: Riverview Organics LLLP, c/o Steve Bruere, 12119 Stratford Dr Ste B, Clive IA 50325

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 7283-3

Water Permit No. 7283-3 appropriates 3.42 cubic feet of water per second from one well for irrigation of 240 acres located in the NW ¼ Section 3 and NE ¼ Section 4; all in T109N, R76W, Hughes County. During a recent field inspection conducted for the purpose of licensing the irrigation system authorized by Permit No. 7283-3, it was found that no irrigation system had been developed. Water Permit No. 7283-3 was issued to the applicant with construction to be completed on or before January 23, 2017, and water put to beneficial use on or before January 23, 2021. When Water Rights Program staff spoke with property manager Kyle Walker, it was confirmed that while the well had been drilled, no pump or motor had ever been installed. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 7283-3 due to non-construction.

The Water Management Board will consider cancellation of Water Permit No. 7283-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 7283-3 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

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The time of the hearing will be automatically extended for at least twenty days upon your written request to the Chief Engineer after a petition has been filed to oppose the cancellation. If an extension is requested, the hearing on the cancellation will be continued until the next regular Board Meeting. Any request for extension must be filed with the Chief Engineer by September 3, 2024.

Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

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RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 7283-3, RIVERVIEW ORGANICS LLLP

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit No. 7283-3.

Water Permit No. 7283-3 was approved on January 23, 2012, with construction to be completed on or before January 23, 2017, and water put to beneficial use on or before January 23, 2021. When Water Rights Program staff arrived at the property authorized for irrigation under Permit No. 7283-3, for the purpose of licensing the irrigation system, it was found that the system had not been completed. The property manager confirmed that while the well had been successfully drilled, no pump or motor were ever installed.

The Chief Engineer is recommending cancellation of the above water permit due to non-construction.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of the water permit does not prohibit a new application for this project in the future.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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PIERRE SD 57501-3182
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August 22, 2024

NOTICE OF CANCELLATION

TO: Coulson Land Company, c/o Tom Coulson, 1205 W 11th St, Yankton SD 57058

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 7325-3

Water Permit No. 7325-3 authorizes the diversion of 1.33 cubic feet of water per second from one well for the irrigation of 24.1 acres located in the NE ¼ NW ¼ Section 14, T93N, R55W. Permit No. 7325-3 was approved April 23, 2012, and issued to the applicant with construction to be completed on or before April 23, 2017, and water to be put to beneficial use on or before April 23, 2021. During a recent inspection conducted by Water Rights Program staff for the purpose of licensing the system, it was found that water was being diverted from the Missouri River, rather than the authorized well. A permit for appropriations from the Missouri River has since been obtained (8872-3). The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 7325-3 due to abandonment, or non-construction, or both.

The Water Management Board will consider cancellation of Water Permit No. 7325-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 7325-3 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

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Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

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RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 7325-3, COULSON LAND COMPANY

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit No. 7325-3.

Water Permit No. 7325-3 was approved April 23, 2012, and issued to the applicant with construction to be completed on or before April 23, 2017, and water to be put to beneficial use on or before April 23, 2021. An on-site inspection conducted by Water Rights Program staff for the purpose of licensing found that water was being diverted from the Missouri River rather than the authorized well. Since the irrigation system was not developed for diversion from the well and the deadline for putting to water to beneficial use had lapsed, the Chief Engineer is recommending cancellation of the above water permit due to abandonment, or non-construction, or both.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of Permit No. 7325-3 does not affect Permit No. 8871-3, authorizing diversion from the Missouri River.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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August 22, 2024

NOTICE OF CANCELLATION

TO: Tim or Dave Ostrem, 45924 300th St, Centerville SD 57014

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 7690-3

Water Permit No. 7690-3 authorizes diversion of 1.78 cubic feet of water per second for the irrigation of 160 acres located in the NE ¼ & E ½ NW ¼ Section 29, T96N, R52W. Permit No. 7690-3 was approved by the Water Management Board in 2014 and issued to the applicants with construction to be completed on or before March 6, 2019, and water put to beneficial use on or before March 6, 2023. In June 2024, when Water Rights Program staff conducted an inspection for the purpose of licensing the system, no well had been drilled and no irrigation system had been developed. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 7690-3 due to non-construction.

The Water Management Board will consider cancellation of Water Permit No. 7690-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 7690-3 based upon facts presented at the public hearing. Our records show you to be the owners of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signatures and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

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Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

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RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 7690-3, TIM OR DAVE OSTREM

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit No. 7690-3.

Water Permit No. 7690-3 was approved by the Water Management Board on March 6, 2014, and issued to the applicants for irrigation 160 acres, with construction to be completed on or before March 6, 2019, and water put to beneficial use on or before March 6, 2023. During a recent on-site visit made by Water Rights Program staff for the purpose of licensing the irrigation system it was discovered that no well had been drilled and the irrigation system was never constructed.

The Chief Engineer is recommending cancellation of the above water permit due to non-construction.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of the water permit does not prohibit a new application for this project in the future.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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August 22, 2024

NOTICE OF CANCELLATION

TO: Jerome Van De Stroet, 1401 290th St, Inwood IA 51240

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 7706-3

Water Permit No. 7706-3 authorized the diversion of 2.44 cubic feet of water per second from two wells for the irrigation of 225 acres, located in the SE ¼ Section 15, W ½ SW ¼ Section 14, and W ½ NW ¼ Section 23; all in T97N-R48W. Water Permit No. 7706-3 was approved on May 6, 2013, and issued to the applicant with construction to be completed on or before May 6, 2018, and water put to beneficial use on or before May 6, 2022. During a field inspection conducted by a Water Rights Program staff member, for the purpose of licensing the irrigation system, it was found the irrigation system had not been developed. When you spoke with Program staff, you confirmed that you were unable to locate sufficient groundwater to operate the pivot system. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 7706-3 due to non-construction.

The Water Management Board will consider cancellation of Water Permit No. 7706-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 7706-3 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

This hearing is an adversarial proceeding. Any party has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

The time of the hearing will be automatically extended for at least twenty days upon your written request to the Chief Engineer after a petition has been filed to oppose the cancellation. If an extension is requested, the hearing on the cancellation will be continued until the next regular Board Meeting. Any request for extension must be filed with the Chief Engineer by September 3, 2024.

Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 7706-3, JEROME VAN DE STROET

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit No. 7706-3.

When Water Rights Program staff visited the property authorized for irrigation under Water Permit No. 7706-3, for the purpose of licensing the system, it was discovered that no system had been constructed. Mr. Van De Stroet confirmed that he had not been able to locate sufficient water to operate a pivot system and was agreeable to cancellation of the permit.

The Chief Engineer is recommending cancellation of the above water permit due to non-construction.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of the water permit does not prohibit a new application for this project in the future.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

August 22, 2024

NOTICE OF CANCELLATION

TO: Bon Homme Colony, c/o Samuel & Jonathan Waldner and Alvin Stahl
31232 Colony Rd, Tabor SD 57063

FROM: Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
Water Rights Program

SUBJECT: Cancellation of Water Permit No. 8213-3

Water Permit No. 8213-3 authorizes the irrigation of 370 acres, located in the S ½ SW ¼ Section 7-T93N-R58W, NE ¼ Section 12-T93N-R59W, and SW ¼ Section 36-T94N-R59W, using the diversion authority held by Water Right No. 8141-3 from the Missouri River. Water Permit No. 8213-3 was issued to the applicant, with all construction to be completed on or before May 31, 2021. During a recent field inspection, conducted by a Water Rights Program staff member for the purpose of licensing the system, it was found that the irrigation system had not been built. The Chief Engineer of the Water Rights Program is recommending cancellation of Water Permit No. 8213-3 due to non-construction.

The Water Management Board will consider cancellation of Water Permit No. 8213-3 at **9:30 am, Wednesday, October 2, 2024 (Central Time)** in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol, Pierre, SD *(the agenda time is an estimate, and the actual time of hearing may be later).*

The recommendation of the Chief Engineer is not final or binding upon the Board. The Board is authorized to 1) cancel, 2) cancel portions of, 3) delay action on, or 4) take no action on Water Permit No. 8213-3 based upon facts presented at the public hearing. Our records show you to be the owner of property covered by this water permit. If you wish to oppose the cancellation and if you intend to participate in the hearing before the Board and present evidence or cross-examine witnesses according to SDCL 1-26, you must file a written petition with the Chief Engineer by September 3, 2024. The petition may be informal, but it must include a statement describing the reasons for your opposition to the cancellation, and your signature and mailing address or your legal counsel if legal counsel is obtained.

The hearing will be conducted pursuant to the provisions of SDCL 46-1-1 thru 46-1-10, 46-1-14 thru 46-1-15; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-5-36, 46-5-37, 46-5-37.1; 46-2A-1 thru 46-2A-8; and Board Rules ARSD 74:02:01:36 thru 74:02:01:41. These are contested cases pursuant to procedures contained in SDCL 1-26.

This hearing is an adversarial proceeding. Any party has the right to be present or to be represented by a lawyer. These and other due process rights will be forfeited if they are not exercised. Decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

The time of the hearing will be automatically extended for at least twenty days upon your written request to the Chief Engineer after a petition has been filed to oppose the cancellation. If an extension is requested, the hearing on the cancellation will be continued until the next regular Board Meeting. Any request for extension must be filed with the Chief Engineer by September 3, 2024.

Prior to September 3, 2024, contact the Water Rights Program, Joe Foss Building, 523 E Capitol, Pierre, SD (605-773-3352) if assistance is needed with the following: 1) further information on the proposed cancellation; 2) to assure access to the meeting room for the handicapped; or 3) to obtain an interpreter for the hearing impaired.

According to SDCL 1-26-18.3, parties to a contested case may use the Office of Hearing Examiners to conduct a hearing if either a property right is being terminated or the dollar amount in controversy exceeds $2,500.00. If you choose to use the Office of Hearing Examiners rather than the hearing procedure described above, then you need to notify the Chief Engineer (Water Rights Program, 523 E. Capitol Avenue, Pierre SD) by September 3, 2024.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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PIERRE SD 57501-3182
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RECOMMENDATION OF CHIEF ENGINEER

FOR WATER PERMIT NO. 8213-3, BON HOME COLONY

Pursuant to SDCL 46-2A-2 and 46-5-37.1, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit No. 8213-3.

Construction of the irrigation system authorized under Permit No. 8213-3 was to be completed on or before May 31, 2021. When Water Rights Program staff conducted an on-site inspection for the purpose of licensing the irrigation system, it was found that none had been constructed.

The Chief Engineer is recommending cancellation of the above water permit due to non-construction.

Ron Duvall, Natural Resources Engineer
for Eric Gronlund, Chief Engineer
August 22, 2024

Note:

Cancellation of the water permit does not prohibit a new application for this project in the future. Cancellation of Water Permit No. 8213-3 has no bearing on Water Right No. 8141-3.

WATER MANAGEMENT BOARD MEETING
October 2, 2024

Qualifications:
wi - well interference
wcr -well construction rules
iq - irrigation questionnaire
lf - low flow

No.	Name	Address	County	Amount	Use	Source	Qualifications
Water Permit Applications to be Considered as Scheduled							
8579-3	Brett Guthmiller	Menno	HT	0.89 cfs	Irrigation	1 well – Niobrara	wi, wcr, iq, 1 special
8616-3	Michael Schultz	Freeman	HT	No Add'l	Irrigation	3 wells – Niobrara	wi, iq
Unopposed New Water Permit Applications Issued Based on the Chief Engineer Recommendations							
2037-1	Jared and Anna Lukens-Black	Spearfish	LA	0.055 cfs	COM/DOM	1 well – Madison	wi, iq, 1 special
2875-2	Tripp County Water User	Winner	TR	960 AF	RWS	1 well – Ogallala	wi, wcr, 2 special
2876-2	Hwy 16, LLC	Rapid City	PE	955 AF	WDS/COM	Dam – Alluuvial	wi, lf, 5 special
2877-2	Rapid Valley Sanitary Dist.	Rapid City	PE	10.9 AF	MUN	Rapid Creek natural flow	7 special
2878-2	City of Custer	Custer	CU	47.5 AF	REC/FWP	Dam – French Creek	lf, 3 special
2879-2	Weinreis Brothers	Edgemont	FR	0.50 cfs	Irrigation	1 well - Madison	wi, iq, 2 special
8846-3	Anthony or Kimberly Folk	Corona	GT	2.00 cfs	Irrigation	2 wells – Wilmot	wi, wcr, iq,
8847-3	Troy Cook	Gayville	YA	1.11 cfs	Irrigation	1 well – Missouri: Elk Point	wi, wcr, iq, 1 special
8848-3	Kingbrook RWS	Arlington	KG	1,100 AF	RWS	4 wells – Vermillion East Fork	wi, wcr, 2 special
8849-3	Reiter, Jim & ETAL	Brandon	KG	0.067 cfs	Irrigation	1 well – Big Sioux: South	wi, wcr, iq, 1 special
8850-3	Derek Guthmiller	Yankton	YA	1.78 cfs	Irrigation	1 well – Missouri: Elk Point	wi, wcr, iq, 1 special
8851-3	Jacob Andersen and Tyler Andersen	Centerville	LN	2.22 cfs	Irrigation	1 well – Upper Vermillion Missouri: South	wi, wcr, iq, 1 special
8852-3	Swan Creek Land Co	Akaska	WL	0.78 cfs	Irrigation	Swan Creek	lf, iq, 1 special
8853-3	Darby Parson – Prairie States Pit	Sioux Falls	MA	6 AF	IND	Surface runoff/Big Sioux: Southern Skunk Creek	wi, 3 special
8854-3	Darby Parson – Chancellor Pit	Sioux Falls	TU	6 AF	IND	Surface runoff/Parker-Centerville	wi, 3 special
8855-3	Darby Parson – Abbas Pit	Sioux Falls	TU	6 AF	IND	Surface runoff/Parker-Centerville	wi, 3 special
8858-3	Plainview Dairy, LLC	Toronto	DU	91.78 AF	COM	Surface runoff	5 special

No.	Name	Address	County	Amount	Use	Source	Qualifications
8865-3	Kyle Jensen	Meckling	CL	1.78 cfs	Irrigation	1 well – Missouri: Elk Point	wi, wcr, iq
8872-3	Coulson Land Company	Aberdeen	YA	1.67 cfs	Irrigation	Missouri River	iq, 1 special
8873-3	Ochsner Real Estate II LP	Aberdeen	BN	1.11 cfs	Irrigation	Surface runoff	lf, iq, 2 special
8874-3	Mark Johnson	Avon	BH	1.45 cfs	Irrigation	1 well – Choteau: West	wi, iq
8875-3	Dakota Valley Farms, Inc.	Elk Point	UN	2.67 cfs	Irrigation	1 well – Missouri: Elk Point	wi, wcr, iq, 1 special
8876-3	East River Genetic Services	Hudson	LN	243 AF	COM	3 wells – Dakota	wi, wcr, 5 special
8877-3	Nick Bebo & Scott Bebo	Redfield	SP	1.78 cfs	Irrigation	Surface runoff	lf, iq, 3 special
8878-3	Tim & Cindy Henrich	Bellingham	GT	2.0 cfs	Irrigation	1 well – Veblen	wi, wcr, iq, 2 special
8879-3	City of Elkton	Elkton	BG	0.18 cfs	Irrigation	1 well – Big Sioux Aurora	wi, iq, 1 special
8880-3	Old Tree Dairy	Volga	BG	No Add'l	Irrigation	2 wells – Big Sioux Brookings	wi, iq
8881-3	Roger Baumfalk	Avon	BH	0.89 cfs	Irrigation	Choteau Creek	lf, iq, 3 special
8882-3	Arlingh E Gretschmann	Avon	BH	0.89 cfs	Irrigation	Choteau Creek	lf, iq, 3 special
8885-3	Myron & Kim Bierema	Springfield	BH	No Add'l	Irrigation	1 well – Choteau Tyndall	wi, iq, 1 special

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
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RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 8858-3, Plainview Dairy LLC

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 8858-3, Plainview Dairy, c/o Mike Vander Dussen, 19218 473rd Avenue, Toronto SD 57268.

The Chief Engineer is recommending APPROVAL of Water Permit No. 8858-3 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. Water Permit No. 8858-3 authorizes construction of two stormwater basins/dugouts with a combined storage capacity of 18.4 acre-feet of water.

2. Water Permit No. 8858-3 is subject to compliance with requirements of the Department's Water Pollution Control Permit issued pursuant to SDCL 34A-2-36 or 34A-2-36.2 or 34A-2-112 or 34A-2-124 for concentrated animal feeding operations.

3. Water Permit No. 8858-3 is subject to compliance with all existing and applicable Water Management Board Rules including but not limited to:

   a) Chapter 74:54:01 Ground Water Quality Standards,
   b) Chapter 74:54:02 Ground Water Discharge Permit,
   c) Chapter 74:51:01 Surface Water Quality Standards,
   d) Chapter 74:51:02 Uses Assigned to Lakes,
   e) Chapter 74:51:03 Uses Assigned to Streams, and
   f) Chapter 74:52:01 through 74:52:11 Surface Water Discharge Provisions

4. The Permit holder shall report to the Chief Engineer annually the amount of water withdrawn from the stormwater basins/dugouts.

5. Water Permit No. 8858-3 appropriates up to 91.78 acre-feet of water annually.

See report on application for additional information.

Eric Gronlund

Eric Gronlund, Chief Engineer
August 21, 2024

Report to the Chief Engineer

On Water Permit Application No. 8858-3

Plainview Dairy, LLC

c/o Mike Vander Dussen

August 23, 2024

Water Permit Application No. 8858-3 proposes to appropriate an amount not exceeding 91.78 acre-feet of water annually from roof and drive surface precipitation runoff at a facility located in the N ½ of Section 17-T113N-R49W. Runoff will be captured at two stormwater basins/dugouts (each with a 9.2 acre-feet storage capacity and 1.5-acre surface area) located in the S ½ NW ¼ of Section 17-T113N-R49W. Water will be diverted at a maximum instantaneous diversion rate of 0.13 cubic feet per second (cfs) from the basins/dugouts for commercial use in a dairy separator building at Plainview Dairy. The site of interest is located in Deuel County approximately five miles northwest of Toronto, SD.

WATER SOURCE: Runoff to an unnamed tributary contributing to Peg Munky Run, a tributary to the Big Sioux River

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 there is unappropriated water available for the applicant's proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and 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 water uses and water rights that are pertinent to this application.

Review of Water Source and Availability

Water Permit Application No. 8858-3 proposes to appropriate an amount not exceeding 91.78 acre-feet annually using water captured from direct precipitation over a drainage area approximately 30 acres in size. The water is to be impounded in two basins/dugouts (each with a 9.2 acre-feet storage capacity and 1.5-acre surface area) located between the branches of an unnamed tributary contributing to Peg Munky Run, a tributary to the Big Sioux River (USGS, 2004).

Figure 1 displays a map of the proposed basin/dugout locations, and the roof runoff intends to be captured from.

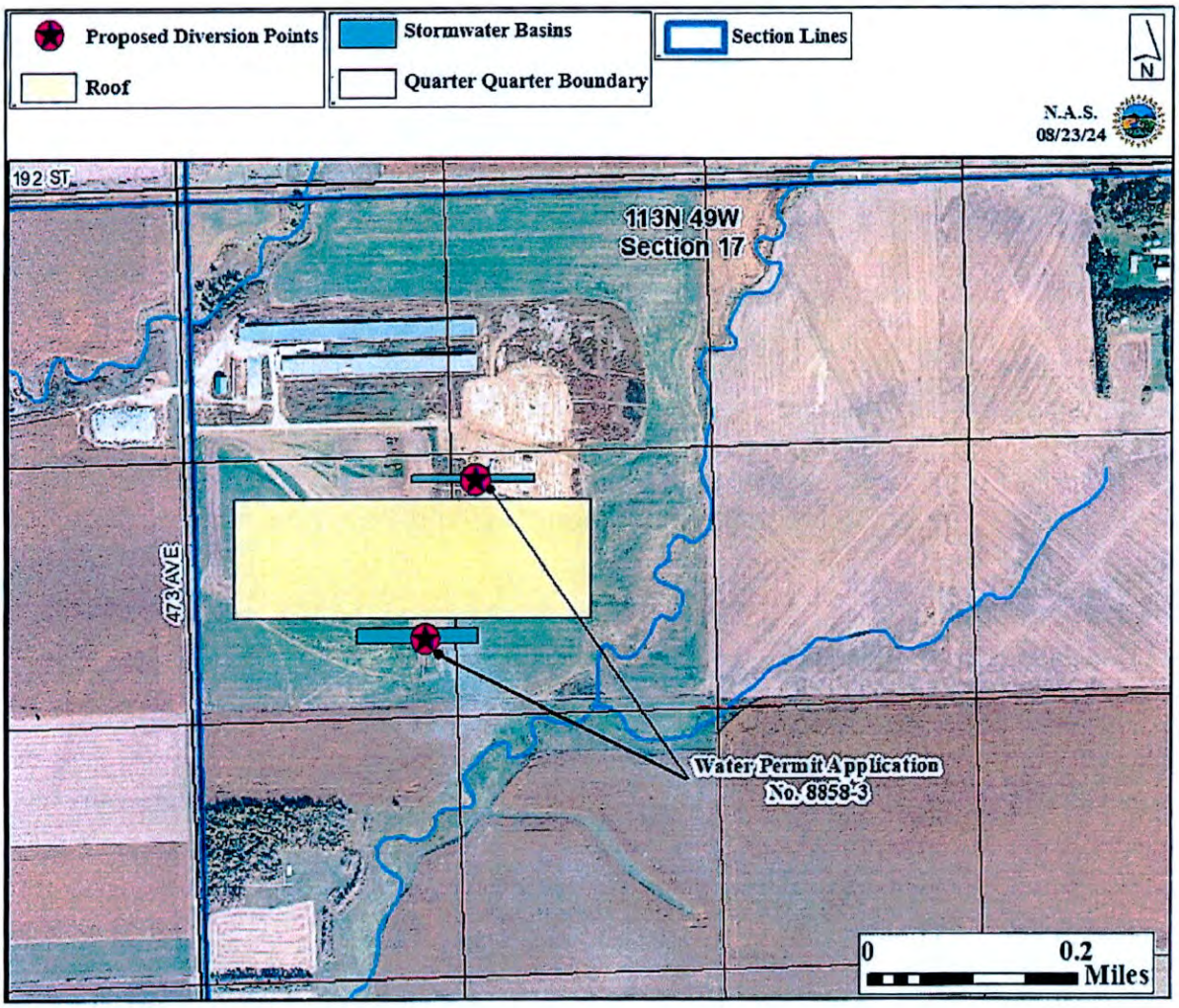

Figure 1: Map of the approximate basin/dugout locations and the roof runoff intends to be captured from

Deuel County receives approximately 24.4 inches of precipitation per year (2.03 feet/year) on average, using climate data from 1895 to 2024 (NOAA, 2024). This number is supported by the High Plains Regional Climate Center precipitation data submitted with the feedlot application to the SD-DANR Feedlots Program, using climate data from 1991 to 2020, and estimating 26.18 inches of precipitation per year for Deuel County (Feedlots, 2023; HPRCC, 2024). The average of these two precipitation estimates will be used in this analysis (approximately 25.3 inches or 2.11 per year). The drainage area of the roof and drive locations, and stormwater basin areas, is approximately 30 acres in size. When multiplying that surface area by 2.11 feet of precipitation per year, approximately 63.3 acre-feet per year is available to be stored on average.

The application indicated the intent is to store the captured runoff in two basins/dugouts. The water is expected to be pumped for use throughout the year but losses due to evaporation and seepage are expected. It has been found that evaporation from a shallow lake, wet soil, or other moist natural surface is roughly 70% of the evaporation from a Class A pan for the same conditions (Farnsworth and Thompson, 1982). Near the proposed basin/dugout locations, the

estimated average pan evaporation rate for April through October is 49 inches/year, and for November through March is 6.5 inches/year, for a total of 55.5 inches/year (4.63 feet/year) in pan evaporation (Poudyal, 2006). To account for evaporation from natural surfaces, 70% of that rate is approximately 38.9 inches/year (3.24 feet/year). This number agrees with the SPAW model in the engineering analysis completed by Agri-Services & Engineering, Inc submitted to the SD-DANR Feedlots Program, calculating an annual evaporation rate of 33 inches (2.75 feet) per year using climate data from 1893 to 2016 (Feedlots, 2023). Estimated loss due to seepage is not available since this is not known until after years of operation and is typically not measured (Kilts, 2022). Using the average of the two evaporation estimates (36 inches per year or 3 feet per year), net loss between direct precipitation and evaporation is approximately 10.7 inches per year, or approximately 2.68 acre-feet per year over the stormwater basin areas.

These precipitation and evaporative estimates are not a guarantee of what will occur in any given year, but are on average, over time, estimates. The proposed water source may not be a reliable source during multi-year drought periods.

Review of Existing Water Rights, Discussion, and Recommendation

There are no water rights/permits authorized to appropriate water from Peg Munky Run or on any of the connecting tributaries in the watershed (Water Rights, 2024). Additionally, there are no location notices on file on the unnamed tributary off Peg Munky Run near the proposed basin/dugout locations, or on Peg Munky Run (downstream of the tributary near the proposed basin/dugout locations) to the confluence with the Big Sioux River (Water Rights, 2024).

Given the lack of water rights/permits within the Peg Munky Run watershed, and the lack of complaints for appropriative and domestic water uses, if Water Permit Application No. 8858-3 is approved, is not expected to unlawfully impair existing downstream appropriative uses or domestic uses.

CONCLUSIONS:

1. Water Permit Application No. 8858-3 proposes to appropriate an amount not exceeding 91.78 acre-feet of water annually from roof and drive surface precipitation runoff at a facility. Runoff will be captured at two stormwater basins/dugouts (each with a 9.2 acre-feet storage capacity and 1.5-acre surface area). Water will be diverted at a maximum instantaneous diversion rate of 0.13 cfs from the basins/dugouts for commercial use in a dairy separator building at Plainview Dairy. The site of interest is located in Deuel County approximately five miles northwest of Toronto, SD.

2. On average, Deuel County receives approximately 25.3 inches of precipitation per year, which would yield approximately 63.3 acre-feet per year available to be stored in the two dugouts.

3. On average, Deuel County experiences 36 inches of evaporative losses per year, resulting in a net loss between direct precipitation and evaporation of approximately 10.7 inches per year, or approximately 2.68 acre-feet per year over the stormwater basin areas.

4. These precipitation and evaporative estimates are not a guarantee of what will occur in any given year, but are on average, over time, estimates. The proposed water source may not be a reliable source during multi-year drought periods.

5. Approval of this application is not expected to unlawfully impair existing downstream water rights/permits, location notices, or domestic uses.

Nakaila Steen

Nakaila Steen
Natural Resources Engineer II
SD DANR - Water Rights Program

References

Farnsworth, R.K. and Thompson, E.S. 1982. Mean Monthly, Seasonal, and Annual Pan Evaporation for the United States. National Oceanic and Atmospheric Administration, U.S. Department of Commerce. Technical Report NWS 34.

Feedlots, 2023. Plainview Dairy State Permit Application – Project Manual, SD DANR-Feedlots Program, Joe Foss Bldg, Pierre, South Dakota.

HPRCC, 2024. High Plains Regional Climate Center, Monthly Averages County Level Data. 1991 to 2020.

Kilts, W. 2022. Report on Water Permit Application No. 8647-3. DANR- Water Rights Program. Joe Foss Building. Pierre, SD.

NOAA, 2024. NOAA National Centers for Environmental information, Climate at a Glance: County Time Series, published May 2024, retrieved on May 22, 2024 from https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series

Poudyal, Sudarshan. 2006. Annual, Monthly and Daily Pan Evaporation Maps for the State of South Dakota. Master's Thesis. South Dakota State University.

USGS, 2004. National Hydrography Dataset. United States Geological Survey. Dept. of the Interior, Reston, Virginia. U.S.

Water Rights, 2024. Water Right/Permit Files, SD DANR-Water Rights Program, Joe Foss Bldg, Pierre, South Dakota.

Affidavit of Publication

State of South Dakota

ss

County of Brookings

Katherine Foiles of said county, first duly sworn, on oath, says: That she is the office clerk of THE BROOKINGS REGISTER, a daily newspaper, printed and published in the City of Brookings, in said County of Brookings, and State of South Dakota; that she has full and personal knowledge of the facts herein stated; that said newspaper is a legal newspaper and has a bona fide circulation of at least two hundred copies of each issue daily; that said newspaper has been published within the said County of Brookings and State of South Dakota, for more than one year prior to the first publication of Exhibit "A," hereto attached and herein mentioned, and was and is printed that the

LEG #40317 NOTice of Application 8858-3

same was published, is hereto attached marked Exhibit "A" said newspaper for 1 times, to-wit:

August 28, 2024

said Exhibit "A" inures to the sole benefit for the publishers of said newspaper; that no agreement or understanding for the division thereof has been made with any other person, and that no part thereof has been agreed to be paid to any person whomsoever; that the fees charged for the publication thereof are:

Forty-Seven Collars and Ninety-One Cents $47.91

AARON JORENBY
NOTARY PUBLIC
SOUTH DAKOTA
SEAL SEAL

30 day of August 2024

Notary Public in and for the County of Brookings, South Dakota.
My Commission expires February 22, 2026

Exhibit "A"

Legal 40317 1X 8/28

NOTICE OF APPLICATION NO. 8858-3 TO APPROPRIATE WATER

Notice is given that Plainview Dairy, LLC., c/o Mike Vander Dussen, 19218 473rd Avenue, Toronto SD 57268 has filed an application for a water permit to appropriate an amount not exceeding 91.78 acre-feet of water annually from roof and drive surface precipitation runoff at a facility located in the N 1/2 Section 17-T113N-R49W. Runoff will be captured in two stormwater basins/dugouts (each with a 9.2 acre-feet storage capacity) located in the S 1/2 NW 1/4 Section 17-T113N-R49W. Water will be diverted from the basins/dugouts at a maximum instantaneous diversion rate of 0.13 cubic feet of water per second for commercial use in a dairy separator building at Plainview Dairy. This site is located approximately 5 miles northwest of Toronto SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8858-3 with qualifications because 1) unappropriated water is available, 2) existing domestic water uses and water rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest as it pertains to matters within the regulatory authority of the Water Management Board. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at https://danr.sd.gov/public or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing

RECEIVED
SEP 05 2024
OFFICE OF WATER

the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at https://danr.sd.gov/public or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by September 9, 2024.

The petition shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at https://danr.sd.gov/public or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by September 9, 2024.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Published August 28, 2024 at the total approximate cost of $47.91 and may be viewed free of charge at www.sdpublicnotices.com.

AFFIDAVIT OF PUBLICATION

STATE OF SOUTH DAKOTA
COUNTY OF DEUEL

Ken Reiste being first duly sworn, on oath says: That he is publisher of the Clear Lake Courier, a weekly newspaper published in the City of Clear Lake, Deuel County, South Dakota; that he has full and personal knowledge of all facts herein stated; that said newspaper is a legal newspaper as defined in SDCL 17-2-2.1 through 17-2-2.4 inclusive; that said newspaper has been published within the said County of Deuel and State of South Dakota, for at lease one year next prior to the first publication of the attached public notice

Notice Of Application No.
8858-3 to Appropriate Water

paper in which the same was published, and which is hereto attached and made a part of this affidavit, was published in said newspaper for **one** successive week(s) to wit:

August 28,2024

That the full amount of the fee charged for publication of the attached public notice insures to the sole benefit of the publisher; that no agreement or understanding for the division thereof has been made with any other person, and that no part thereof has been agreed to be paid to any person whomsoever; that the fees charged for the publication thereof are: **$46.15**

Ken Reiste

Ken Reiste

Subscribed and sworn to before me

this 28th day of August,
2024

Brenda Schake

Notary Public, South Dakota
My commission expires: 9.21.27

BRENDA SCHAKE
SEAL NOTARY PUBLIC SEAL
SOUTH DAKOTA

Public notice

NOTICE OF APPLICATION NO. 8858-3 to Appropriate Water

Notice is given that Plainview Dairy, LLC., c/o Mike Vander Dussen, 19218 473rd Avenue, Toronto SD 57268 has filed an application for a water permit to appropriate an amount not exceeding 91.78 acre-feet of water annually from roof and drive surface precipitation runoff at a facility located in the N 1/2 Section 17-T113N-R49W. Runoff will be captured in two stormwater basins/dugouts (each with a 9.2 acre-feet storage capacity) located in the S 1/2 NW 1/4 Section 17-T113N-R49W. Water will be diverted from the basins/dugouts at a maximum instantaneous diversion rate of 0.13 cubic feet of water per second for commercial use in a dairy separator building at Plainview Dairy. This site is located approximately 5 miles northwest of Toronto SD.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8858-3 with qualifications because 1) unappropriated water is available, 2) existing domestic water uses and water rights will not be unlawfully impaired, 3) it is a beneficial use of water, and 4) it is in the public interest as it pertains to matters within the regulatory authority of the Water Management Board. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at https://danr.sd.gov/public or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

Any person interested in opposing this application or recommendation shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at https://danr.sd.gov/public or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501" or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by September 9, 2024.

The petition shall include a statement describing the unique injury upon approval of the appli-

cation on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at https://danr.sd.gov/public or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by September 9, 2024.

If the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the recommendation with no hearing held before the Water Management Board. If a petition opposing the application or contesting the recommendation is filed, then a hearing will be scheduled, and the Water Management Board will consider this application. Notice of the hearing will be given to the applicant and any person filing a petition.

Published once at the approximate cost of $46.15. (29-1/130)

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Duvall, Ron

From: DANRnoreply <DANRnoreply@state.sd.us>
Sent: Sunday, September 8, 2024 11:08 PM
To: Duvall, Ron; Gronlund, Eric
Subject: [EXT] Comment on 8858-3, Plainview Dairy, LLC, c/o Mike Vander Dussen

Comment On:
No. 8858-3, Plainview Dairy, LLC, c/o Mike Vander Dussen

Comment Deadline Date:
09/09/2024

Date Comment Filed:
09/08/2024 23:07:46

Commenter Info:
Troy Lenning
47236 193rd St.
Toronto SD, 57268

Comment:
I have a concern with this application. By granting Plainview Dairy this permit, they could harvest nearly 30,000,000 gallons of water out of the watershed upstream from my farming operation. This water will be coming out of the creek that feeds a stock dam I utilize as well as the creek. I have neighbors downstream who rely on this tributary as the sole water source for their cattle as well. It is stated this consumption of water has to be for a beneficial use. I question whether harvesting of a natural resource for the sole use of mixing in a manure system is a beneficial use of a state resource. Where I live my well is 8 feet to the static water level. So this shallow aquifer could be directly affected with the harvesting of this water from the watershed.

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

August 16, 2024

NOTICE OF HEARING

TO: Kevin Robling, Secretary
South Dakota Department of Game, Fish, and Parks
523 East Capitol Ave
Pierre SD 57501

FROM: Eric Gronlund, Chief Engineer
Water Rights Program, DANR

SUBJECT: Validation of Recognized Vested Water Right Claim No. 1844-3, Department of Game, Fish, and Parks for Richmond Dam

A Notice of Intent to validate recognized Vested Water Right Claim No. 1844-3 for Foot Creek and Richmond Dam was published in the Aberdeen American News on June 15 and 22, 1988. The Notice was published to validate the claim for sufficient water to fill Richmond Dam annually to the outlet elevation or to the elevation necessary to maintain the ordinary high water mark, whichever is lower. The Chief Engineer petitioned opposing the validation of all Department of Game, Fish, and Parks vested water right claims for dams to include the spillway elevation, correct the amount of water claimed, and add any amendments and qualifications necessary to clarify the vested right claim. Recently, Barr Engineering Co. provided survey results for Richmond Dam, which included the primary spillway elevation. Therefore, validation of the vested right claim can now proceed.

Enclosed is the recommendation for the Water Management Board to validate recognized Vested Water Right Claim No. 1844-3 for sufficient water annually to maintain the water to the primary spillway elevation of 1,360.6 feet mean sea level (NAVD 88).

The Water Management Board will consider validation of Claim No. 1844-3 at 9:30 AM (Central Time) on Wednesday October 2, 2024, in the Floyd Matthew Training Center, Joe Foss Building, 523 E Capitol Ave, Pierre SD 57501. The agenda time is an estimate and may be delayed due to prior items on the agenda.

Applicable provisions of the published notice of intent to validate Claim No. 1844-3 will still apply at this hearing.

Contact Ron Duvall or myself if you have any questions at (605) 773-3352.

enclosure

cc: Jennifer Verleger, Assistant Attorney General
Commissioner Brock Greenfield, South Dakota Office of School and Public Lands

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

RECOMMENDATION OF CHIEF ENGINEER ON VALIDATION OF RECOGNIZED VESTED WATER RIGHT CLAIM NO. 1844-3, DEPARTMENT OF GAME, FISH, AND PARKS, FOOT CREEK & RICHMOND DAM

Pursuant to SDCL 46-2A-2, the following is the recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources, concerning validation of Recognized Vested Water Right Claim No. 1844-3, Department of Game, Fish, and Parks, c/o Secretary Kevin Robling, 523 E Capitol Ave, Pierre SD 57501.

The Chief Engineer of the Water Rights Program recommends VALIDATION of recognized Vested Water Right Claim No. 1844-3 for sufficient water to maintain the water level to Richmond Dam's primary spillway elevation of 1,360.6 feet mean sea level (NAVD 88). The vested water right will retain a priority date of January 1, 1935.

This recommendation is based on a surveyed primary outlet elevation provided by Barr Engineering Co in a Technical Memorandum dated October 25, 2022.

Eric Gronlund

Eric Gronlund, Chief Engineer
August 16, 2024

CERTIFICATION

The undersigned hereby certifies under the penalty of perjury that I have personally deposited a true and correct NOTICE OF HEARING & RECOMMENDATION dated August 16, 2024, via inter-office mail to the following parties:

Kevin Robling, Secretary
South Dakota Department of Game, Fish, and Parks
523 East Capitol Ave
Pierre SD 57501
(Joe Foss Building)

Jennifer Verleger, Assistant Attorney General
1302 East Highway 14, Suite 1
Pierre SD 57501
(Mickelson Building)

Brock Greenfield, Commissioner
South Dakota Office of School and Public Lands
500 East Capitol Ave, Suite 212
Pierre SD 57501
(State Capitol)

Shannon Konst
Senior Secretary-Water Rights

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 15th day of August, 2024.

Rachel Rodriguez Notary Public
My Commission expires May 16, 2029

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

REVISED RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 8579-3, Brett Guthmiller

Pursuant to SDCL 46-2A-2, the following is the revised recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 8579-3, Brett Guthmiller, 28680 435th Avenue, Menno SD 57045.

Based on impacts to adequate domestic wells being mitigated by the domestic well owners connecting to rural water and installation of observation wells, the Chief Engineer is recommending APPROVAL of Application No. 8579-3 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. 8579-3 is located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals must be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

2. The well authorized by Permit No. 8579-3 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. Pursuant to SDCL 46-5-6 which allows a greater diversion rate if the method of irrigation, time constraints, or type of soils so requires, Permit No. 8579-3 authorizes a maximum diversion rate of 0.89 cfs for the irrigation of 32 acres with an annual volume not to exceed 2 acre-feet of water per acre per year.

4. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Eric Gronlund

Eric Gronlund, Chief Engineer
August 20, 2024

NOTE: This Permit is in an area with a history of adequate domestic wells being impaired by pumping of high-capacity wells. Enforcement of Qualification No. 1 may result in a shutoff order being issued to prevent impairment of adequate domestic wells or prior rights with adequate wells.

Updated Report to the Chief Engineer
Water Permit Application 8579-3
Brett Guthmiller
August 20, 2024

Water Permit Application No. 8579-3 proposes to appropriate water for the irrigation of 32 acres at a maximum instantaneous diversion rate of 0.89 cubic feet per second (cfs) from one well (approximately 200 ft deep) to be completed into the Niobrara aquifer. Both the proposed well and proposed acres for irrigation are located in the NE ¼ NE ¼ Section 18-T97N-R56W in Hutchinson County. The applicant is requesting a diversion rate greater than the statutory limit 1 cfs per 70 acres. This site is located approximately four miles southeast of Menno, SD.

This application was initially filed with the Water Rights Program on January 10, 2022. On May 4th, 2022, the South Dakota Water Management Board took action to defer Application No. 8579-3 for up to two years to allow for study to determine if existing irrigation in the area was unlawfully impairing two adequate domestic wells. On January 10th, 2023, the Water Rights Program was notified that the adequate domestic wells in question had been replaced with connections to a rural water system. Two years have passed since this application was deferred; therefore, it is being brought back for re-evaluation. Initial analysis work for this report was done in March 2023 and portions of that analysis were reviewed and updated in June and July 2024 (primally water use reporting and observation well data).

There are several applications related to this portion of the Niobrara aquifer, which are summarized in Table 1 with locations shown in Figure 1. The test holes for Application No. 8587-3 suggested that the target aquifer is a sand and gravel deposit that overlies this portion of the Niobrara aquifer, and the application was held for further investigation. In June 2024, the target aquifer for Application No. 8587-3 was updated to this portion of the Niobrara aquifer.

Table 1: Applications Related to this Portion of the Niobrara Aquifer (Water Rights, 2024b)

Application Number	Diversion Rate (cfs)	Acres	Purpose	Priority Date	Status
8579-3	0.89	32	irrigation	01/10/2022	deferred by Board-unlawful impairment review
8587-3	1.78	134	irrigation	01/25/2022	2022-deferral recommendation-for aquifer determination June 2024-test hole received for Niobrara aquifer
8616-3	no additional	21	irrigation	03/23/2022	abeyance-deferral recommendation due to 8579-3, adding additional acres to Water Permit No. 7344-3

Aquifer: Niobrara (NBRR)

Aquifer Information

Geology and Basic Hydrogeology

The Niobrara Formation is a bedrock formation that underlies most of eastern and western South Dakota (Hedges et al, 1982; Allen et al, 1985). The Niobrara Formation is a Late Cretaceous age white to dark grey argillaceous (clay containing) chalk, marl, and shale that can contain thin bentonite beds, minor sand, and chalky carbonaceous shale (Tomhave, and Schulz, 2004). Locally,

the Niobrara Formation is also known as "chalk rock" and is extensive throughout South Dakota; however, characteristics of the Niobrara aquifer vary greatly across the state (Hedges et al., 1982).

The Niobrara aquifer is contained within portions of the Niobrara Formation where sufficient permeability exists to allow for the transmission of groundwater and where the permeable portions of the formation are sufficiently saturated to yield quantities of groundwater to wells. Both Hedges et al. (1982) and Stephens (1967) identified factures and solution cavities as the main means of water movement through the Niobrara aquifer. Hedges et al. (1982) noted these features are partially controlled by flexures and faults. Where these secondary porosity features are absent, the Niobrara Formation is generally a low-permeability or almost a no-permeability formation that transmits little to no water (Hedges et al., 1982; Stephens, 1967). Weathering and glacial activity may also contribute to higher productive zones in the Niobrara aquifer (Hedges et al., 1982), with greater amounts of weathering and glacial activity generally having occurred where the Niobrara Formation is exposed at ground surface or directly underlies glacial deposits and generally less where the Niobrara Formation underlies the Pierre Shale.

In southeastern South Dakota, there are several areas where portions of the Niobrara Formation were isolated from the main body of the Niobrara through erosional forces (Tomhave and Schulz, 2004). The proposed well site is located within the extent of one of these isolated portions of the Niobrara Formation. The initial mapping of this portion of the Niobrara Formation was done by Tomhave and Schulz (2004) and is shown in Figure 1. Holmes and Filipovic (2015) as part of a study of the Upper Vermillion aquifer updated a section of the eastern boundary of this portion of the Niobrara aquifer. This update is shown in Figure 2. This portion of the Niobrara Formation underlies approximately 338,130 acres (Figure 2 extent-Niobrara Portion (Holmes and Filipovic, 2015)) of portions of Hutchinson, Clay, Turner, Yankton, and McCook Counties. In general, this portion of the Niobrara directly underlies either the Pierre Shale (shown in Figure 1) or glacial deposits (in areas not underlying the Pierre Shale) and overlies the Carlile Shale (Tomhave and Schulz, 2004). This portion of the Niobrara may also directly underlie a portion of the undifferentiated Tertiary deposits of the Turkey Ridge aquifer (Kilts, 2023a and SDGS, 2023). Well completion reports on file with the Water Rights Program report encountering water throughout this portion of the Niobrara Formation generally indicating aquifer potential throughout this portion of the formation (Water Rights, 2023a; 2023b; 2023c). Since this portion of the Niobrara aquifer is isolated from the main body, the remainder of this report will focus solely on this portion of the Niobrara aquifer.

No test hole or water well completion report was submitted with this application. However, there is sufficient information to determine that at the proposed well location the requested well depth of approximately 200 feet would be expected to be completed into the Niobrara aquifer (Water Rights, 2024a and SDGS, 2024). Well completion reports on file with the Water Rights Program within one mile of the proposed well location for this application indicated that the Niobrara Formation can have sufficient permeability and saturated thickness to act as an aquifer in this area (Water Rights, 2023a). The Niobrara aquifer is expected to be under confined conditions at the proposed well location for this application (Water Rights, 2022a).

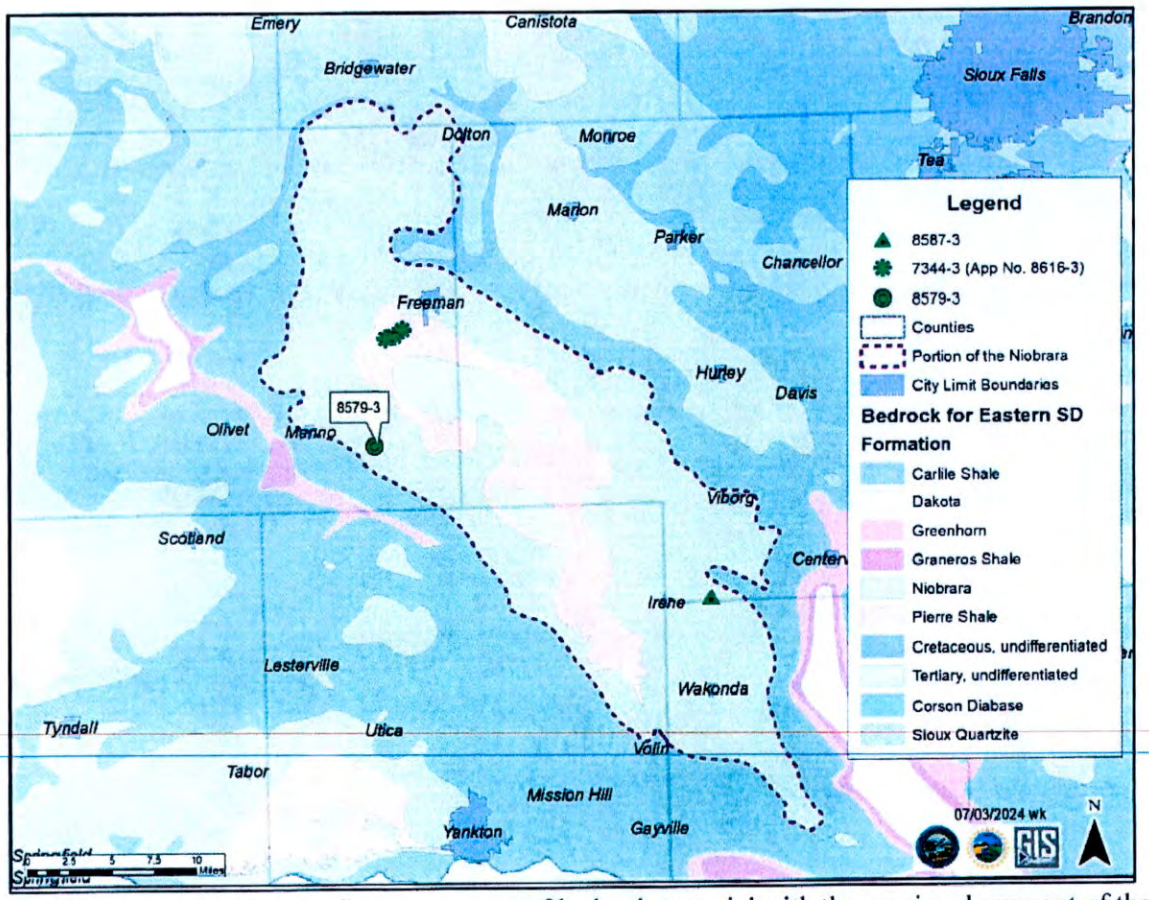

Figure 1: Map showing the first occurrence of bedrock material with the erosional remnant of the Niobrara Formation this application proposes to use (modified from Tomhave and Schulz, 2004)

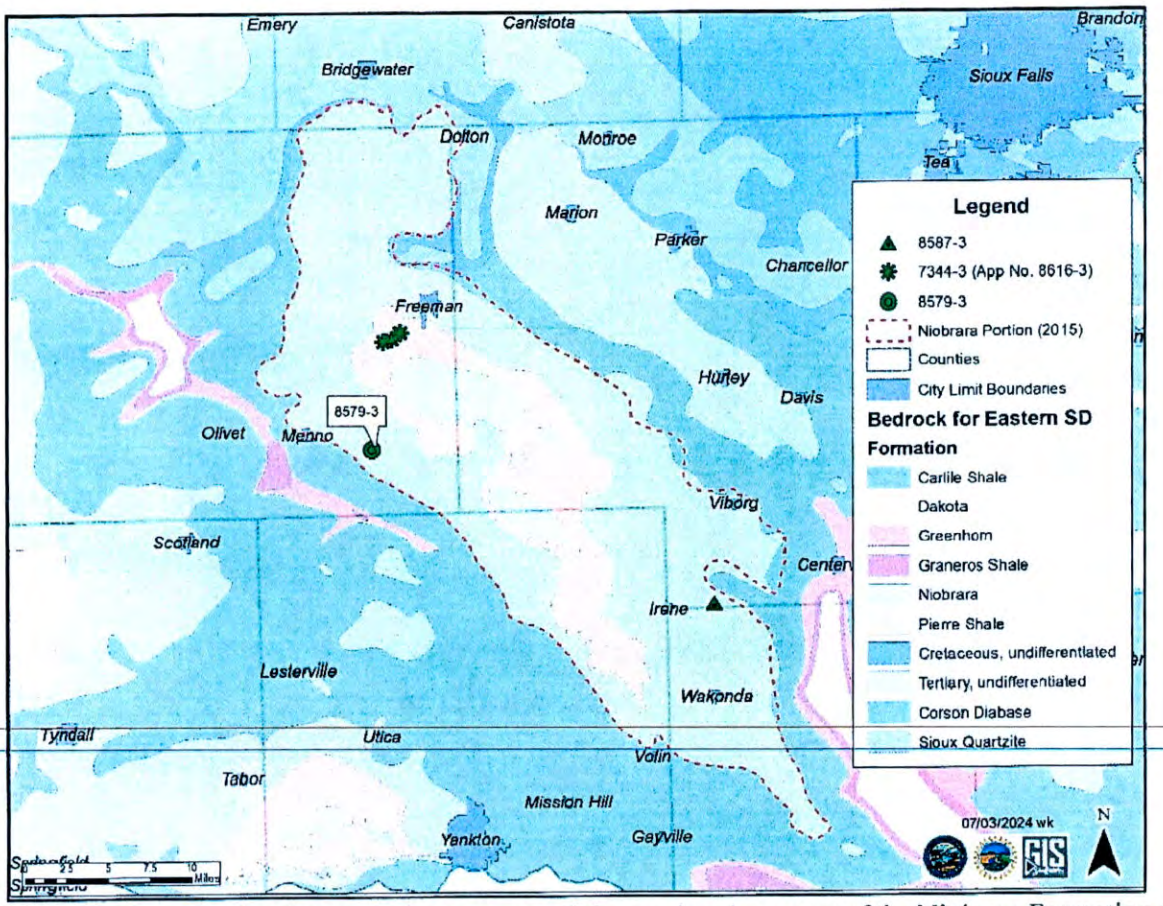

Figure 2: Map showing the approximate extent of the erosional remnant of the Niobrara Formation this application proposes to use and the first occurrence of bedrock material (modified from Tomhave and Schulz, 2004 and Holmes and Filipovic, 2015)

Potentiometric Surface Mapping

A potentiometric surface map is a spatial mapping of groundwater levels in an aquifer at a given period in time. Potentiometric surface maps are created by plotting elevations of the static water level and then generating contours or lines of equal elevation. The maps can yield several insights into aquifer behavior. Since groundwater moves from higher elevation to lower elevation, potentiometric surface maps can be used to determine the direction of groundwater flow. On a potentiometric surface map, the direction of groundwater flow is perpendicular to the contours from higher elevations to lower elevations (see the arrows in Figure 3 as an example). Initial potentiometric surface mapping for this portion of the Niobrara aquifer was done by Lindgren and Hansen (1990) shown in Figure 3. Mathiowetz (2016) also examined the potentiometric surface for May 2016, shown in Figure 4, as part of further analysis of this portion of the Niobrara aquifer concerning water permit applications summarized in Table 1 and Water Permit No. 8684-3. Further potentiometric surface mapping was generated for this portion of the Niobrara aquifer for May 2013 and May 2022; Figures 5-6. Potentiometric surface mapping was also generated for

May 2018; however, there was insufficient data coverage for the mapping to be used for this report; the map is included in Appendix B of this report. The potentiometric surface mapping for May 2013, May 2018, and May 2022 were all generated with the ERSI ArcMap analysis and contour creation functionalities. Information on inputs to generate these maps is summarized in Table 2. Some of the differences between the potentiometric surface maps is due to the differences in locations of water level measurements used to generate the contours. The size of the aquifer and distribution of observation wells does not allow for potentiometric surface mapping of every year, since domestic well completion records are needed to fill in data gaps and the drilling of new domestic wells is not consistent.

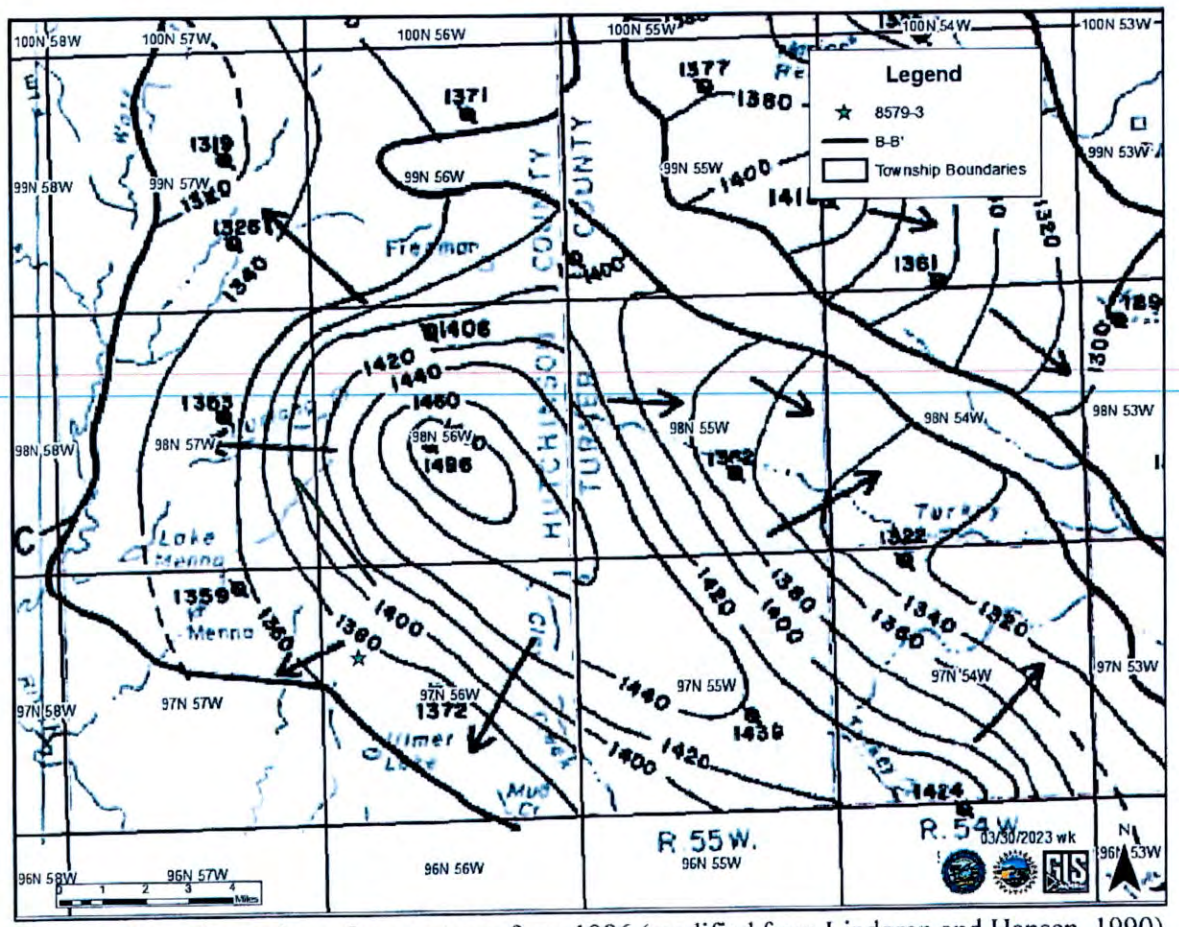

Figure 3: Potentiometric surface contours from 1986 (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

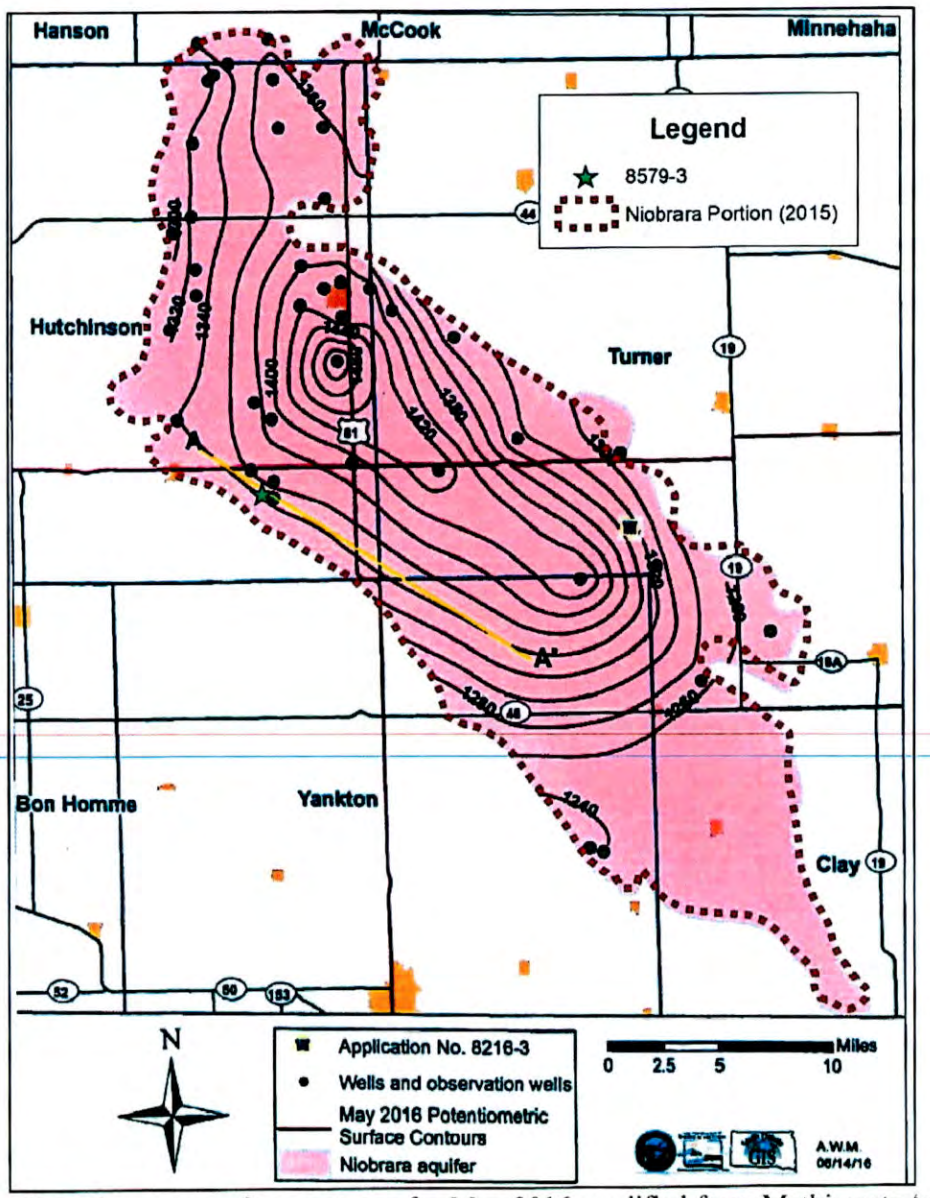

Figure 4: Potentiometric surface contours for May 2016 modified from Mathiowetz 's (2016) report on Application No. 8216-3. Elevation reference NGVD29.

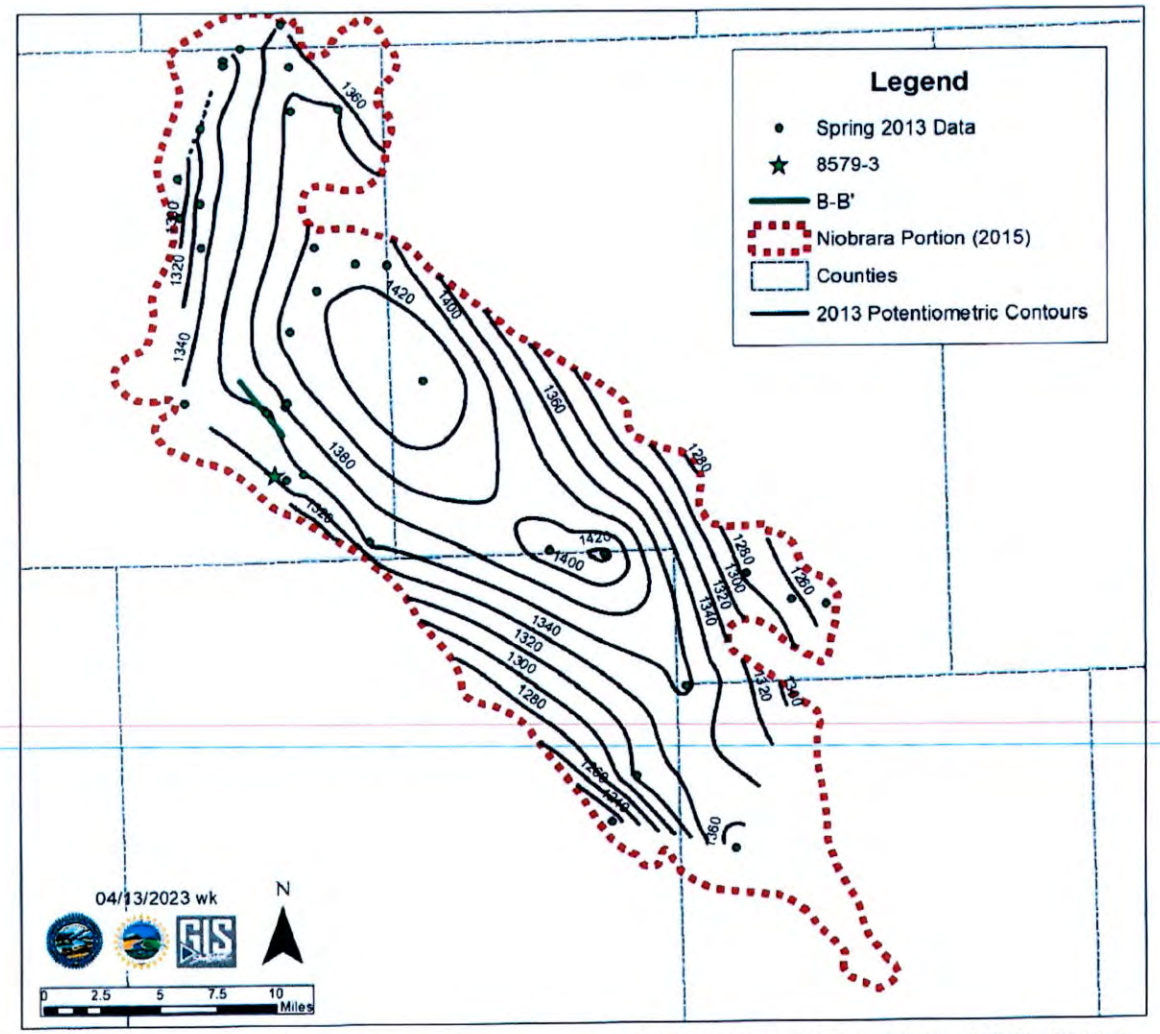

Figure 5: Potentiometric surface contours from May 2013 (Water Rights, 2023a;2023b;2023c). Elevation reference NAVD88.

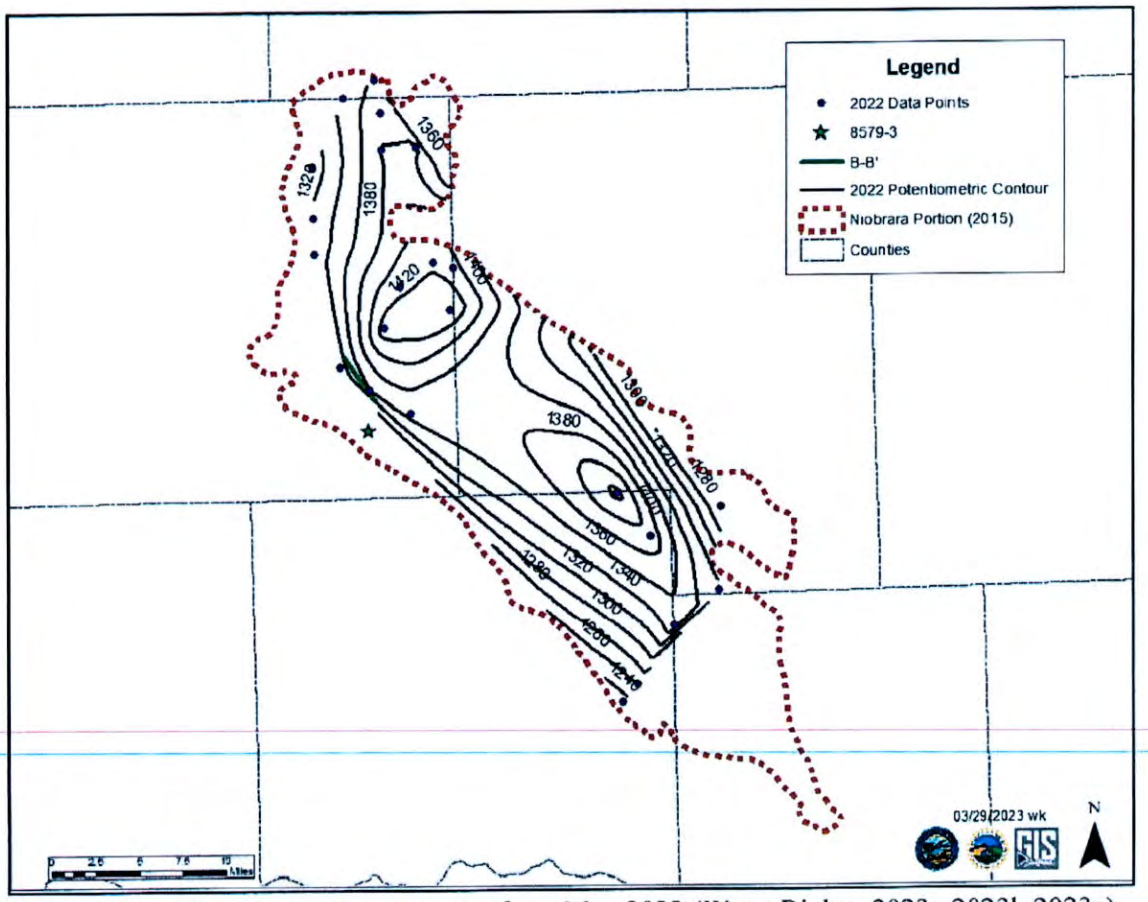

Figure 6: Potentiometric surface contours from May 2022 (Water Rights, 2023a;2023b;2023c). Elevation reference NAVD88.

Table 2: Summary of Potentiometric Surface Mapping			
Time Period	**Figure**	**Data Points**	**Sources**
November 1986	Figure 3	16	Lindgren and Hansen (1990)
May 2016	Figure 4	41	Mathiowetz (2016)
May 2013	Figure 5	34	Water Rights, 2023a and 2023c
May 2018	Appendix B	17	Water Rights, 2023a and 2023c
May 2022	Figure 6	23	Water Rights, 2023a and 2023c

The springtime period is typically chosen by the Water Rights Program for potentiometric surface mapping to map conditions as close to natural as possible. Natural groundwater flow goes from areas of recharge to areas of discharge. In Figures 3-6, the general direction of groundwater movement is generally from the central area of this portion of the Niobrara aquifer toward the edges. This indicates two things: first, this portion of the Niobrara aquifer is likely discharging to water sources near the outer edges of the aquifer and second, there is likely a higher rate of recharge near the edges of the overlying Pierre Shale.

In the northern part of this portion of the Niobrara aquifer, the most likely possibility for a recharge source is the Turkey Ridge aquifer (Lindgren and Hansen, 1990 and Kilts, 2023a). The Turkey Ridge aquifer is made up of Tertiary undifferentiated sands overlaying portions of the Pierre Shale overlaying the central portion of the aquifer (Kilts, 2023a). Near the peripheries of the Turkey Ridge aquifer there are areas where the aquifer is in direct contact with the Niobrara aquifer or separated from the Niobrara aquifer by a relatively thin layer of weathered Pierre Shale (Kilts, 2023a; SDGS, 2023; and Water Rights, 2024a). Additionally, water level comparisons by Kilts (2023a) supported the Turkey Ridge aquifer as a likely source of recharge to this portion of the Niobrara aquifer, since water level elevations in the Turkey Ridge aquifer are higher than in the Niobrara aquifer. Further sources of recharge to this portion of the Niobrara aquifer are likely infiltration of precipitation through overlaying glacial deposits, especially where those deposits have a higher amount of more transmissive materials like sands and gravels (Lindgren and Hansen, 1990).

This portion of the Niobrara aquifer is surrounded by valleys in the bedrock where the Niobrara Formation has been eroded, which contain glacial outwash aquifers. Where these glacial outwash aquifers are in contact with this portion of the Niobrara (either overlaying or are adjacent to), there is potential for leakage between the aquifers based on hydraulic head. The Lower James Missouri (LJM) aquifer lies in the bedrock valley to the west of this portion of the Niobrara and in some locations extends far enough east to be in contact with this portion of the Niobrara (Tomhave and Schulz, 2004; Hedges et al., 1982) as shown in Figure 7. To further illustrate the nature of this connection, select cross sections from Lindgren and Hansen (1990) are provided in Appendix A. Although these cross sections would likely have slight changes if updated to reflect additional drilling since Lindgren and Hansen (1990), they still illustrate the general nature of the connection. The Upper Vermillion Missouri aquifer lies in the bedrock valley to the east of this portion of the Niobrara aquifer and can also be hydrologically connected (Lindgren and Hansen, 1990). Stephens (1967) indicated the presence of a glacial outwash aquifer (named the Wakonda aquifer) directly overlaying and with a strong hydrologic connection to this portion of the Niobrara in portions of Clay County. However, the first occurrence of aquifer materials mapping by Jensen (2000) indicates that the Wakonda aquifer is unlikely to be as extensive as was mapped by Hedges et al. (1982). Lindgren and Hansen (1990) also indicate seepage into Wolf Creek in the very north part of the aquifer is possible.

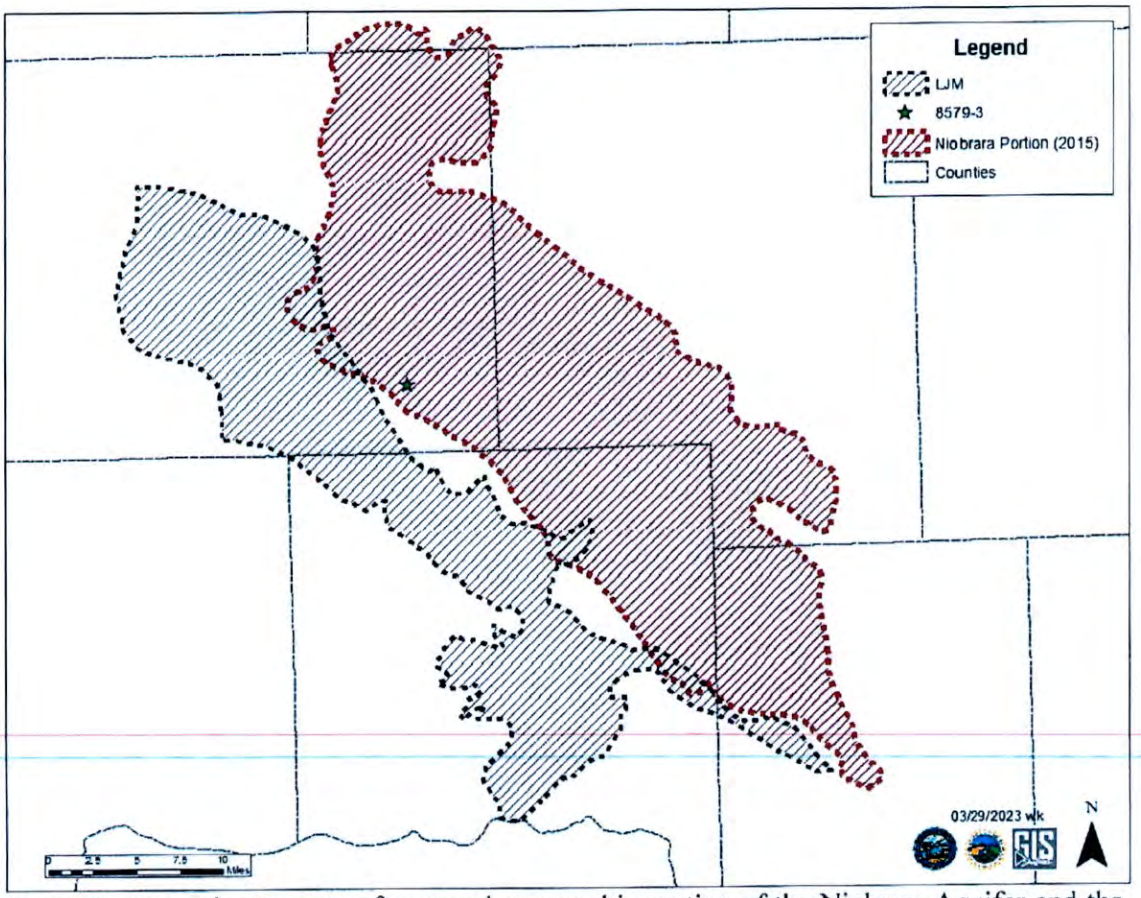

Figure 7: Approximate areas of contact between this portion of the Niobrara Aquifer and the Lower James Missouri aquifer (modified from Hedges et al., 1982; Tomhave and Schulz, 2004 and Holmes and Filipovic, 2015)

Natural Discharge

The natural discharge from this portion of the Niobrara aquifer can be estimated using information from potentiometric surface mapping in addition to other data. The flow rate for natural discharge is estimated using equation 1.

Equation 1: $Q = T * I * L * c$

Where:

Q=flow rate, units: acre-feet per year

T= Transmissivity (hydraulic conductivity times aquifer thickness), units: gallons per day per foot (gpd/ft)

I=Gradient of the Potentiometric surface, units: feet per mile (ft/mi)

L=Length of aquifer contact, units: miles

c=conversion factor equal to 365 days per year divided by 325,851.429 gallons per acre-feet=0.00112

The green B-B' line in Figure 8 is 3.0 miles long. It is the approximate length of the Niobrara aquifer and Lower James Missouri aquifer connection downgradient of the proposed wellsite for this application. Due to limited data availability along the edge of the aquifer, for analysis the discharge line had to be shifted slightly upgradient of the actual area of connection between the two aquifers. This length, 3.0 miles, is used for "L" in equation 1. Pumping data from both domestic and appropriative wells were used to calculate specific capacity, which was then used to estimate transmissivity and hydraulic conductivity. This information is summarized in Table C1 of Appendix C. The calculation of hydraulic conductivity was used as a check of calculated transmissivity values. Appendix C includes further discussion of data points tagged as outliers. Table C1 is split into three sections: data within one mile of the B-B' line (Section 1), data from the rest of the aquifer (Section 2), and outlier data (Section 3). The average gradient of the potentiometric surface, I, across line B-B' for each time period is shown in Table 3. The estimated flow across B-B' for each time period is summarized in Table 3. Average estimated discharge across the B-B' line is 173 acre-feet per year. While calculation utilizing the overall estimated non-outlier average transmissivity for the aquifer are also presented in Table 3, the more representative transmissivity value for estimated discharge across B-B' is the average of transmissivity values within one mile of the B-B' line (Table C1 Section 1 average).

Table 3: Estimated Discharge Across B-B'

Year	Gradient (ft/mi)	Table C1 Section 1-Average Transmissivity (T) (gpd/ft)	Table C1 Section 1 & 2-Average Transmissivity (T) (gpd/ft)	Length (mi)	Discharge (acre-feet/yr) using Section 1 Average T	Discharge (acre-feet/yr) using Section 1 & 2 Average T
1986	30	2,243.7	4,293.2	3.0	226.17	432.75
2016	10	2,243.7	4,293.2	3.0	75.39	144.25
2013	17	2,243.7	4,293.2	3.0	128.16	245.23
2018	insufficient data coverage				n/a	n/a
2022	35	2,243.7	4,293.2	3.0	263.86	504.88
Average					**173.39**	**331.78**

Kilts (2024) estimated flow through the discharge area to the Lower James Missouri aquifer directly north of this discharge area (shown in Figure 8 as the peach-colored C-C' line) to be 346 acre-feet per year. Kilts (2023b) estimated discharge from this portion of the Niobrara aquifer to the Upper Vermillion Missouri: West aquifer downgradient of the well site for Application No. 8684-3 to range between 685 to 890 acre-feet per year. Kilts (2023b) also noted there was likely additional natural discharge potential to the Upper Vermillion Missouri: South aquifer and other adjacent aquifers along the eastern edge of this portion of the Niobrara aquifer that have not yet been quantified.

Rather than estimate discharge to the Lower James Missouri aquifer utilizing local discharge area estimates (as done above and in Kilts (2024 and 2023b)), Mathiowetz (2016) used a single line (the yellow A-A' line in Figure 4) with a total length equal to the various areas of connection between this portion of the Niobrara aquifer and the Lower James Missouri aquifer to estimate total natural discharge to the Lower James Missouri aquifer. Mathiowetz (2016) used equation 1 with a L of 17.5 miles, a I of 20 ft/mi, and a T of 25,092 gpd/ft to estimate a total natural discharge to the Lower James Missouri aquifer from this portion of the Niobrara aquifer of approximately 9,837 acre-feet per year. Mathiowetz (2016) estimated transmissivity using data from 27 high-capacity wells (primarily for irrigation use) authorized by water rights/permits, several of the data points used by Mathiowetz (2016) were tagged as outliers in Table C1. Given

that water movement in the Niobrara aquifer is dominated by secondary porosity features, the average transmissivity of Mathiowetz (2016) only represented areas of higher transmissivity within the aquifer that are capable of supporting high capacity well yields and only captured an average of the very high end of transmissivity within the aquifer. The non-outlier average transmissivity (4,293.2 gpd/ft) presented in Table C1 (which includes domestic well data) is a transmissivity that is much more representative of average conditions in the aquifer than the transmissivity estimate of Mathiowetz (2016). Recalculation of the total natural discharge to the Lower James Missouri aquifer for May 2016 using the more representative value for transmissivity for this aquifer results in an estimated total natural discharge to the Lower James Missouri aquifer from this portion of the Niobrara aquifer of 1,803 acre-feet. Given that this discharge estimate uses a more representative value for transmissivity for this aquifer, 1,803 acre-feet per year is a closer estimate of the magnitude of natural discharge occurring from this aquifer to the Lower James Missouri aquifer. In looking at Table 3, Kilts (2024), and Kilts (2023b) the localized natural discharge estimates for May 2016 are consistently at the lower end of the range for the time periods examined, so this estimate could be considered slightly conservative.

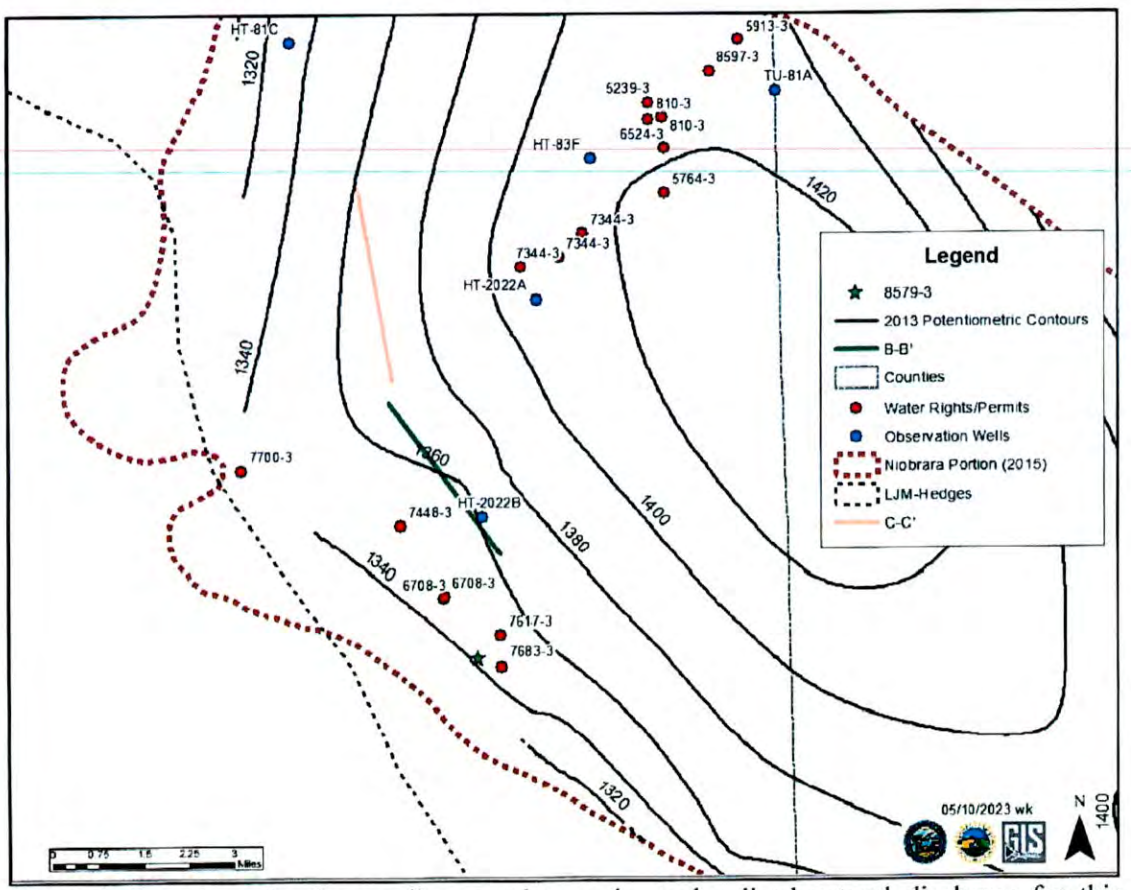

Figure 8: Location of reference lines used to estimate localized natural discharge for this application and Kilts (2024). Also shown for refence is the approximately boundary of the Lower James Missouri (LJM) aquifer (Hedges et al., 1982) and the May 2013 potentiometric surface contours.

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 there is unappropriated water available for the applicant's proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and 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 water uses and water rights within this portion of the Niobrara aquifer.

Water Availability

Water Permit Application No. 8579-3 proposes to appropriate water from the Niobrara aquifer for irrigation use. The probability of unappropriated water being available from an 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." If the source of the water is older or lower than the Greenhorn Formation and the application is for a water distribution system defined in SDCL 46-1-6 (17), the Board need not consider the recharge/withdrawal issue. The Niobrara Formation is neither older or stratigraphically lower than the Greenhorn Formation and this application is not for a water distribution system as defined in SDCL 46-1-6 (17); therefore, the withdrawal/recharge issue must be considered.

Observation Well Data

In determining the availability of unappropriated water for a permit application, Administrative Rule 74:02:05:07 requires the Water Management Board to rely on 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 annual recharge.

The DANR Water Rights Program monitors 13 observations well completed into this portion of the Niobrara aquifer (Water Rights, 2024c). Two of those observation wells (HT-2022A and HT-2022B) were installed in 2022 and have a limited period of record, so their data is of limited usefulness in evaluating long term water availability. During the winter of 2022 and early spring of 2023, a programing error in the dataloggers resulted in no data collection during that time. The hydrographs for these two wells also include both data logger data and manual readings. The nearest observation well to the proposed well location for this application is observation well HT-2022B located approximately 2.3 miles to the north of the well location for this application. The next nearest observation well is HT-2022A located approximately 5.9 miles to the north of the proposed well site for this application. The hydrographs for these observation wells are shown in Figure 9.

The closet observation wells to the proposed well site for this application with long periods of record are HT-83F (approximately 8.3 miles north) and TU-81A (approximately 10.4 miles north-northeast). The remaining hydrographs for the observation wells completed into this portion of the Niobrara aquifer are shown in Figure 10, with just observation wells in the northern portion

of the aquifer shown in Figure 11. Readings on TU-81A were suspended in 2023 due to the presence of iron bacteria in the well (Water Rights, 2024c). The location of these observation wells are shown in Figure 12.

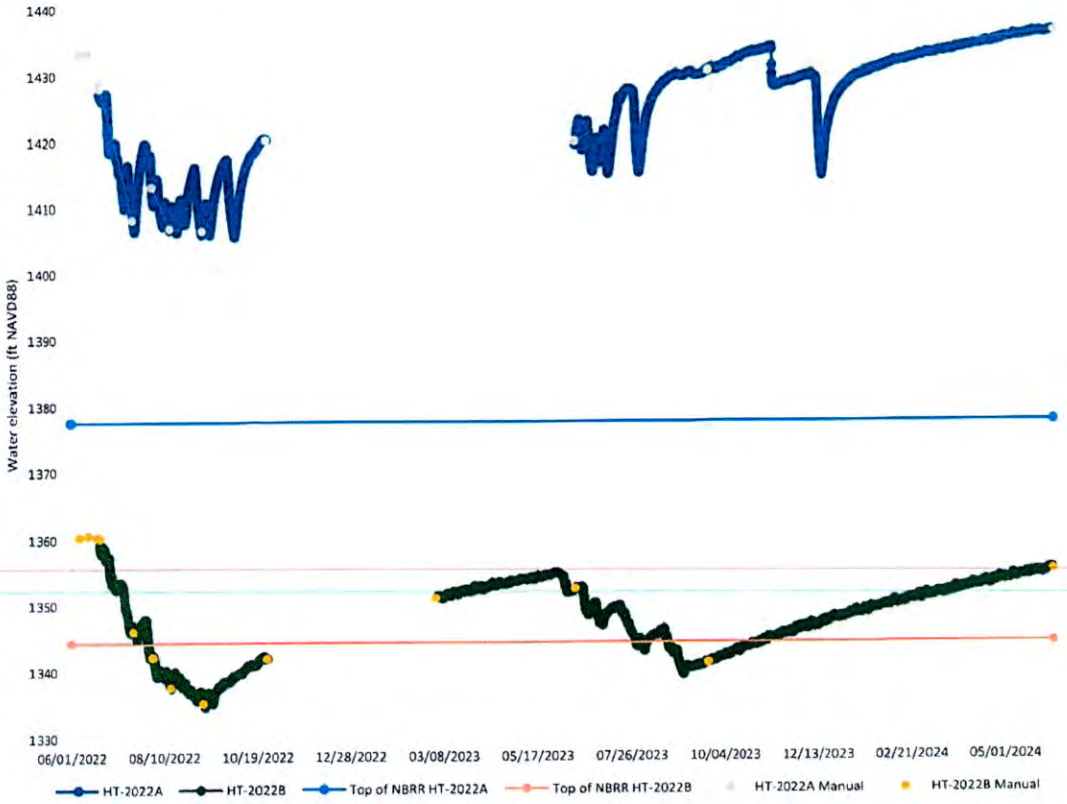

Figure 9: Hydrograph of Observation Wells HT-2022A and HT-2022B (Mathiowetz, 2024 and Water Rights, 2024c).

Of note in the hydrograph for observation well HT-2022A, is what appears to be a response in the water levels to a nearby high capacity well operating in November of 2023. In talking to the holder of the closest permit (Water Permit No. 7344-3 held by Michael Schultz), Mr. Schultz indicated he likely operated the Niobrara wells associated with Permit No. 7344-3 around that time (Schultz, 2024). The system for Permit No. 7344-3 includes a storage pond and typically irrigation is done out of the storage pond. Depending on the pond level, water is sometimes added to the storage pond outside of the irrigation season in preparation for the next season (Schultz, 2024 and Water Rights, 2024b). Mr. Schultz indicated he does not track when he runs his wells for the annual irrigation questionnaire to the Water Rights Program, just when he irrigates, but believed he ran the wells last winter to partially refill the pond (Schultz, 2024). This response is not seen in the hydrograph for HT-2022B either the pumping did not go on for a long enough period of time to reach the observation well or some hydrogeologic property of the aquifer limits the impacts of pumping of the wells for Water Permit No. 7344-3 from reaching HT-2022A.

In looking at the hydrograph for HT-2022B during both the 2022 and 2023 irrigation seasons, the water level drops below the top of the Niobrara Formation. Although the period of record is limited for HT-2022B, the hydrograph indicates that during periods of dry climatic conditions and higher than average pumping (Table 7) water levels likely do not fully recover from the previous year's irrigation seasons prior to the start of the next irrigation season. However, the period of record is not long enough to determine if, long-term, the combination of wetter climatic periods with less irrigation and dry climatic periods with increased irrigation will result in stable, increasing, or decreasing water levels in this area of the aquifer. Also, in looking at the hydrograph for HT-2022B, response to a single pumping well cannot be distinguished from the cumulative pumping in the area.

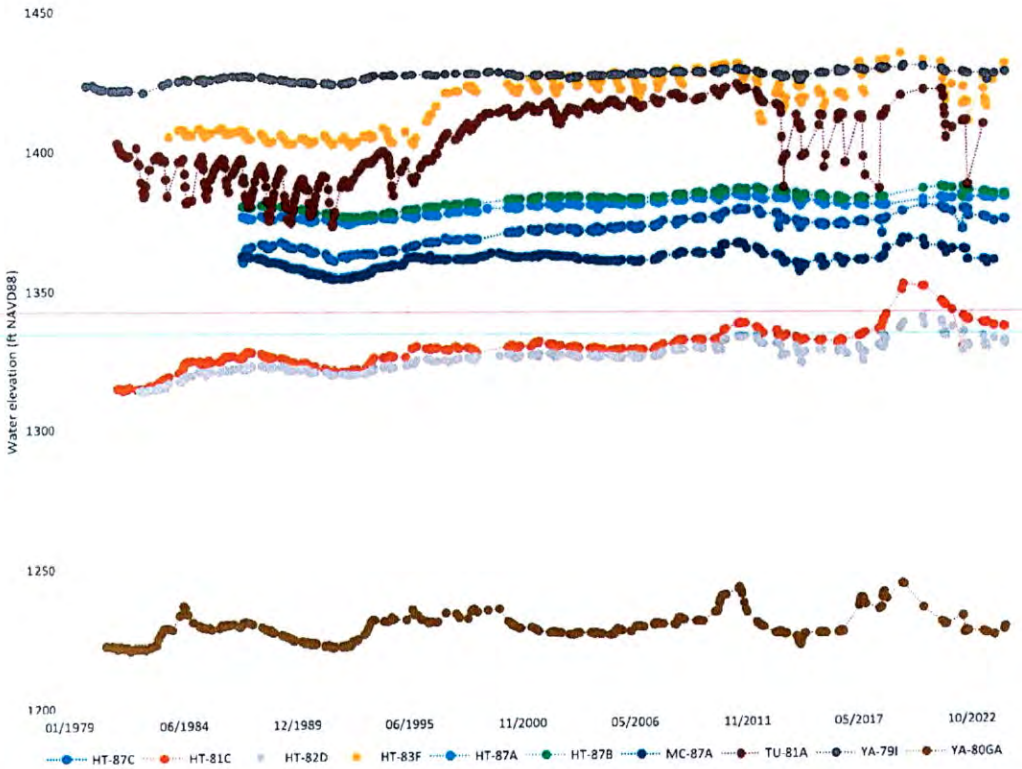

Figure 10: Hydrographs for observation wells monitoring this portion of the Niobrara aquifer with over 20 years of data (Water Rights, 2024c)

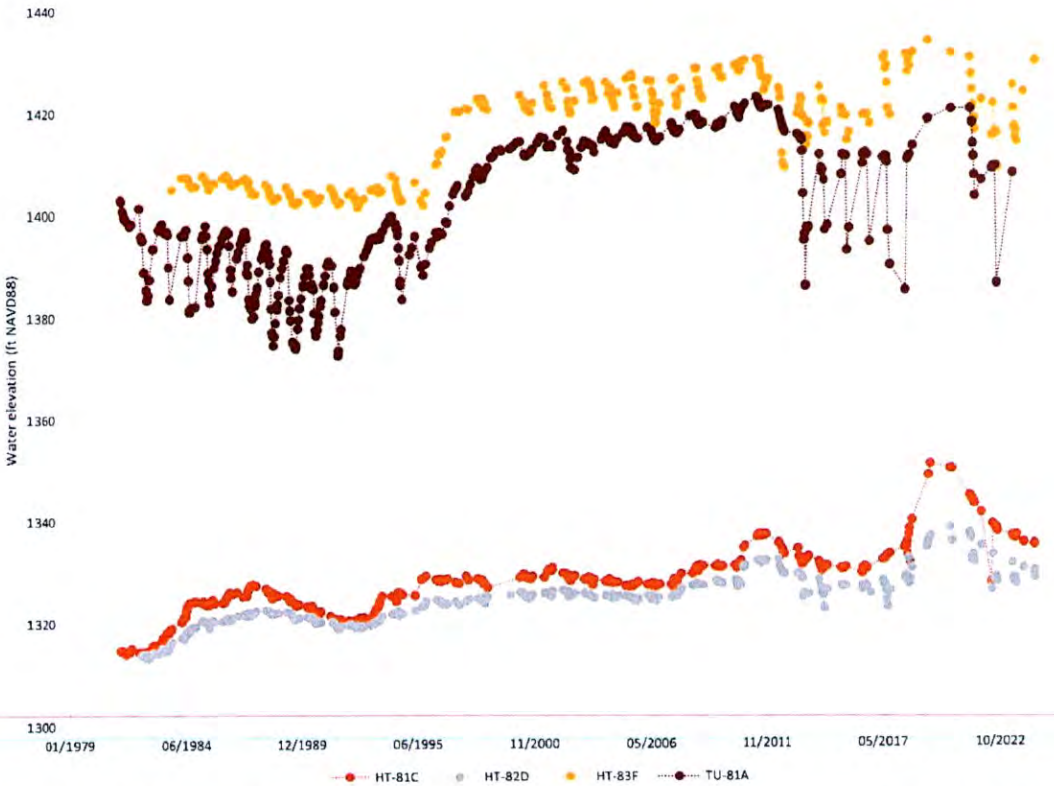

Figure 11: Hydrographs for the observation wells within approximately 10 miles of the well site for this application monitoring this portion of the Niobrara aquifer with over 20 years of data (Water Rights, 2024c). Note these wells are also shown in Figure 10. The top of the Niobrara elevation (NAVD88) is approximately 1,281 ft at HT-81C, 1,292 ft at HT-82D, 1,403 ft at HT-83F, and 1,284 ft at TU-81A (Water Rights, 2024c).

The hydrographs shown in Figures 10 and 11 are representative of the longer term (approximately 35 to 42 years) showing stable to slightly to moderately increasing water level trends in this portion of the Niobrara aquifer. The magnitude of shorter period fluctuations in response to wet and dry climatic cycles varies between observation wells. For example, see the variation in the hydrographs for observation wells YA-79I and YA-80GA. Several observation wells (for example HT-83F and TU-81A) in close proximity to irrigation wells show localized seasonal dips in measured water levels during the irrigation season in response to pumping (Water Rights, 2024b and 2024c). This is representative of the artesian head pressure of the aquifer in the area responding to seasonal irrigation pumping. However, water levels recover after the end of the irrigation season when pumping ends. Around 1996, behavior changes in both TU-81A and HT-83F is noticeable; this is approximately when The Town of Freeman began using rural water (Water Rights, 2024b). HT-83F is approximately 1 mile from the town's wells and TU-81A is approximately 2 miles away. TU-81A appears to start responding to seasonal pumping in 2013; this corresponds with Water Right No. 5913-3 located 1.1 miles to the north-northwest starting to consistently report a higher volume of water use during the irrigation season.

Water levels in the observation wells monitoring this aquifer generally rise during wet periods and decline to stable levels during drier periods. This type of behavior, along with aquifer recovery following the irrigation season, is indicative that climatic conditions, and therefore the effects of recharge to and natural discharge from the aquifer, govern the long-term fluctuations in water levels in the aquifer instead of pumping. Since recharge to and natural discharge from an aquifer can be captured for pumping, there is a reasonable probability that unappropriated water is available from this portion of the Niobrara aquifer for the proposed appropriation.

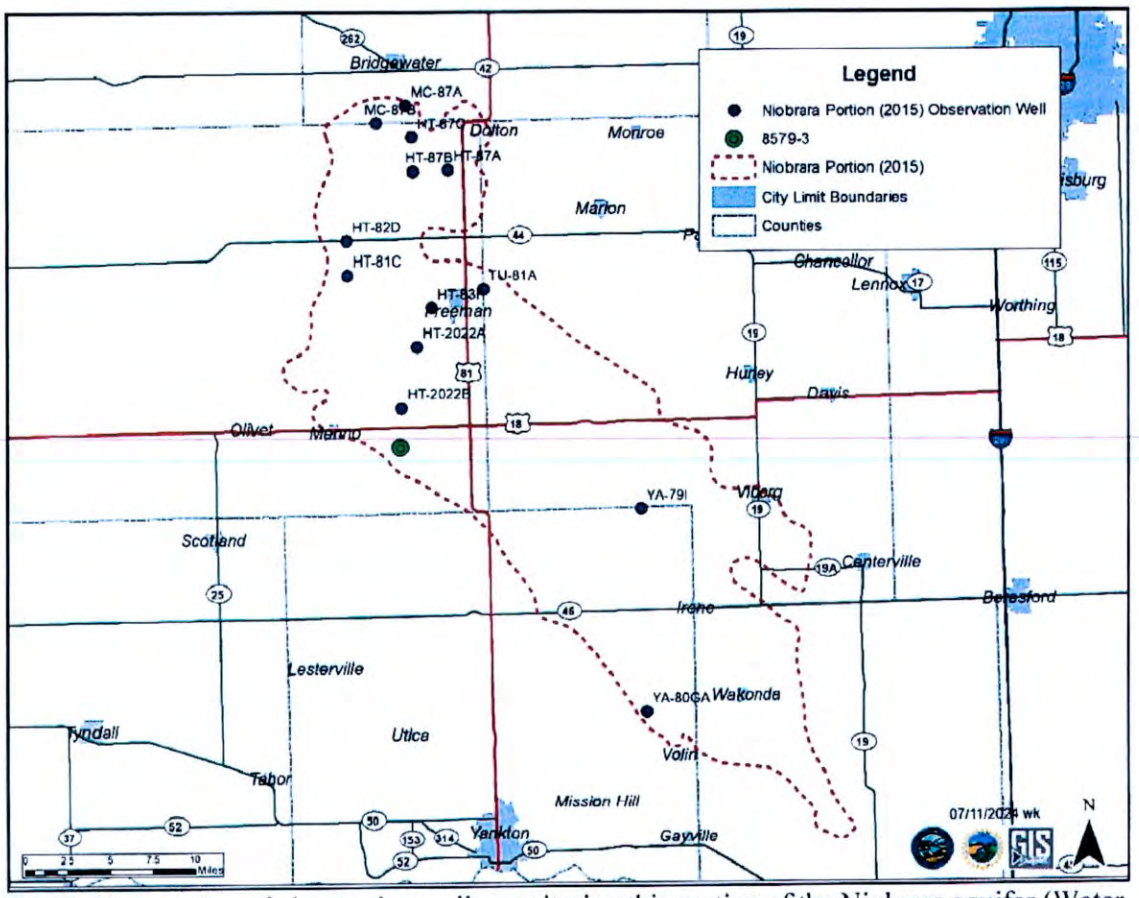

Figure 12: Location of observation wells monitoring this portion of the Niobrara aquifer (Water Rights, 2024c)

Hydrologic Budget

Direct comparison of average annual withdrawals to average annual recharge is statutorily required to determine whether water is available for appropriation from an aquifer. However, other components of an aquifer's budget can be used to examine the approximate status of water availability (or provide a general idea of the magnitude of recharge to an aquifer) in an aquifer or area of an aquifer. In general, for aquifers under natural conditions (no artificial withdrawals), the hydrologic budget of an aquifer can be represented by equation 2. When using equation 2 to look

at the natural conditions of an aquifer, the change in storage is typically estimated to average out to zero over the longer term. However, the shorter-term recharge and discharge fluctuate from year to year based on climatic conditions. Thus, the shorter-term changes can be examined to estimate water movement through the aquifer.

Equation 2: $\Delta S = R - D$

Where:

$\Delta S = change\ in\ storage$

R=recharge (water entering the aquifer)

D=discharge (water leaving the aquifer)

In general, once pumpage (artificial withdrawals) from the aquifer starts, the discharge component of the equation can be broken down into pumping withdrawals and natural discharges (i.e. seepage to other aquifers, evapotranspiration, seepage to surface water, etc.), shown in equation 3.

Equation 3: $\Delta S = R - (W + D_{nat})$

Where:

$\Delta S = change\ in\ storage$

R=recharge (water entering the aquifer)

D_{nat}=natural discharge (water leaving the aquifer through natural means)

W=withdrawals (water leaving the aquifer through artificial means (e.g. pumpage)

Given the management requirements, that the quantity of water withdrawn from a groundwater source not exceed the quantity of the average estimated annual recharge to the groundwater source, the goal is long-term change in storage in the aquifer be zero or be positive. In order for this balance to be achieved, either additional recharge has to occur (e.g. by pumping the target aquifer in close proximity to a connected aquifer creating a gradient to allow flow from the connected aquifer into the target aquifer) or natural discharge to other connected water sources has to decrease (or a combination of the two). Ultimately, there is a limit to how much recharge can increase, and natural discharge can decrease to support increasing withdrawals; when this limit is exceeded, depletion of the water in storage in an aquifer begins. Equation 3 also illustrates how natural discharge estimates can be used as part of monitoring an aquifer's hydrologic budget, since groundwater tends to move from areas of recharge to areas of discharge (which can be seen in the potentiometric surface map of an aquifer). Ideally the location of the natural discharge estimate is at the location of the discharge; however, data limitations typically prevent this.

There are two approaches to dealing with data limitations when doing natural discharge estimates. Approach one is estimating water movement across a cross section between the recharge and pumping area of an aquifer and the discharge area of an aquifer (similar to the C-C' line in Figure 8). Approach two is estimating water movement across a cross section between the recharge area of an aquifer and the discharge and pumping area of an aquifer (similar to the B-B' line in Figure 8).

For natural discharge estimates, water levels from the late April to May time period are targeted to minimize the impact of local pumping (drawdown from an individual pumping well) on the estimate, since by late April to May water levels have typically recovered to the greatest extent possible at the current climatic conditions from the prior irrigation season and pumping on the next irrigation season has not yet begun. Additionally, critical to using natural discharge estimates from an aquifer to examine the status of the hydrologic budget is having observation well data to approximate the direction of storage changes in an aquifer over the long term (e.g. increasing, stable, or decreasing). While changes in the water level in an observation well under confined conditions is not a direct measurement of the change in storage of an aquifer, depending on aquifer characteristics in confined observation wells with limited artesian head pressure (less than 50 ft or so) changes in water level can still be indicative of changes in aquifer storage. Especially when water level can be seen to be dropping below the top of the formation during the year, for example HT-2022B. In the Niobrara aquifer where factures and solution cavities are the main means of water movement and the compressibility of the aquifer material itself is limited, confined observation wells in this type of aquifer material with limited artesian head pressure can be indicative of changes in water storage in the aquifer.

Recharge

Recharge to this portion of the Niobrara aquifer is primarily from groundwater inflow from adjacent or overlying aquifers due to leakage from these hydrologically connected aquifers when the potentiometric gradients are favorable (a higher hydraulic head in the connected overlying or adjacent aquifer than in the Niobrara aquifer indicates potential for leakage into the Niobrara aquifer). Kilts (2023a) presents the support for the Turkey Ridge aquifer being a source of recharge to this portion of the Niobrara aquifer. Some recharge is also likely from infiltration from precipitation where the Niobrara is at or near ground surface, and leakage through till (Lindgren and Hansen, 1990).

There is no estimate of average annual recharge to this portion of the Niobrara aquifer or the Niobrara aquifer in general available for South Dakota (Hedges et al., 1985). However, of the Niobrara aquifer in South Dakota, Hedges, et al. (1985) noted the Niobrara aquifer had such high storage and low use it was unlikely that withdrawals are approaching or exceeding recharge and there was no evidence of significant head loss in the aquifer to suggest that use is exceeding recharge at that time. As documented in the observation well section of this report, the additional years of observation well data collected since Hedges, et al. (1985) still show no evidence of significant long term head loss across the entirety of the aquifer (Water Rights, 2024b).

Discharge

Discharge from this portion of the Niobrara aquifer is due to well withdrawals and leakage to hydrologically connected aquifers where the potentiometric gradients are favorable (a higher water level elevation in the Niobrara aquifer than in an overlying or adjacent aquifer would indicate potential for discharge from the Niobrara) and some limited seepage to surface water. There are currently 24 active water rights/permits in this portion of the Niobrara aquifer, and two pending irrigation applications with priority dates junior to this application for irrigation use (summarized in Table 1). The approximate location of the diversion point or points for these water rights/permits

and pending applications is shown in Appendix B Figure B4. Of the water rights/permits, 16 are for irrigation use, 3 for municipal use, 4 for commercial use, and 1 for institutional use.

The eight non-irrigation water rights/permits are summarized in Table 4. The Town of Irene and the City of Freeman both purchase their water from a rural water system but keep their water rights on standby for emergency use, so their average annual withdrawal is estimated to be zero (Drinking Water, 2023). Historically, average water use by non-irrigation appropriations limited solely by instantaneous diversion rate have been estimated as pumping 60% of the time at the maximum permitted diversion rate. For water rights/permits limited to an annual volume, full use of that volume is assumed for estimation of average annual withdrawal. Appropriative non-irrigation water use is summarized in Table 4. The estimated average annual appropriative non-irrigation use from this portion of the Niobrara aquifer is 539.7 acre-ft per year. There are domestic wells completed into this portion of the Niobrara aquifer that do not require appropriative water permits or report annual pumpage. Due the development of rural water systems in the area and to their relatively limited diversion rates, it is assumed the volume pumped from domestic wells is negligible to the hydrologic budget for this aquifer.

Table 4: Non-irrigation Use (Water Rights, 2024b)

Permit No.	Name of Permit Holder	Priority Date	Status	Use	Rate (cfs)	Annual Volume Limit (acre-ft)	Estimated Average Annual Use (acre-ft per yr.)
810-3	City of Freeman	01/01/1950	LC	MUN	1.26	n/a	0 (system on standby)
1229-3	Town of Irene	01/01/1915	LC	MUN	0.56	n/a	0 (system on standby)
5239-3	City of Freeman	10/17/1988	LC	MUN	0.33	n/a	0 (system on standby)
6524-3	Freeman Jr College & Freeman Academy	07/19/2004	LC	INS	0.07	n/a	30
6706-3	Pheasant Run Farm	02/21/2006	PE	COM	0.1	n/a	43
8216-3	B&K Dairy Farms LLC	02/01/2016	PE	COM	0.67	460	460
8597-3	CHS Farmers Alliance	02/22/2022	PE	COM	0.1	1.3	1.3
8626-3	Tri-Cross Renewable Energy	03/28/2022	PE	COM	0.1	4.6	4.6
						Total	**539.7**

LC-water right, PE-water permit, MUN-municipal, INS-institutional, COM-commercial

The majority of water rights/permits for irrigation in South Dakota are required to report annual irrigation usage to the Water Rights Program. The 16 active irrigation water rights for this aquifer are summarized in Table 5. Reported use for 15 of the 16 active water rights/permits for irrigation from this portion of the Niobrara aquifer are summarized in Table 6. Water Permit No. 8684-3 is still in its five-year construction period and has not yet started irrigation. Water Right No. 5913-3 incorporated portions of another permit when licensed, so reported irrigation usage for the incorporated permit is also included in Table 6.

Table 5: Summary of Irrigation Water Rights/Permits (Water Rights, 2024b)						
Permit No.	**Name of Permit Holder**	**Priority Date**	**Status**	**Rate (cfs)**	**Acres**	**Comments**
5764-3	City of Freeman	03/15/1993	LC	0.24	27.5	irrigation reporting started in 2016
5913-3	Roger Schmidt	04/02/1981	LC	0.77	123	incorporates portions of 4679-3, starts being consistent in 2013
6708-3	David Huber	04/03/2006	LC	1.78	271	
7344-3	Michael Schultz	04/09/2012	PE	5.33	399	has been inspected, developed 21 extra acres
7448-3	Robert Heckenlaible	10/03/2012	LC	6.67	560	
7515-3	Greg Wirth	10/24/2012	PE	2.28	160	
7526-3	Derrick Walter	11/15/2012	PE	3.56	257	
7617-3	Brett Guthmiller	01/07/2013	LC	1.34	119	
7683-3	Roger Guthmiller	01/28/2013	LC	1.34	134	
7700-3	David Huber	02/14/2013	LC	2.22	160	
7893-3	Wayne or Trina Knutson	09/03/2013	LC	0.07	1.2	allows up to 3 acre-feet per year
8162-3	Don Schellpfeffer	05/28/2015	LC	1.78	122.65	
8260-3	Cameron Johnson	12/27/2016	LC	1.67	117.35	
8326-3	Jerry Nelsen	01/08/2018	PE	2.00	120	reported system destroyed in 2020 & no water available since
8416-3	Jerome Poeschl	12/02/2019	LC	1.56	116	
8684-3	Matthew Wirth	11/30/2022	PE	2.11	300	not yet irrigating
LC-license, PE-permit						

Average reported irrigation usage for the water rights/permits for irrigation from this portion of the Niobrara aquifer is 233 acre-ft per year. Since the number of irrigation water rights/permits has continued to increase, the estimated average annual withdrawal rate for irrigation appropriations for the entire period of record may not accurately reflect the current level of development. The average annual withdrawal rate for irrigation appropriations from 2013 to 2023 better represents the current level of irrigation development in this portion of the Niobrara aquifer. Average reported irrigation usage from 2013 to 2023 for the water rights/permits in this portion of the Niobrara aquifer is 773 acre-ft per year. Water Permit Application No. 8616-3 is the result of a licensing inspection for Water Permit No. 7344-3, to reflect an additional 21 acres being irrigated by the irrigation systems authorized under Water Permit No. 7344-3. Since irrigation of these acres is being reported as part of water use under Water Permit No. 7344-3, the water use proposed by Application No. 8616-3 is assumed to be already reflected in the reported irrigation data. Typically, average irrigation rates in eastern South Dakota are less than 10 inches per acre per year (Water Rights, 2024b). Water Permit Nos. 8326-3 and 8684-3 have yet to report any use, so using this rate, average annual water usage is estimated at less than 350 acre-feet per year. This application and Application No. 8587-3 propose to irrigate a total of 166 new acres, estimated average annual water use for these applications is less than 138 acre-feet per year. Total estimated average annual irrigation use plus expected irrigation use from this and other pending applications from this portion of the Niobrara aquifer is less than 1,261 acre-feet per year.

Table 6: Reported Irrigation use (Water Rights, 2024e)

Year	No. Permits	Reported Pumping (acre-feet)
1981	1	0.0
1982	1	69.7
1983	1	35.6
1984	1	42.0
1985	1	50.0
1986	1	50.0
1987	1	120.0
1988	1	72.9
1989	1	136.6
1990	1	92.8
1991	1	106.1
1992	1	6.6
1993	1	0.0
1994	1	33.1
1995	1	29.4
1996	1	6.6
1997	1	9.0
1998	1	0.0
1999	1	0.0
2000	1	0.0
2001	1	0.0
2002	1	25.2
2003	1	7.7
2004	1	0.0
2005	1	0.0
2006	1	0.0
2007	2	23.1
2008	2	49.5
2009	2	28.3
2010	2	0.0
2011	2	141.4
2012	3	381.6
2013	13	999.1
2014	14	928.9
2015	15	724.6
2016	16	518.1
2017	17	616.8
2018	18	98.0
2019	18	20.5
2020	19	815.0
2021	19	1024.5
2022	19	1451.1
2023	15	1310.7
Max	**19**	**1451.1**
Min	**1**	**0**
1981-2023 Avg	**5.2**	**233.1**
2013-2023 Avg	**16.6**	**773.4**

Natural discharge from an aquifer can be used to gain understanding into the status of an aquifer's hydrologic budget when an estimated average annual recharge value is not available. The updated May 2016 estimate of natural discharge occurring from this aquifer to the Lower James Missouri aquifer is 1,803 acre-feet per year. Since this estimate is for a single point in time (May 2016), this value does not represent an average annual value for discharge from the aquifer but does offer insight into the magnitude of discharge from the western flank of the aquifer at the time the analysis was performed. Actual natural groundwater discharge from this aquifer (and therefore recharge to) is likely higher than indicated by this estimate. This is due to the direction of groundwater flow being generally from the center of the aquifer outward to the edges of the aquifer and this estimate is only for natural discharge from the western side of the aquifer. Additionally, Kilts (2023b) estimated discharge from this portion of the Niobrara aquifer to the Upper Vermillion Missouri: West aquifer downgradient of the well site for Water Permit No. 8684-3 to be 685 to 890 acre-feet per year. Kilts (2023b) also noted there was likely additional natural discharge potential to the Upper Vermillion Missouri: South aquifer and other adjacent aquifers that have not yet been quantified. Therefore, there is a reasonable probability that over the total extent of this portion of the Niobrara aquifer, water is available for this application and the other applications summarized in Table 1. However, since this natural discharge estimate only serves as an indicator of the magnitude of discharge from the aquifer at the point in time of the estimate, it is worth emphasizing the importance of observation well data as part of assessing water availability in this aquifer.

Balance

Estimated average appropriative withdrawals from this aquifer, including the applications summarized in Table 1, is less than 1,801 acre-feet per year (irrigation: 1,123 acre-feet, non-irrigation: 540 acre-feet, Application No. 8587-3 and this application: 138 acre-feet). There is no recharge estimate for this portion of the Niobrara aquifer. However, natural discharge estimates can be used to gain an understanding of the approximate amount of recharge an aquifer is receiving. Estimated overall natural discharge from this portion of the Niobrara aquifer to the Lower James Missouri aquifer to approximately 1,803 acre-feet per year for May of 2016. Kilts (2023b) estimated natural discharge to the Upper Vermillion: West on the eastern side of the aquifer ranging between 685 to 890 acre-feet per year. This totals an estimated natural discharge ranging from 2,488 to 2,693 acre-feet per year based on the points in time the discharge was calculated. Kilts (2023b) also noted there is likely additional natural discharge occurring to the Upper Vermillion: South aquifer from this portion of the Niobrara aquifer. Based on these estimates of natural discharge from the aquifer, there is a reasonable probability that water is available from the overall extent of this portion of the Niobrara aquifer for the appropriation requested by this application.

Localized Budget

Localized budgets are utilized in subareas of aquifers where (based on the engineering judgment of Water Rights staff) a combination of significant hydrogeology characteristics and appropriative water use results in a locally distinct subarea of water availability from the overall water availability in an aquifer. Examples of where subareas are routinely utilized would be the

Madison, Minnelusa, and Inyan Kara aquifers at locations in close proximity to the aquifer outcrop areas in the Black Hills (Water Rights, 2023b). For this portion of the Niobrara aquifer, the potentiometric surface mapping consistently indicates that water movement is generally from the central area of the aquifer to the outer edges of the aquifer indicating the potential for differing water availability between the various flanks of the aquifer.

Figure 8 shows the water rights/permits in the vicinity of the localized natural discharge estimate summarized in Table 3 and in Kilts (2024). The water rights/permits associated with the localized natural discharge estimate shown in Table 3 (approximately 173 acre-feet per year) are Water Right Nos. 6708-3, 7448-3, 7617-3, 7683-3, and 7700-3. Given the close proximity of Water Right No. 7700-3 to the natural discharge area to the north (C-C' line) of the one represented by the B-B' line, Water Right No. 7700-3 is likely also utilizing some amount of natural discharge occurring to the north of the discharge area being examined in this localized budget. Water use for the water rights associated with the localized natural discharge estimate is shown in Table 7. Water Right No. 7700-3 reported no pumping in 2022; it was indicated the system was damaged in a storm (Water Rights, 2024e).

Table 7: Reported Irrigation by Year in the Area of B-B' in Acre-Feet (Water Rights, 2024e)

Permit No.	6708-3	7448-3	7617-3	7683-3	7700-3	Total
Priority Date	04/03/2006	10/03/2012	01/07/2013	01/28/2013	02/14/2013	
Approximate distance to complaint wells (miles)	2.1	1.9	2.6	3.1	4.3	
Total Acres	271	304	119	134	146	974.0
2023	167.9	179	69	33.4	58.9	508.2
2022	243.06	201.63	89.82	82.58	0.00	617.1
2021	86.9	192.5	43.1	57.4	15.5	395.4
2020	103.3	125.4	35.7	38.1	51.6	354.0
2019	0.0	0.0	0.0	0.0	0.0	0.0
2018	0.0	29.0	5.7	0.0	0.0	34.7
2017	10.6	26.5	25.4	28.7	42.4	133.6
2016	0.0	117.7	30.5	31.6	28.3	208.0
2015	77.8	75.1	18.6	21.1	56.6	249.1
2014	169.7	136.7	60.8	80.4	120.2	567.8
2013	155.6	175.7	43.1	59.1	141.4	574.9
2012	272.2	n/a	n/a	n/a	n/a	272.2
2011	141.4	n/a	n/a	n/a	n/a	141.4
2010	0.0	n/a	n/a	n/a	n/a	0.0
2009	28.3	n/a	n/a	n/a	n/a	28.3
2008	49.5	n/a	n/a	n/a	n/a	49.5
2007	23.1	n/a	n/a	n/a	n/a	23.1
Average 2007-2023						244.5
Average 2013-2023						331.2

This application is seeking to irrigate 32 acres, so estimated average annual use for this application is less than 27 acre-feet per year. This results in a localized estimated average annual water use of 358 acre-feet per year. The estimated localized natural discharge in this area is 173 acre-feet per year (Table 4). This indicates that caution should be used in adding additional appropriative users to this localized area, since to support additional users in this area horizontal groundwater movement into the area downgradient of B-B' would have to be induced from the areas adjacent to the area downgradient of B-B' (such as the area downgradient of C-C') by

pumpage from water users in the area downgradient of B-B'. Withdrawals exceeding groundwater movement into a localized area, can result in a localized long-term decreasing trend in local water levels (that does not eventually stabilize in relation to withdrawals) governing local water levels rather than climatic conditions. In areas dominated by seasonal pumping, this would start as one or two wells being impacted toward the middle and end of an irrigation season when higher-than-average irrigation pumping is occurring. Then, unless water levels stabilize as water levels decrease over time, the number of wells impacted would increase with the most impacted wells experiencing issues sooner in the irrigation season even with average irrigation pumpage. Since this natural discharge estimate only serves as an indicator of the magnitude of recharge to a localized area within an aquifer at the point of time of the estimate, it is worth emphasizing the importance of observation wells as part of monitoring this aquifer. The only observation well in this localized area is HT-2022B for which limited data is available. Depending on the aquifer and climatic conditions, it takes five to ten years of data before conclusions can be drawn on water availability from observation well data.

The localized budget for this subarea of this portion of the Niobrara aquifer and the localized budget areas Kilts (2024) and Kilts (2023b), is not to be considered as a budget representing separate groundwater sources pursuant to SDCL 46-6-3.1. Therefore, average annual withdrawals exceeding average annual recharge within a subarea of a groundwater source is not a violation of SDCL 46-6-3.1. However, impacts of average annual withdrawals exceeding average annual recharge within this localized area, may eventually result in unlawful impairment of existing users. So, while this localized budget is presented in the water availability section of this report (since it uses methodology based on the overall review of water availability from the groundwater source), the review of this localized budget serves more as an analysis reviewing the potential for cumulative appropriative use in a localized area resulting in unlawful impairment of existing domestic water uses and water rights over a longer term time scale than is typically reviewed as part of the potential for unlawful impairment. The potential for unlawful impairment review generally focuses more on the potential for direct impact and unlawful impairment of existing users as a result of drawdown caused by pumping. In this particular instance, it is prudent to consider whether the longer-term cumulative impacts of pumping by the proposed application and existing users may eventually cause an unlawful impairment of existing users due to relatively limited local transmissivity and natural discharge.

Potential for Unlawful Impairment

Area water rights/permits completed into this portion of the Niobrara aquifer are shown in Figure 8 and summarized in Tables 4 and 5. The nearest water right/permit to the proposed well site for this application is Water Permit No. 7683-3 for irrigation of 134 acres located approximately 0.4 miles to the southeast. The nearest domestic well on file with the Water Rights Program not under the last name of Guthmiller is for Ernest Handel located approximately 0.7 miles to the northwest based on the legal description provided by the well driller in the well completion report (Water Rights, 2023a). There could potentially be other domestic wells completed into the Niobrara aquifer near the diversion point that are not on file with the DANR-Water Rights Program.

In 2013, the Water Rights Program received a complaint of a domestic well being impacted in this portion of the Niobrara aquifer in the general area of this application; however, when

investigated, it was determined that the well had likely collapsed and was not an adequate well as defined by Administrative Rules of South Dakota (ARSD) 74:02:04:20(6) (Water Rights, 2023d). ARSD 74:02:04:20(6) defines an adequate well as, "a well constructed or rehabilitated to allow various withdrawal methods to be used, to allow the inlet to the pump to be placed not less than 20 feet into the saturated aquifer or formation material when the well is constructed, or to allow the pump to be placed as near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet".

In 2015, a complaint was received that Water Permit No. 7526-3 (near the northern edge of this portion of the Niobrara aquifer) was impacting springs; however, the springs were identified as artesian in nature and artesian head pressure is not protected as a means of delivery. Therefore, it was concluded that no unlawful impairment was occurring (Water Rights, 2023d), since in the case of Water Permit Application No. 2313-2 for the Coca-Cola Bottling Company of the Black Hills the Water Management Board adopted findings that noted that if the increased costs or decreased production as a result of the impacts of legitimate users on artesian head pressure could be considered an adverse impact, it would conflict with SDCL 46-1-4 (Water Rights, 1995). SDCL 46-1-4 requires the water resources of the state be put to beneficial use to the maximum extent of which they are capable (Water Rights, 1995).

On May 4th, 2022, the South Dakota Water Management Board took action to defer Application No. 8579-3 (this application) for up to two years to allow for study to determine if existing irrigation in the area was unlawfully impairing two adequate domestic wells located approximately 2.3 miles to the north of the well site for this application in relation to a complaints starting in August 2021 (Water Rights, 2023b). On January 10th, 2023, the Water Rights Program was notified that the water supply from the adequate domestic wells in question had been replaced with connections to a rural water system. However, the available information for these domestic wells (D. Mehlhaf and T. Mehlhaf wells both drilled in 2012) and another area domestic well (Streyle well drilled 08/06/2013) will be reviewed to consider potential for unlawful impairment to occur.

To aid in the consideration of unlawful impairment, the Water Management Board has adopted the definition of an adversely impacted domestic well in ARSD 74:02:04:20(7). The Board has defined an adversely impacted domestic well 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." While in most aquifers 20 feet is an adequate depth of water for prior users and domestic wells, in some areas of the Niobrara aquifer, 20 feet of aquifer is not sufficient for a well to be a dependable water supply; ARSD 74:02:04:60 could be used to aid in identifying these areas.

ARSD 74:02:04:60 specifies requirements for the installation of pumps in wells. The rule requires that the depth of the pump inlet placement be determined by dividing the specific capacity of the well into the required yield and adding at least 10 additional feet. This represents an estimate of the pump inlet depth needed to maintain pump submergence below the maximum anticipated drawdown that would likely occur due to pumping from the well itself. This is the estimated depth of pump inlet placement to prevent the pump from pumping itself dry. Review of

the basic data from the domestic wells at the time of drilling and the calculation for ARSD 74:02:04:60 is summarized in Table 8. The review of the data and the ARSD 74:02:04:60 calculation indicates that the D. Mehlhaf and Streyle wells, aquifer characteristics, and the requirements for pump inlet placement per ARSD 74:02:04:60 point to 20 feet of aquifer thickness not being sufficient for the well to be a dependable water supply.

Table 8: Domestic Well Information (Water Rights, 2023a and Water Rights, 2023d)

	Well		
Information	**D. Mehlhaf 2012**	**T. Mehlhaf (10/10/2012)**	**Streyle (08/06/2013)**
Ground elevation* (ft)	1460	1450	1400
Static water level drill date (ft)	74	73	44
Static water elevation drill date (ft)	1386	1377	1356
Depth to top of Niobrara (NBRR) (ft)	80	70	58
Elevation top of NBRR (ft)	1380	1380	1342
Elevation 20ft below top of NBRR	1360	1360	1322
Total well depth (ft)	141	101	100
Elevation of bottom of well (ft)	1319	1349	1300
Test pumping rate (gpm)	8	15	15
Draw drown from test pump (ft)	36	7	16
Specific Capacity (gpm/foot of drawdown)	0.222	2.143	0.938
Pump Inlet Depth per ARSD 74:02:04:60 (ft)	126	87	84
Pump Inlet Depth per ARSD 74:02:04:60 below top of NBRR (ft)	46	17	26
Pump inlet depth 5/9/2022 driller visit (ft)	137	90	n/a
Pump inlet elevation 5/9/2022 driller visit (ft)	1323	1360	n/a
Static water level 5/9/2022 driller visit (ft)	93	73	n/a
Static water elevation 5/9/2022 driller visit (ft)	1367	1377	n/a
Comments			Showed water at 77ft. Based on this pump inlet placement is likely lower then the estimated 84 ft
*all elevations in Table 8 refer to NAVD88			

To attempt to assess impacts to these wells, the water level data from HT-2022B and the other observation wells in this aquifer were utilized to create an estimated potentiometric surface map for this area of the aquifer for Fall 2022. This map is show in Appendix B, Figure B2 with Figure B3 are also included to show the location of existing water rights in relation to these domestic wells. This Fall 2022 potentiometric surface map was used to estimate water levels at these domestic wells under the cumulative impacts of the dry climatic conditions of 2022 and the higher-than-average irrigation pumping that occurred during the 2022 irrigation season. The Fall 2022 estimated water level elevations at these wells are provided in Table 9, along with the estimated water levels from the potentiometric surface maps from other time periods. Also shown in Table 9 is the calculated depth of maximum pump inlet placement per ARSD 74:02:04:60, adjusted for the Fall 2022 water levels, where the calculation per ARSD 74:02:04:60(2) from the Fall 2022 water levels is being used to estimate if the well could have been supplied sufficient water for domestic needs under the combined impact of climatic conditions and pumping on water levels

As a check on the potentiometric surface mapping of the water levels, the water levels for the D. Mehlhaf and T. Mehlhaf wells from the May 2022 driller site visit (not used in the generation of the potentiometric surface mapping) was compared to the generated potentiometric surface mapping. For the T. Mehlhaf well, the difference in water level elevation was three feet, which for the amount of processing and interpreting of data indicates a reasonably good correlation between the generated potentiometric surface and reported water level in the area of this domestic well. For the D. Mehlhaf well, the difference in water level elevation was 11 feet, which is still within reason for the amount of processing and interpreting of data that goes into potentiometric surface mapping. However, in comparing the D. Mehlhaf and T. Mehlhaf well water levels for May 2022, expected well behavior would be to see full recovery of water levels from the pumping of the previous irrigation season. This is seen in the T. Mehlhaf well but not the D. Mehlhaf well, indicating there is potentially another unknown factor influencing water levels in the D. Mehlhaf well (such as notable lower transmissivity in the aquifer locally at the well location or vertical variations in aquifer productivity in the well bore due to fracturing).

Table 9: Estimated Potentiometric Surface at Different Time Periods

	Estimated water level elevation at well locations (ft)		
Time Period	**D. Mehlhaf 2012**	**T. Mehlhaf (10/10/2012)**	**Streyle (08/06/2013)**
November 1986	1445	1440	1390
May 2016	1390	1390	1355
May 2013	1385	1379	1356
May 2018	n/a	n/a	n/a
May 2022	1378	1374	1354
Fall 2022	1352	1347	1332
Pump inlet depth calculated per ARSD 74:02:04:60 at Fall 2022 water levels (ft)	154	120	94
Pump inlet elevation* calculated per ARSD 74:02:04:60 at Fall 2022 water levels (ft)	1306	1330	1306
Total well depth (ft)	141	101	100
*all elevations in Table 9 refer to NAVD88			

The Fall 2022 water level elevation reflects the cumulative impacts of the dry climatic conditions of 2022 and the higher-than-average irrigation pumping that occurred during the 2022 irrigation season. There is not sufficient data available to separate the climatic impacts from the pumping impacts on the estimated Fall 2022 water levels for the location of these domestic wells. Based on the specific capacity of the D. Mehlhaf and T. Mehlhaf wells, the estimated Fall 2022 water level elevations at the wells, and the calculation for ARSD 74:02:04:60 at the Fall 2022 water level; the pump inlet in these wells would need to have been set below the total depth of the wells (and in excess of 20 feet below the pump placement calculated by ARSD 74:02:04:60 at the time of drilling). Based on the specific capacity of Streyle well, the estimated Fall 2022 water level elevations at the wells, and the calculation for ARSD 74:02:04:60 at the Fall 2022 water level; the pump inlet in this well would need to have been set at approximately 94 ft or 6 ft from the bottom of the well (this is 10 ft below the calculated pump inlet placement at the time of drilling). Additionally, although it is the most distant water right from these wells included in the analysis

of localized hydrologic budget, Water Right No. 7700-3 did not operate during the 2022 irrigation season (Table 7). Information is also not available to determine if sufficient thickness exists in the Niobrara aquifer at any of these three domestics well locations to allow for these wells to be deepened while still being open to only the Niobrara aquifer.

Based on the information presented in Table 8, the domestic wells had sufficient depth to meet ARSD 74:02:04:60 requirements at the time of drilling. Since there is not sufficient data available to separate the climatic impacts from the pumping impacts on the estimated Fall 2022 water levels for the location of these domestic wells, there is not sufficient information available to determine if the Mehlhaf wells could supply water needed for domestic use with only climatic impacts on water levels. However, the information from Table 8 and Table 9 suggests in the Fall of 2022 for the two Mehlhaf wells, the water level of the aquifer declined to a level where the pumps could no longer deliver sufficient water for the well owner's needs. As previously mentioned, the two Mehlhaf wells have been replaced by rural water connections. The information presented in Tables 8 and 9 indicates that development in this portion of the Niobrara aquifer could potentially cause unlawful impairment of existing adequate domestic wells (beyond the domestic users that have connected to rural water) during a combination of a dry climatic conditions and the cumulative effects of heavy irrigation pumping.

During the 2022 irrigation season appropriative pumping was shut down in the area of observation wells HT-2020A and HT-2020B. Water Rights/Permit Nos. 7244-3, 7700-3, 7448-3, 7682-3, 7617-3 were issued shutoff orders from July 20, 2022, to July 27, 2022 (Water Rights, 2024b). The location of these water rights/permits and observation wells in relation to each other is shown in Figure 8. The water level data collected by datalogger for 2022 for these two observation wells is shown in Figure 13 along with the date period of the shutoff order. The water levels in HT-2022A can be seen to make faster recovery with the cessation of pumping than in HT-2022B. There are couple of things this response can be indicative of. The magnitude of the seasonal response of water levels in the aquifer due to pumping near HT-2022A may be affected more by the pumping of a single permit rather than cumulative drawdown. Another possibility is that HT-2022A could be closer to recharge source than HT-2022B. Figure 13 and Figure 9 also point to water levels in the aquifer at HT-2022A making a quicker and more complete recovery with the cession of pumping at the end of the irrigation season than HT-2022B.

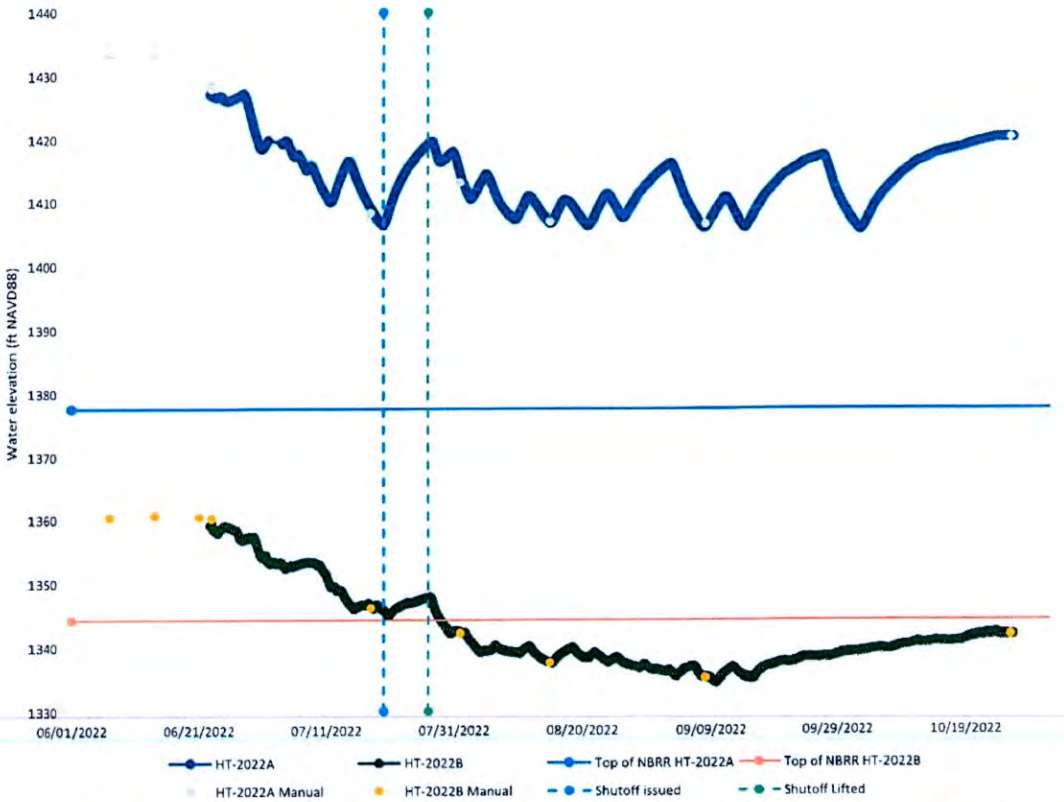

Figure 13: Water level data collected by datalogger for June 2022 to November 2022 for observation wells HT-2022A and HT-2022B (Mathiowetz, 2024 and Water Rights, 2024c).

A more in-depth analysis would require a combination of further information and an extensive groundwater modeling effort using specialized groundwater modeling software to account for the locally complex hydrogeologic conditions and cumulative impacts from the multiple appropriative wells in the area.

SDCL 46-5-6 Diversion Rate Limit

Pursuant to SDCL 46-5-6, the diversion rate for an irrigation appropriation cannot be in excess of one cfs for every 70 acres, or "the equivalent thereof." The statute does provide that the Water Management Board may allow a greater diversion rate if the method of irrigation or soil types so require. Water Permit Application No. 8579-3 proposes to divert up to 0.89 cfs for the irrigation of 32 acres or the equivalent of 1.95 cfs per 70 aces. The application indicated that the proposed method of irrigation is by center pivot. Center pivots generally require a certain diversion rate for operation, so when a center pivot irrigation system is not making a full turn or consists of a shorter span than a full quarter (such as the case here) the one cfs for every 70 acres rate is sometimes exceeded. This reason has historically been accepted as an allowed exceedance due to the method of irrigation.

Conclusions

1. Water Permit Application No. 8579-3 proposes to appropriate water for irrigation of 32 acres at a maximum instantaneous diversion rate of 0.89 cubic feet per second (cfs) from one well (approximately 200 ft deep) to be completed into the Niobrara aquifer. Both the proposed well and proposed acres for irrigation are located in the NE ¼ NE ¼ Section 18-T97N-R56W in Hutchinson County.

2. On an aquifer wide scale, based on the hydrologic budget and observation well data, there is a reasonable probability that water is available in the aquifer to meet the water use proposed by this application.

3. Based on the localized hydrologic budget, there may be localized impacts to existing water users which, if determined to be unlawful impairment, may result in curtailment of water use under this application, if approved.

4. The currently best reasonable information available indicates development in this portion of the Niobrara aquifer is reaching the point where the potential for unlawful impairment of existing adequate domestic wells (beyond the domestic users that have connected to rural water) is becoming possible under certain conditions during the irrigation season when a combination of a dry climatic period and greater than average irrigation pumping coincide.

5. This application is requesting a diversion rate greater than the statutory limit 1 cfs per 70 acres due to the method of irrigation (shorter than standard pivot span). This reason has been accepted by the Water Rights Program and Water Management Board in the past.

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SDDANR-Water Rights Program

References

Allen, J.C., Iles, D.L., and Petres, A.K. 1985. Analysis of Groundwater and Streamflow Data Western Dakotas Region of South Dakota Tasks 3A.B.C. and 4A.B.: Groundwater Resource Inventory Final Report. U.S. Army Corps of Engineers Contract DACW 45-82-C-0151. SD DANR-Geological Survey. Vermillion, South Dakota.

Aqtesolv. 2019. Representative Values of Hydraulic Properties. Updated Nov 23, 2019. Accessed April 17, 2023. < http://www.aqtesolv.com/aquifer-tests/aquifer_properties.htm>

Aqtesolv. 2023. Transmissivity from Specific Capacity. Accessed March 2023. < http://www.aqtesolv.com/forum/transcap.asp>

Bugliosi, E. F. 1986. Water Resources of Yankton County, South Dakota. Water-Resources Investigation Report 84-4241. United States Geological Survey. Huron, SD.

Drinking Water. 2023. South Dakota Drinking Water System Information. SDDANR-Water Rights Program. Accessed February 24, 2023. <https://danr.sd.gov/OfficeOfWater/DrinkingWater/default.aspx>.

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: Bedrock Topography and Distribution, Task 2: Extent of Aquifers, Task 3: Ground-Water Storage, Task 4: Computerized Data Base, Final Report. U.S. Army Corps of Engineers Contract DACW 45-80-C-0185.

Hedges, L.S., Allen, J. and 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. U.S. Army Corps of Engineers Contract DACW 45-80-C-0185.

Holmes, S. L. and Filipovic, D. 2015. Hydrogeologic Investigation of the Upper-Vermillion-Missouri Aquifer. Open-File Report 93-UR. SD Geological Survey Program. Vermillion, SD.

Jensen, A. R. 2000. First Occurrence of Aquifer Materials in Clay County, South Dakota. Aquifer Materials Map 1. South Dakota Geological Survey. Vermillion, SD.

Kilts, W. 2023a. Report to the Chief Engineer on Water Permit Application No. 8654-3: Schultz Dairy. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Kilts, W. 2023b. Report to the Chief Engineer on Water Permit Application No. 8684-3: Matthew Wirth. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Kilts, W. 2024. Report to the Chief Engineer on Water Permit Application No. 8616-3: Michael Schultz. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Lindgren, R.J. and Hansen, D.S. 1990. Water Resources of Hutchinson and Turner Counties, South Dakota. Water Resources Investigations Report 90-4093. USGS. Huron, SD.

Mathiowetz, A. 2016. Report to the Chief Engineer on Water Permit Application No. 8216-3. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Mathiowetz, 2024. Compiled Datalogger Data for Observation Wells HT-2022A and HT-2022B. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Schultz, M. 2024. Personal communication by phone on Water Permit No. 7344-3. June 27, 2024.

SDGS. 2023. South Dakota Geological Survey Lithologic Logs Database. Accessed February 2023. <http://cf.sddenr.net/lithdb/>.

Stephens, J.C. 1967. Geology and Hydrology of Clay County South Dakota: Part II Water Resources. Bulletin 19. SDGS. Vermillion, SD.

Tomhave, D. T. and Schulz, L.D. 2004 Bedrock Geologic Map Showing Configuration of the Bedrock Surface in South Dakota East of the Missouri River. General Map 9, scale 1:500,000. South Dakota Geological Survey. Vermillion, South Dakota.

Water Rights. 2023a. Well Completion Reports. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota. Accessed March 2023.

Water Rights. 2023b. Water Right/Permit Files. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota. Accessed March 2023.

Water Rights. 2023c. Observation Well Files. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota. Accessed March 2023.

Water Rights. 2024a. Well Completion Reports. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota.

Water Rights. 2024b. Water Right/Permit Files. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota.

Water Rights. 2024c. Observation Well Files. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota.

Water Rights. 2024d. Water Rights County Complaint Files. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota. Accessed June 2024.

Water Rights. 2024e. Water Rights Irrigation Reporting Data. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota. Accessed June 2024.

Appendix A: Select Geologic Cross Sections from Lindgren and Hansen, (1990)

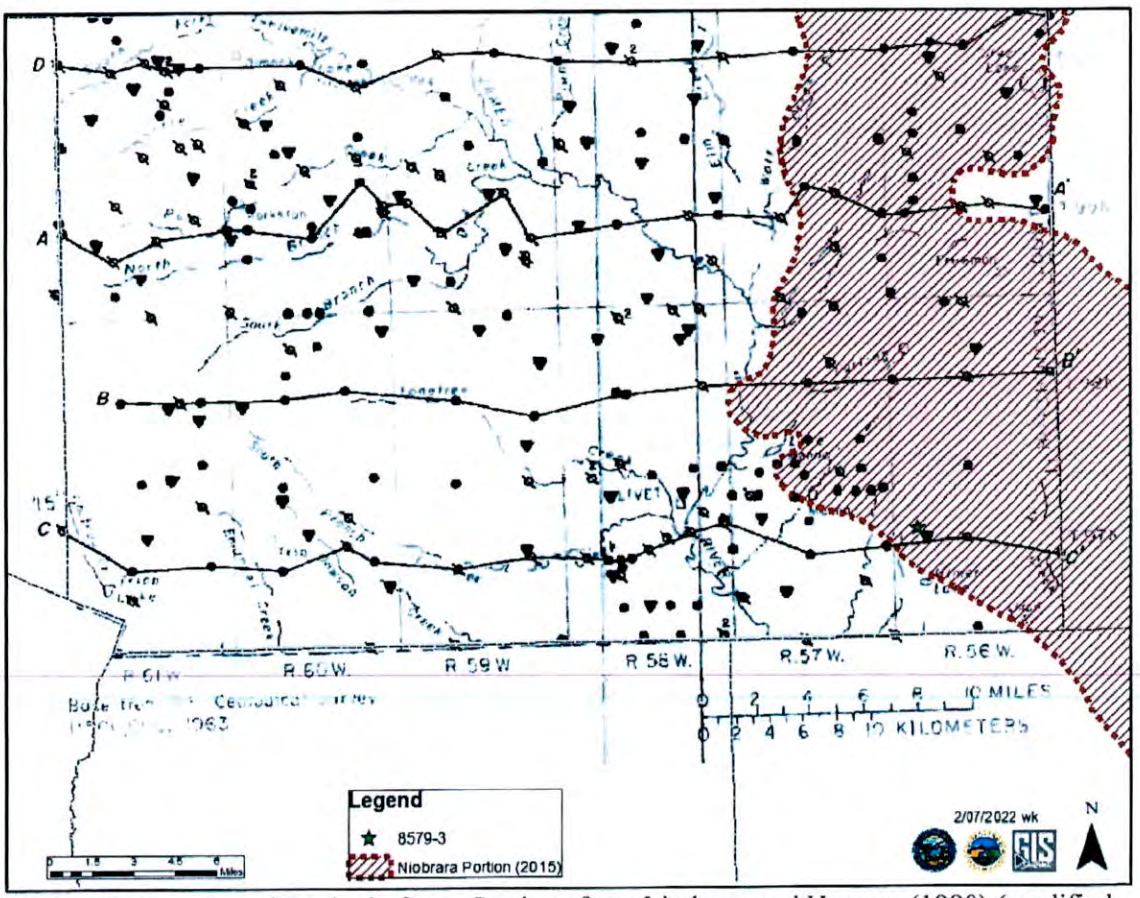

Figure A1: Location of Geologic Cross Sections from Lindgren and Hansen, (1990) (modified from Lindgren and Hansen, 1990)

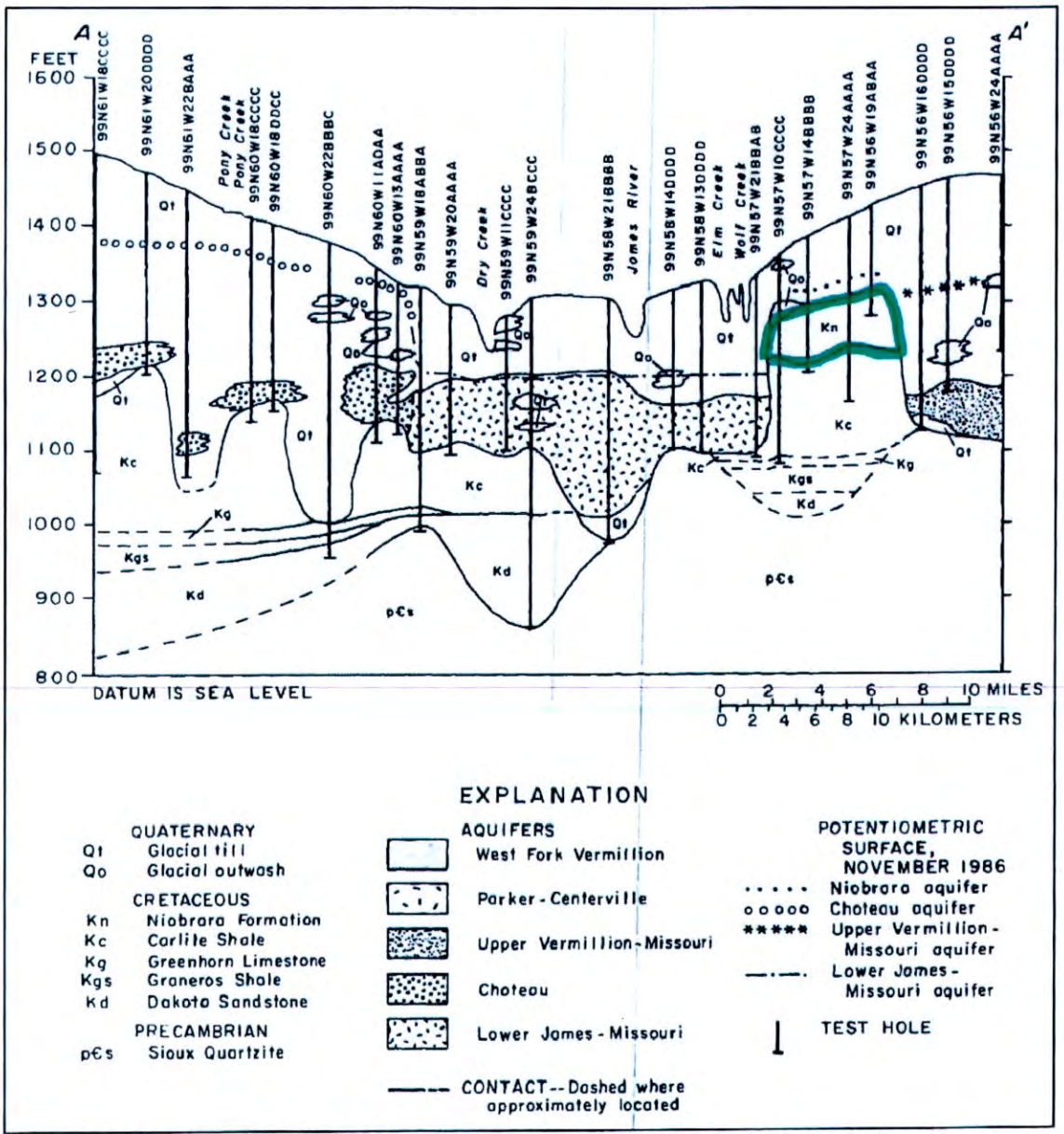

Figure A2: Geologic Cross Section A-A' with portion of Niobrara of interest indicated with green highlight (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

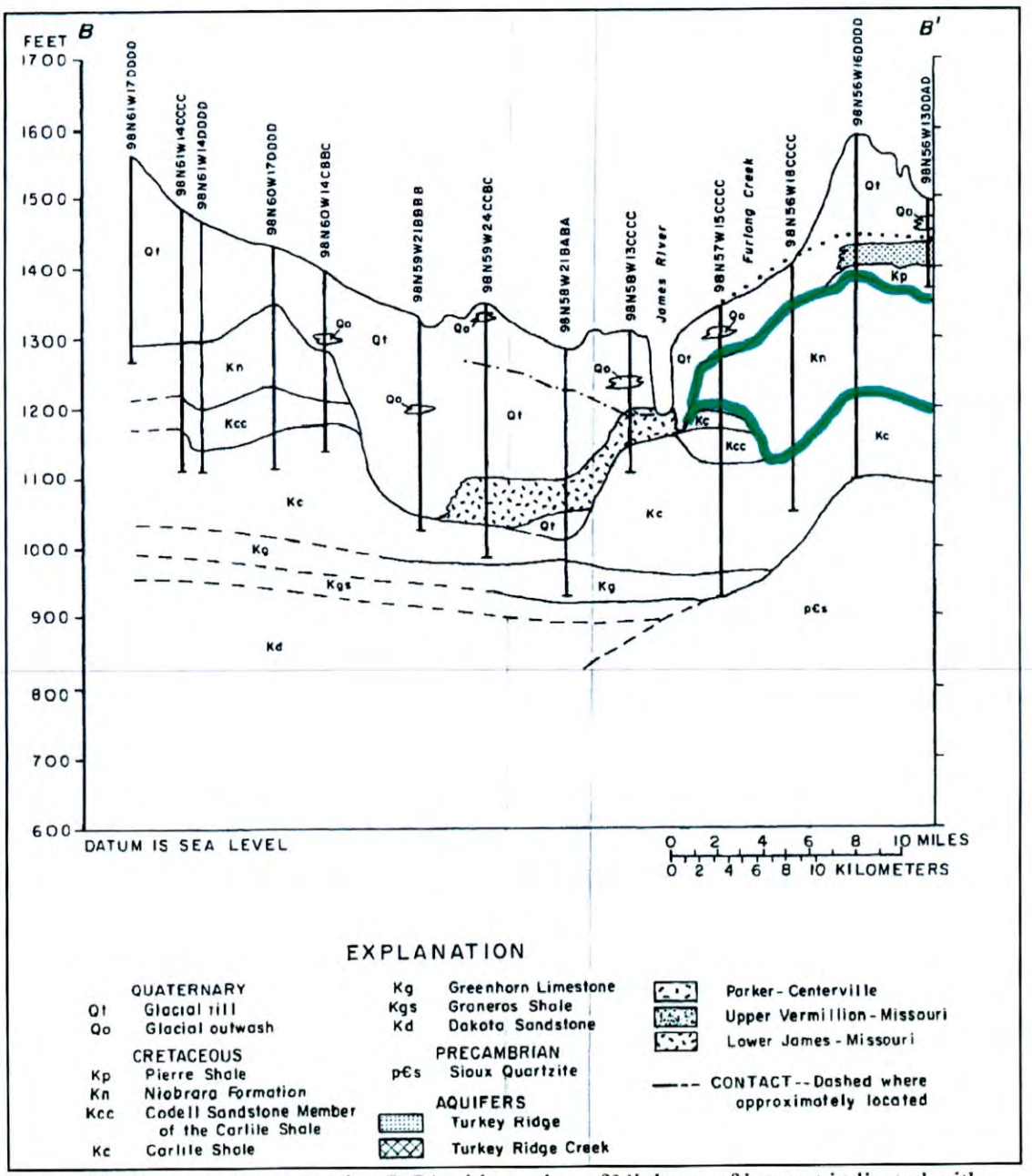

Figure A3: Geologic Cross Section B-B' with portion of Niobrara of interest indicated with green highlight (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

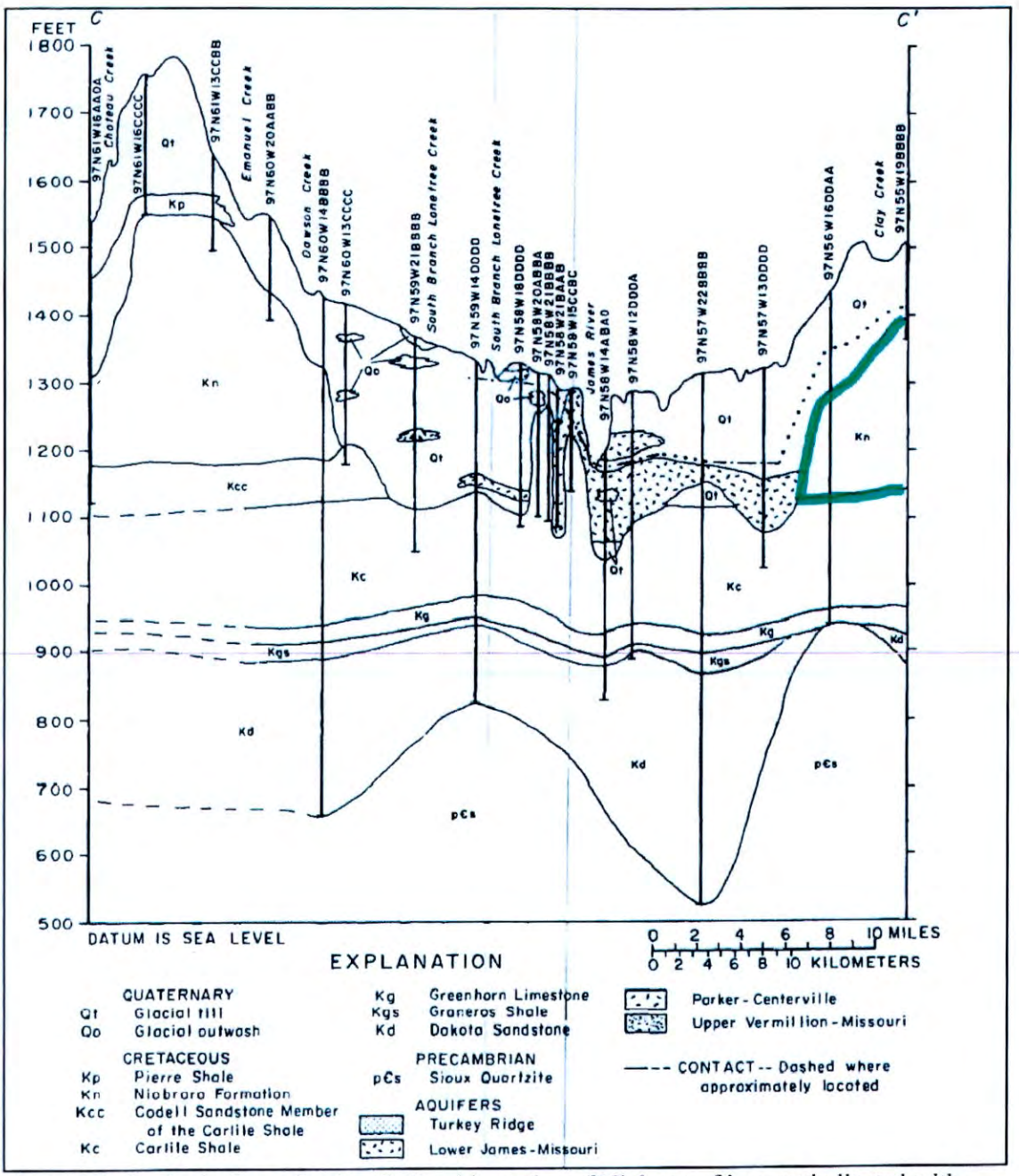

Figure A4: Geologic Cross Section C-C' with portion of Niobrara of interest indicated with green highlight (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

Appendix B: Additional Maps

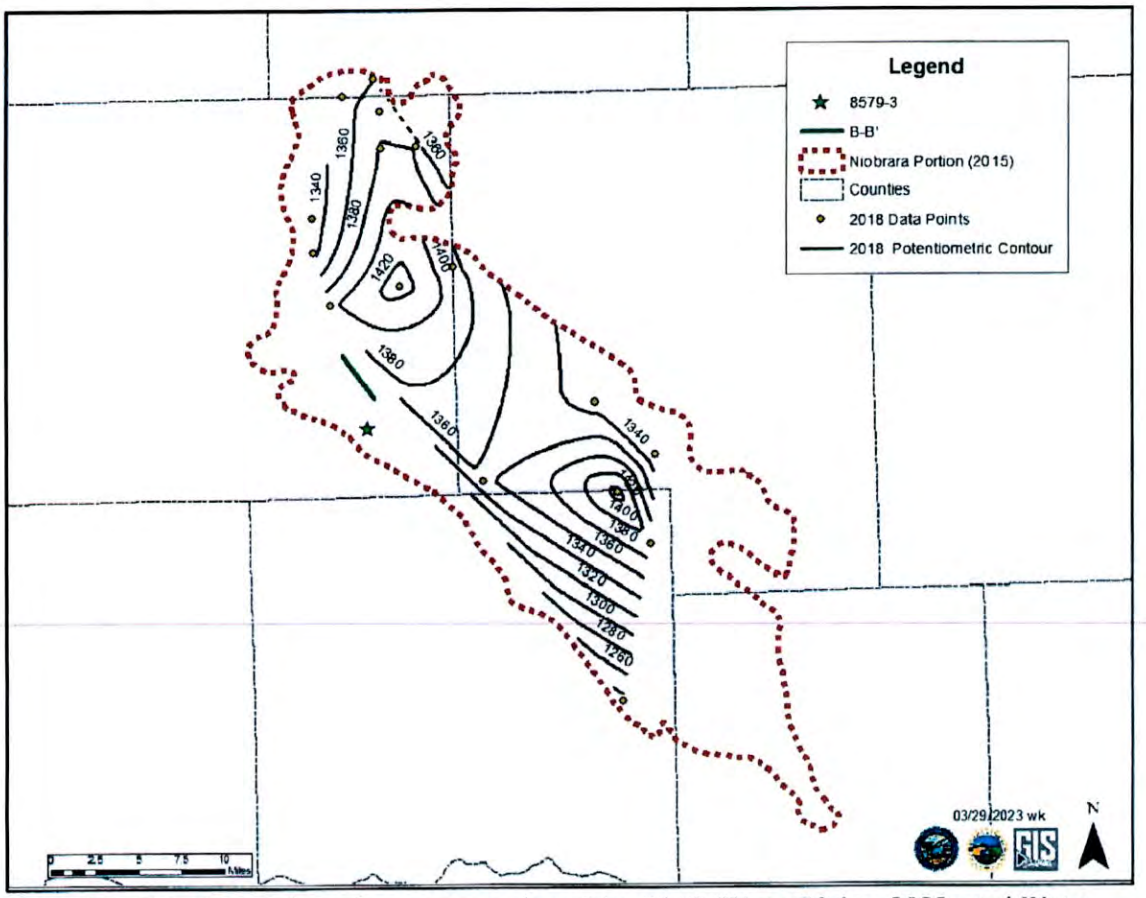

Figure B1: Potentiometric surface contours from May 2018 (Water Rights, 2023a and Water Rights, 2023c). Elevation reference NAVD88.

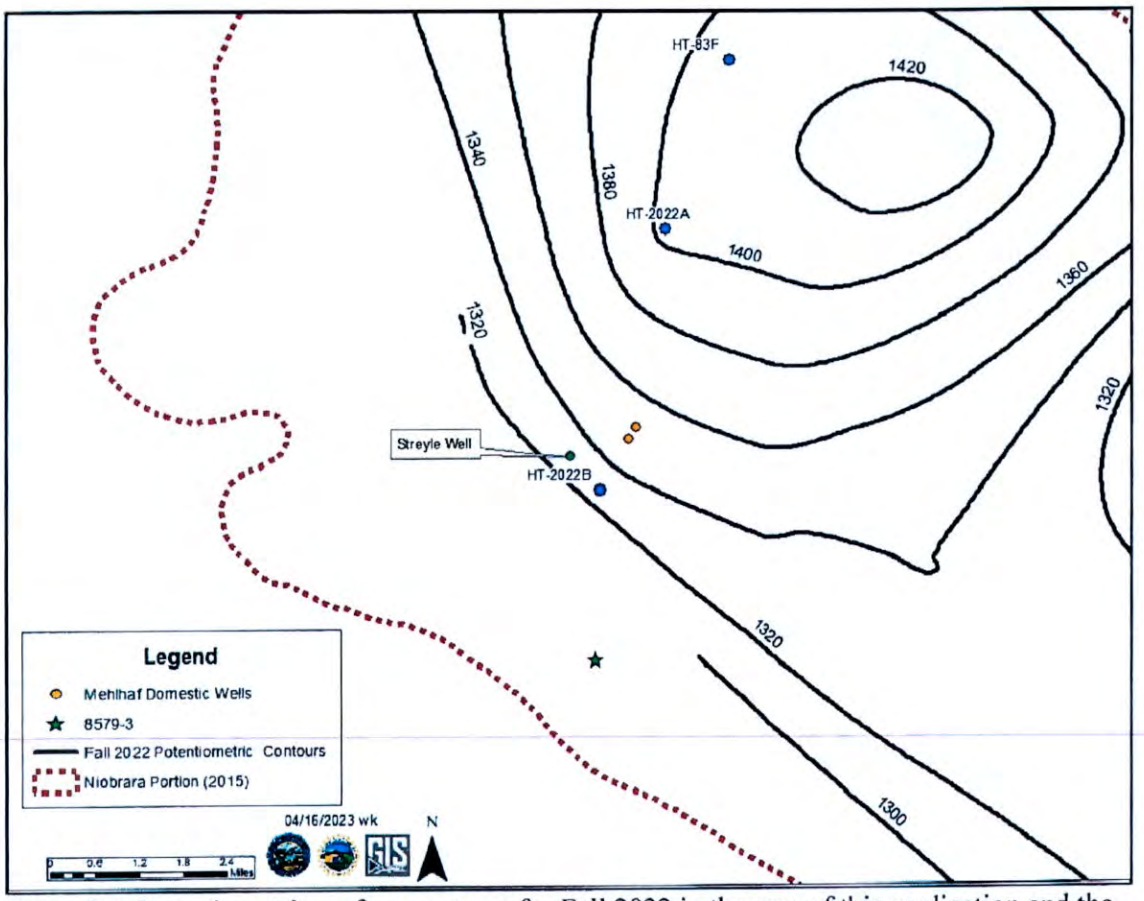

Figure B2: Potentiometric surface contours for Fall 2022 in the area of this application and the domestic wells discussed in the unlawful impairment section of this report (Water Rights, 2023a and Water Rights, 2023c). Elevation reference NAVD88.

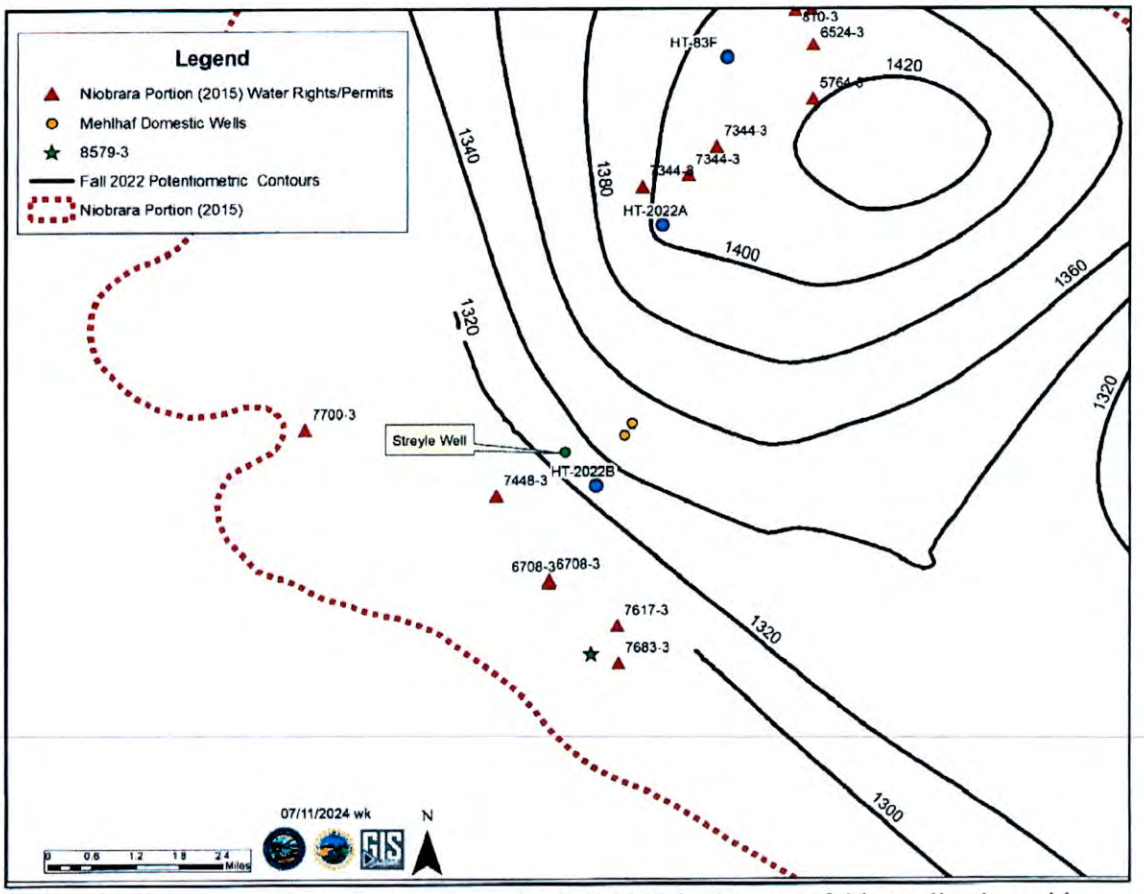

Figure B3: Potentiometric surface contours for Fall 2022 in the area of this application with area active water rights/permits from the Niobrara aquifer and the domestic wells discussed in the unlawful impairment section of this report (Water Rights, 2024a and Water Rights, 2024c). Elevation reference NAVD88.

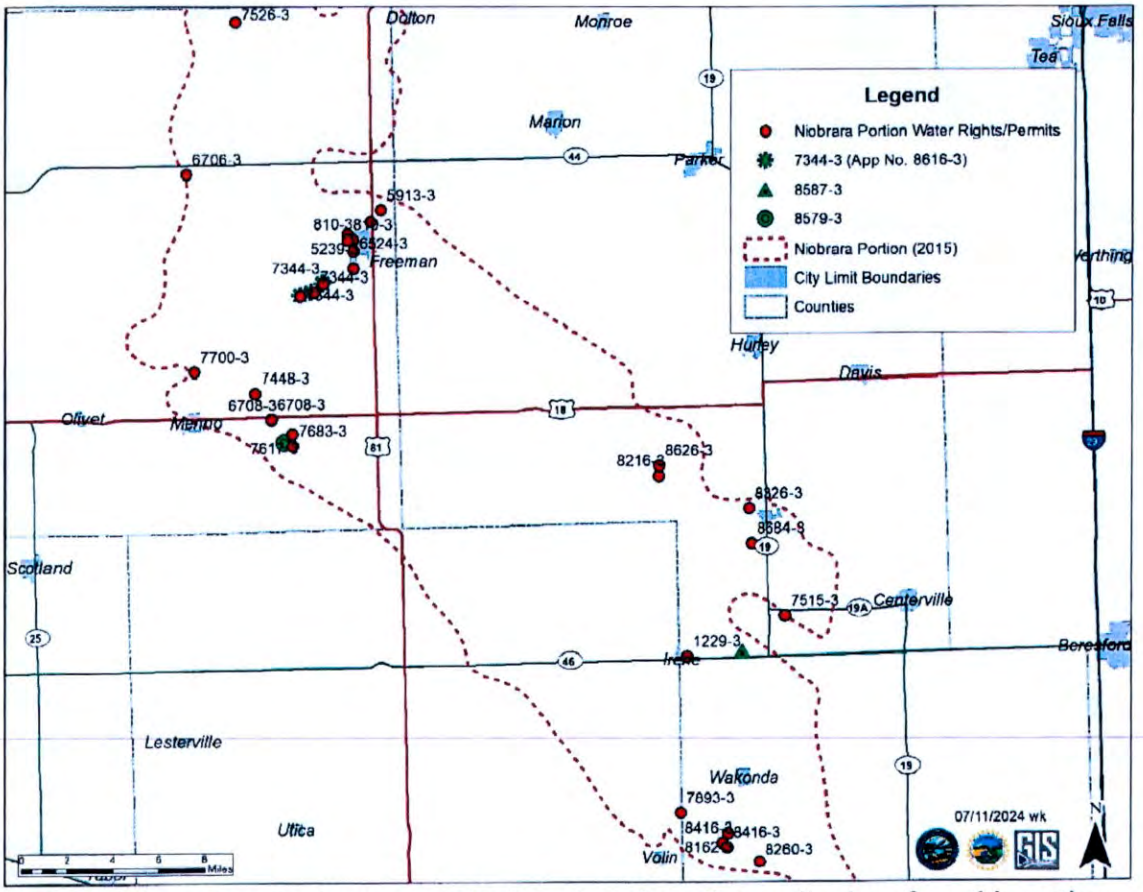

Figure B4: Location of active water rights/permits and pending applications from this portion of the Niobrara aquifer (Water Rights, 2024a and Water Rights, 2024c).

Appendix C: Estimated Transmissivity from Specific Capacity

Pumping data from both domestic and appropriative wells were used to calculate specific capacity, which was then used to estimate transmissivity and hydraulic conductivity. This data is summarized in Table C1. All well completion reports on file with the Water Rights Program for this portion of the Niobrara (Water Rights, 2023a) have sufficient pumping data to calculate specific capacity. The Aqtesolv online conversion tool was then used to estimate transmissivity from specific capacity (Aqtesolv, 2023). Aquifer thickness and/or screened interval was then used to calculate hydraulic conductivity from transmissivity. Typical values for hydraulic conductivity for different geologic materials in shown in Figure C1.

Tomhave and Schulz (2004) define the Niobrara Formation as "White to dark-gray argillaceous chalk, marl, and shale. Weathers yellow to orange. Contains thin, laterally continuous bentonite beds, chalky carbonaceous shale, minor sand, and small concretions." Chalk is a carbonate rock and the well completion reports, along with other available information suggest that this portion of the Niobrara aquifer is much more fractured than cavernous (Water Rights, 2023a). Therefore, values for hydraulic conductivity would be expected to be on the lower end of the range for carbonate rocks (0.001 to 10 ft/d), especially since the Niobrara Formation can contain shale which has an even lower range for hydraulic conductivity. In looking at Table C1, the middle well for No. 7526-3 appeared to have a non-typical amount of sand in the screened interval compared to other wells in this portion of the Niobrara aquifer, based on all of this information, the transmissivity estimate for the middle well for No. 7526-3 and the other higher value transmissivity estimates were categorized as outliers and not included in the calculation of average transmissivity values for this portion of the Niobrara aquifer.

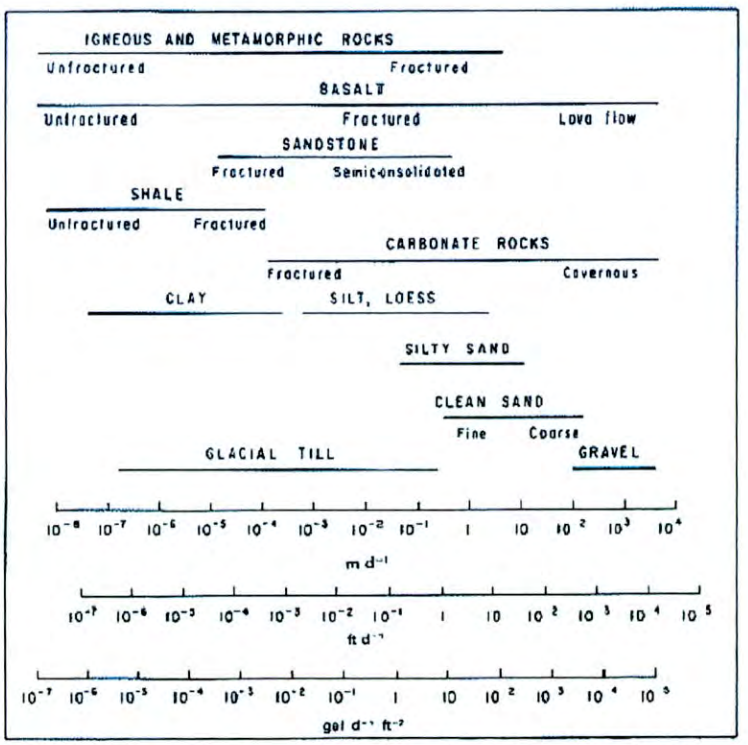

Figure C1: Typical values for hydraulic conductivity for different geologic material (Aqtesolv, 2019)

Table C1: Table of Estimate Transmissivity and Hydraulic Conductivity (Aqtesolv, 2023; Water Rights, 2023a)

Well*	Construction Year	Specific Capacity (gpm/ft drawdown)	Transmissivity (square ft per day)	Hydraulic Conductivity (ft/d)	Comment
Section 1: Wells within 1 mile of B-B'					
D. Melhalf	2012	0.22	59.42	0.97	
Mehlhaf	2013	0.43	114.59	2.34	
Streyle	2016	2.50	668.45	11.14	
Melhaf	2019	0.50	133.69	6.68	
Streyle	2012	0.94	250.67	5.97	
T. Melhalf	2012	2.14	572.96	18.48	
Section 1 Average		1.12	299.96	7.60	
Section 2: Other well data					
Taylor	1994	0.05	13.83	0.13	
Kramer	1981	0.08	21.39	0.31	
Berberich	1991	0.15	40.11	0.50	
Pekron	2010	0.11	28.14	0.55	
Waltner	2002	0.09	22.92	0.62	
Swenson	2009	0.09	24.95	0.71	
Graber-well 2	2018	0.18	48.91	0.80	
Ryken	2009	0.18	48.61	0.81	
6706-3	2005	0.30	81.41	0.93	
Hofer	1983	0.11	28.15	0.94	
Houser	2022	0.14	38.20	0.95	
Hofer	1986	0.24	64.54	1.09	
Langeland	2013	0.28	73.59	1.34	
Boars	2019	0.31	81.85	1.44	
Aman	2014	0.33	87.51	1.51	
Graber-well 1	2018	0.37	97.82	1.60	
stahl	2017	0.29	77.13	1.84	
Gross	1981	0.23	60.16	2.15	
Eisenbeis	2008	0.50	133.69	2.30	
Hanson	1993	0.40	106.95	2.43	
Plate	2015	0.56	148.54	2.97	
Olsen	2021	0.35	92.84	3.09	
Highland 2	2015	0.70	188.16	3.14	
7654-3	2013	0.71	190.99	3.18	
T. Nelson	2021	0.50	133.69	3.34	
Koerner	1980	0.50	133.69	3.61	
6524-3	2005	0.90	240.64	3.82	
Highland 1	2015	0.50	133.69	4.46	
Deckert	2002	0.60	160.43	4.58	
Madsen	1999	1.03	276.60	4.69	
8626-3	2017	2.62	699.74	5.00	
Zimmarmen	1991	0.80	213.90	5.35	
8162-3 North	2014	1.54	410.16	5.47	
7344-3 well 2	2012	3.16	844.34	5.59	
Hofer	1982	1.00	267.38	6.08	
5764-3	1992	2.50	668.45	6.68	
Kleinsasser	1987	0.55	147.06	9.19	
Schultz	2008	0.78	208.89	9.95	
5239-3	1988	2.17	581.28	10.57	
Bradley	2018	4.29	1145.91	11.94	
Gross	1982	1.00	267.38	12.15	
7526-3 north	2013	4.59	1227.76	12.28	
Vandewalle	2022	2.14	572.95	15.49	
Booth	2013	3.60	962.57	16.04	
7893-3	2013	2.50	668.45	16.71	
Rang	1982	1.00	267.38	16.71	
8067-3 well2	2015	6.98	1399.06	17.94	
Glanzer	2015	3.75	1002.67	18.92	
L. Hofer	1984	1.88	501.34	20.05	
7344-3 well 1	2012	7.69	2056.68	21.65	
Waltner	2013	5.00	1336.90	22.28	
H. Waltner	1988	3.75	1002.67	22.79	
8067-3 well 1	2015	5.45	1458.42	24.31	
7617-3	2013	13.27	3546.87	24.46	
8162-3 south	2012	7.14	1909.85	27.28	
Schrag	2013	1.06	283.11	28.31	
T. Waltner	1988	2.25	601.60	28.65	
Fliginger	1986	2.00	534.76	35.65	
8260-3	2016	11.17	2986.69	37.81	
Olsen	2018	3.00	802.14	40.11	
Stone	2015	3.00	802.14	40.11	
Waltner	1998	4.50	1203.21	57.30	"well fractured chalk"
Perterson-north	2007	4.50	1203.21	60.16	siltstone
Perterson-south	2007	4.50	1203.21	63.33	siltstone
Massey	2018	11.54	3085.15	81.19	
W. Waltner	1984	2.14	572.96	95.49	
Section 2 Average		2.27	598.87	15.04	
Section 1 & 2 Average		2.17	573.96	14.42	
Section 3: Outlier well data based on hydraulic conductivity and other information					
7526-3 middle	2014	41.67	11140.78	139.26	sand in screened interval
7683-3	2013	81.25	21724.60	192.25	
Wirth	2014	25.00	6684.49	222.82	

*Well name based on either permit number or last name on well completion report (no attempt was made to verify spellings)

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

August 21, 2024

NOTICE OF HEARING

TO: Brett Guthmiller
28680 435th Avenue
Menno SD 57045

FROM: Ron Duvall, Natural Resources Engineer
SD DANR, Water Rights Program

SUBJECT: Scheduling of Hearing on Deferred Water Permit Application No. 8579-3, Brett Guthmiller

On May 4, 2022, the Water Management Board (Board) deferred Water Permit Application No. 8579-3 for up to two years to determine whether existing high-capacity irrigation wells were unlawfully impairing adequate domestic wells. Since two years have passed, this application is being rescheduled for consideration by the Board. Enclosed is an updated staff report and revised Chief Engineer's recommendation, both dated August 20, 2024.

The Chief Engineer's revised recommendation is that the Board approve Application No. 8579-3. If you intend to oppose the recommendation that the Board approve the application, please file a petition opposing the recommendation by September 3, 2024. A petition form is enclosed for your use if you intend to oppose the recommendation. If you support the recommendation, no petition needs to be filed.

The Water Management Board will conduct the hearing to reconsider deferred Water Permit Application No. 8579-3 at 10:00 AM (Central Time), on Wednesday, October 2, 2024, at the Floyd Matthew Training Center, Joe Foss Building, 523 E. Capitol Avenue, Pierre SD. The time is an estimate and may be delayed due to prior items on the agenda.

Pursuant to SDCL 46-2-9, 46-2-11, and 46-2A-23, the Board has legal authority and jurisdiction to conduct this hearing. Applicable provisions of the public notice published in the Freeman Courier and the Yankton Daily Press & Dakotan on March 31, 2022, still apply.

Questions regarding the hearing process may be directed to Amanda Dewell or Ron Duvall, Water Rights Program at (605) 773-3352 or amanda.dewell@state.sd.us or ron.duvall@state.sd.us.

CERTIFICATION

The undersigned hereby certifies under the penalty of perjury that a true and correct copy of a Notice of Hearing dated August 21, 2024, regarding Water Permit Application No. 8579-3 – Brett Guthmiller, an updated report and revised recommendation both dated August 20, 2024, and an applicant's petition form was served upon the following by enclosing the same in an envelope with first class postage prepaid, and depositing said envelope in the United States mail on August 21, 2024.

Brett Guthmiller
28680 435th Avenue
Menno SD 57045

Above Sent Inter-office to:

Jennifer Verleger, Assistant Attorney General
1302 East Highway 14, Suite 1
Pierre SD 57501-8501

Shannon Konst
Water Rights Program, DANR

STATE OF SOUTH DAKOTA)
) SS
COUNTY OF HUGHES)

Sworn to, before me, this 21st day of August, 2024.

Rachel Rodriguez
Notary Public
My Commission expires May 16, 2029

DEPARTMENT of AGRICULTURE and NATURAL RESOURCES
JOE FOSS BUILDING
523 E. CAPITOL AVE
PIERRE SD 57501-3182
danr.sd.gov

REVISED RECOMMENDATION OF CHIEF ENGINEER FOR WATER PERMIT APPLICATION NO. 8616-3, Michael Schultz

Pursuant to SDCL 46-2A-2, the following is the revised recommendation of the Chief Engineer, Water Rights Program, Department of Agriculture and Natural Resources concerning Water Permit Application No. 8616-3, Michael Schultz, 43721 281st Street, Freeman SD 57029.

Based on impacts to adequate domestic wells being mitigated by the domestic well owners connecting to rural water and installation of observation wells, the Chief Engineer is recommending APPROVAL of Application No. 8616-3 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 wells approved under Water Permit Nos. 7344-3 and 8616-3 are located near domestic wells and other wells which may obtain water from the same aquifer. Water withdrawals must be controlled so there is not a reduction of needed water supplies in adequate domestic wells or in adequate wells having prior water rights.

2. This Permit is approved subject to the irrigation water use questionnaire being submitted each year.

See report on application for additional information.

Eric Gronlund

Eric Gronlund, Chief Engineer
August 14, 2024

NOTE: This Permit is in an area with a history of adequate domestic wells being impaired by pumping of high-capacity wells. Enforcement of Qualification No. 1 may result in a shutoff order being issued to prevent impairment of adequate domestic wells or prior rights with adequate wells.

Report to the Chief Engineer
Water Permit Application 8616-3
Michael Schultz
August 20, 2024

Water Permit Application No. 8616-3 proposes the irrigation of an additional 21 acres with no additional diversion rate from the wells authorized by Water Permit No. 7344-3. Water Permit No. 7344-3 appropriates 5.33 cubic feet per second (cfs) from three wells completed into the Niobrara Aquifer (163, 180, and 209 feet deep) located near the center of the SE ¼ Section 8; NE ¼ SW ¼, SE ¼ NE ¼ Section 9; all in T98N-R56W for the irrigation 399 acres. A storage pond/reservoir is in the W ½ SE ¼ Section 9-T98N-R56W. An investigation of the permit found the systems capable of diverting 2.56 cfs from the existing wells and irrigating an additional 21 acres. The irrigated acreage, including the 21 additional acres for this application, is in the SE ¼, S ½ NE ¼ Section 8; SW ¼, S ½ NW ¼, NE ¼, N ½ SE ¼ Section 9; all in T98N-R56W. Water can be pumped from the three wells to the storage pond and then applied to the acreage. Combined this application, if approved, and Water Permit No. 7344-3 will authorize a total diversion rate of 2.56 cfs for irrigation of 420 acres. This site is located in Hutchinson County approximately two miles southwest of Freeman, SD.

This application is the result of a licensing inspection that found additional acres beyond what was previously permitted for irrigation. This application was initially received March 23, 2022. The application was then placed in abeyance on May 9, 2022, after the Chief Engineer issued a recommendation for deferral due to this portion of the Niobrara aquifer being evaluated for unlawful impairment of two adequate domestic wells. On January 10th, 2023, the Water Rights Program was notified that water supplied from the impacted adequate domestic wells in question had been replaced with connections to a rural water system. Therefore, this application is being brought out of abeyance for evaluation.

There are several applications related to this portion of the Niobrara aquifer, which are summarized in Table 1 with locations shown in Figure 1. The test holes for Application No. 8587-3 suggested that the target aquifer is a sand and gravel deposit that overlies this portion of the Niobrara aquifer, and the application was held for further investigation. In June 2024, the target aquifer for Application No. 8587-3 was updated to this portion of the Niobrara aquifer.

Table 1. Applications Related to this Portion of the Niobrara Aquifer (Water Rights, 2024b)

Application Number	Diversion Rate (cfs)	Acres	Purpose	Priority Date	Status
8579-3	0.89	32	irrigation	01/10/2022	deferred by Board-unlawful impairment review
8587-3	1.78	134	irrigation	01/25/2022	2022-deferral recommendation-for aquifer determination June 2024-test hole received for Niobrara aquifer
8616-3	no additional	21	irrigation	03/23/2022	abeyance-deferral recommendation due to 8579-3, adding additional acres to Water Permit No. 7344-3

Aquifer: Niobrara aquifer

Hydrogeology

Aquifer Information

Geology and Basic Hydrogeology

The Niobrara Formation is a bedrock formation that underlies most of eastern and western South Dakota (Hedges et al, 1982; Allen et al, 1985). The Niobrara Formation is a Late Cretaceous age white to dark grey argillaceous (clay containing) chalk, marl, and shale that can contain thin bentonite beds, minor sand, and chalky carbonaceous shale (Tomhave, and Schulz. 2004). Locally, the Niobrara Formation is also known as "chalk rock" and is extensive throughout South Dakota; however, characteristics of the Niobrara aquifer vary greatly across the state (Hedges et al., 1982).

The Niobrara aquifer is contained within portions of the Niobrara Formation where sufficient permeability exists to allow for the transmission of groundwater and where the permeable portions of the formation are sufficiently saturated to yield quantities of groundwater to wells. Both Hedges et al. (1982) and Stephens (1967) identified factures and solution cavities as the main means of water movement through the Niobrara aquifer. Hedges et al. (1982) noted these features are partially controlled by flexures and faults. Where these secondary porosity features are absent, the Niobrara Formation is generally a low-permeability or almost a no-permeability formation that transmits little to no water (Hedges et al., 1982; Stephens, 1967). Weathering and glacial activity may also contribute to higher productive zones in the Niobrara aquifer (Hedges et al., 1982), with greater amounts of weathering and glacial activity generally having occurred where the Niobrara Formation is exposed at ground surface or directly overlain by glacial deposits and generally less where the Niobrara Formation is overlain be the Pierre Shale.

In southeastern South Dakota, there are several areas where portions of the Niobrara Formation were isolated from the main body of the Niobrara through erosional forces (Tomhave and Schulz, 2004). The well sites are located within the extent of one of these isolated portions of the Niobrara Formation. The initial mapping of this extent of this portion of the Niobrara Formation was done by Tomhave and Schulz (2004) and is shown in Figure 1. Holmes and Filipovic (2015) as part of a study of the Upper Vermillion aquifer updated a section of the eastern boundary of this portion of the Niobrara aquifer shown in Figure 2. This portion of the Niobrara Formation underlies approximately 338,130 acres (Figure 2 extent-Niobrara Portion (2015)) of portions of Hutchinson, Clay, Turner, Yankton, and McCook Counties. In general, this portion of the Niobrara generally directly underlies either the Pierre Shale (shown in Figure 1) or glacial deposits (in areas not underlying the Pierre Shale) and overlies the Carlile Shale (Tomhave and Schulz, 2004). Well completion reports on file with the Water Rights Program report encountering water throughout this portion of the Niobrara Formation indicating aquifer potential throughout this portion of the formation (Water Rights, 2023a; 2023b; 2023c). Since this portion of the Niobrara aquifer is isolated from the main body, the remainder of this report will focus solely on this portion of the Niobrara aquifer.

The three wells for this application are existing wells 163, 180, and 209 feet deep completed into the Niobrara aquifer (Water Rights, 2023b). The Niobrara aquifer is under confined conditions at the well locations for this application (Water Rights, 2022a).

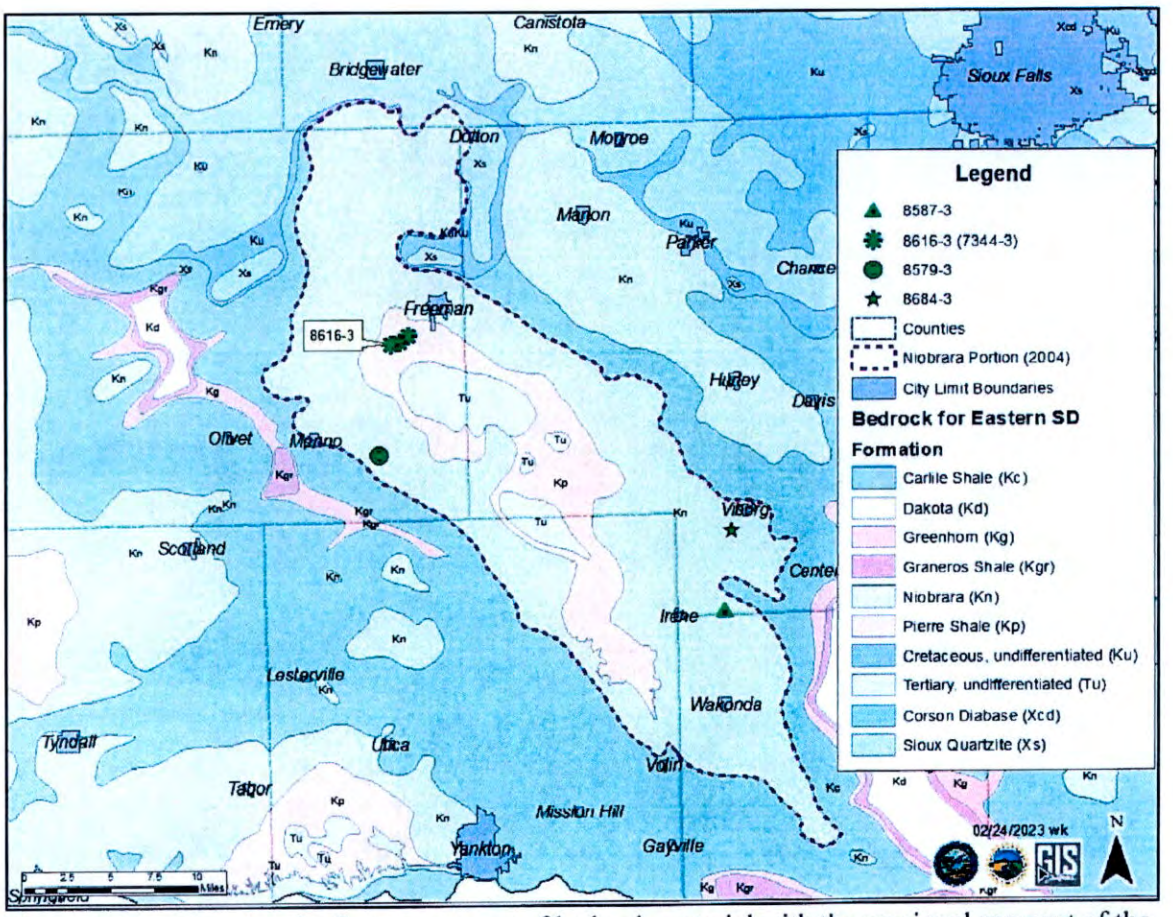

Figure 1: Map showing the first occurrence of bedrock material with the erosional remnant of the Niobrara Formation this application proposes to use (modified from Tomhave and Schulz, 2004)

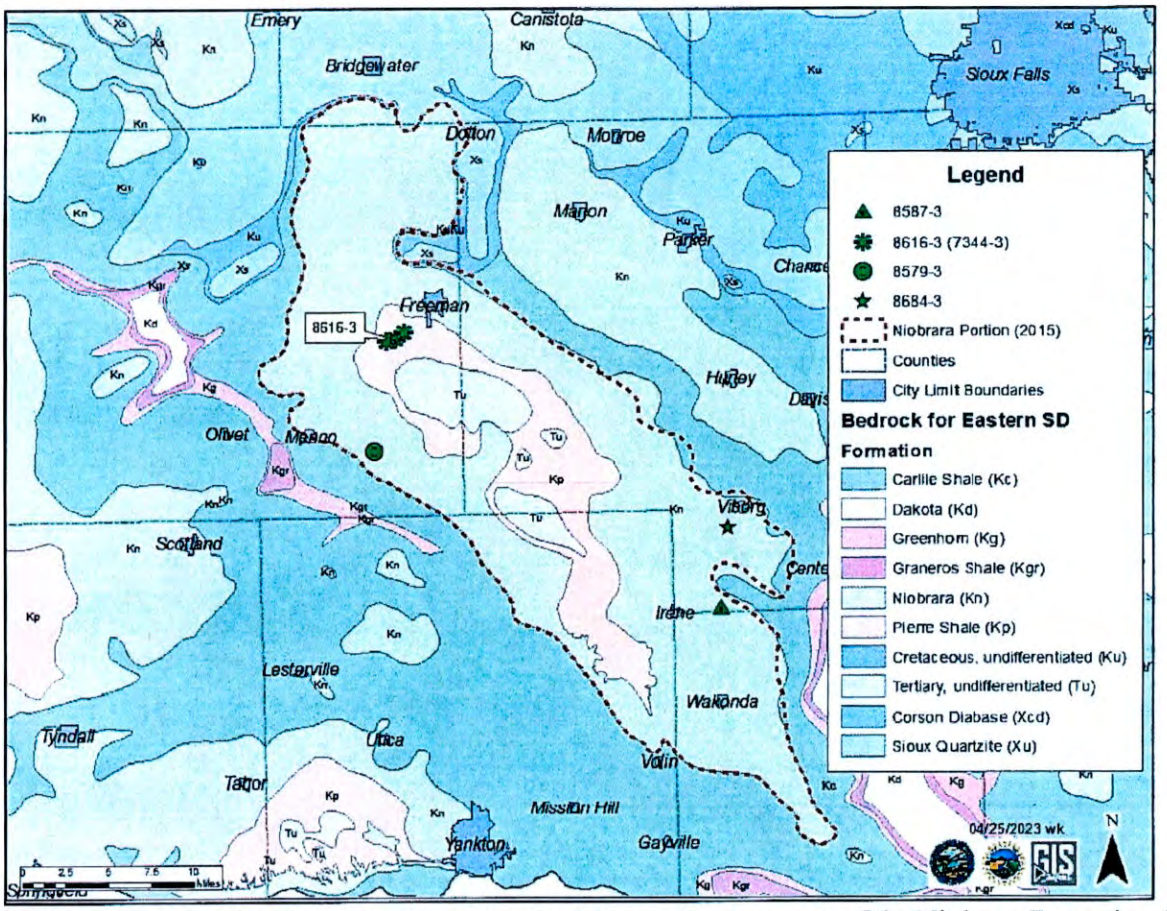

Figure 2: Map showing the approximate extent of the erosional remnant of the Niobrara Formation this application proposes to use and the 2004 first occurrence of bedrock material (modified from Tomhave and Schulz, 2004 and Holmes and Filipovic, 2015)

Potentiometric Surface Mapping

A potentiometric surface map is a spatial mapping of groundwater levels in an aquifer at a given period of time, which can yield several insights into aquifer behavior. Potentiometric surface maps are created by plotting elevations of the static water level and then generating contours or lines of equal elevation. Initial potentiometric surface mapping was of part of this portion of the Niobrara aquifer was done by Lindgren and Hansen (1990) shown in Figure 3. Mathiowetz (2016) also examined the potentiometric surface for May 2016 as shown in Figure 4. Further potentiometric surface mapping was generated for this portion of the Niobrara aquifer for May 2013 (Figure 5), May 2018 (Appendix B), and May 2022 (Figure 6). Information on inputs to generate these maps is summarized in Table 2. Some of the differences between the potentiometric surface maps is due to the differences in locations of water level measurements used to generate the contours.

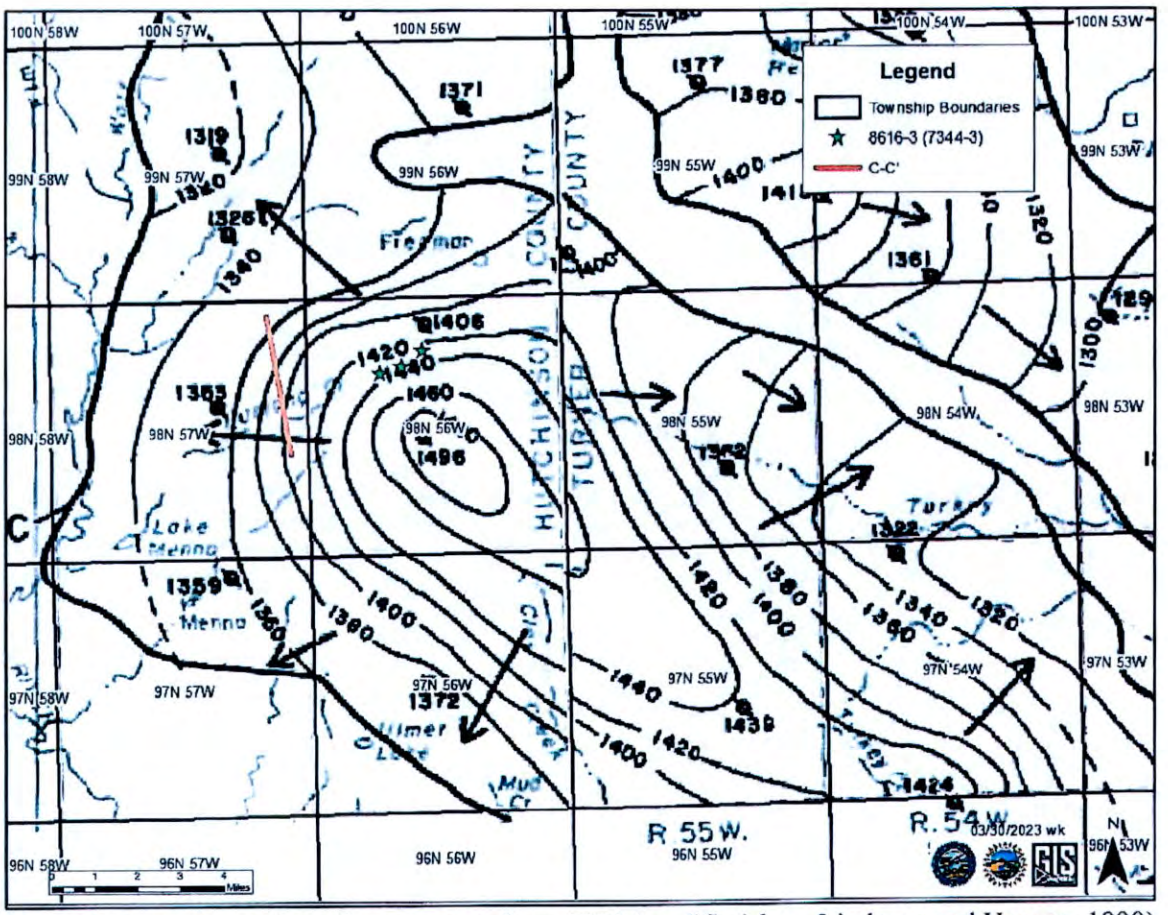

Figure 3: Potentiometric surface contours from 1986 (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

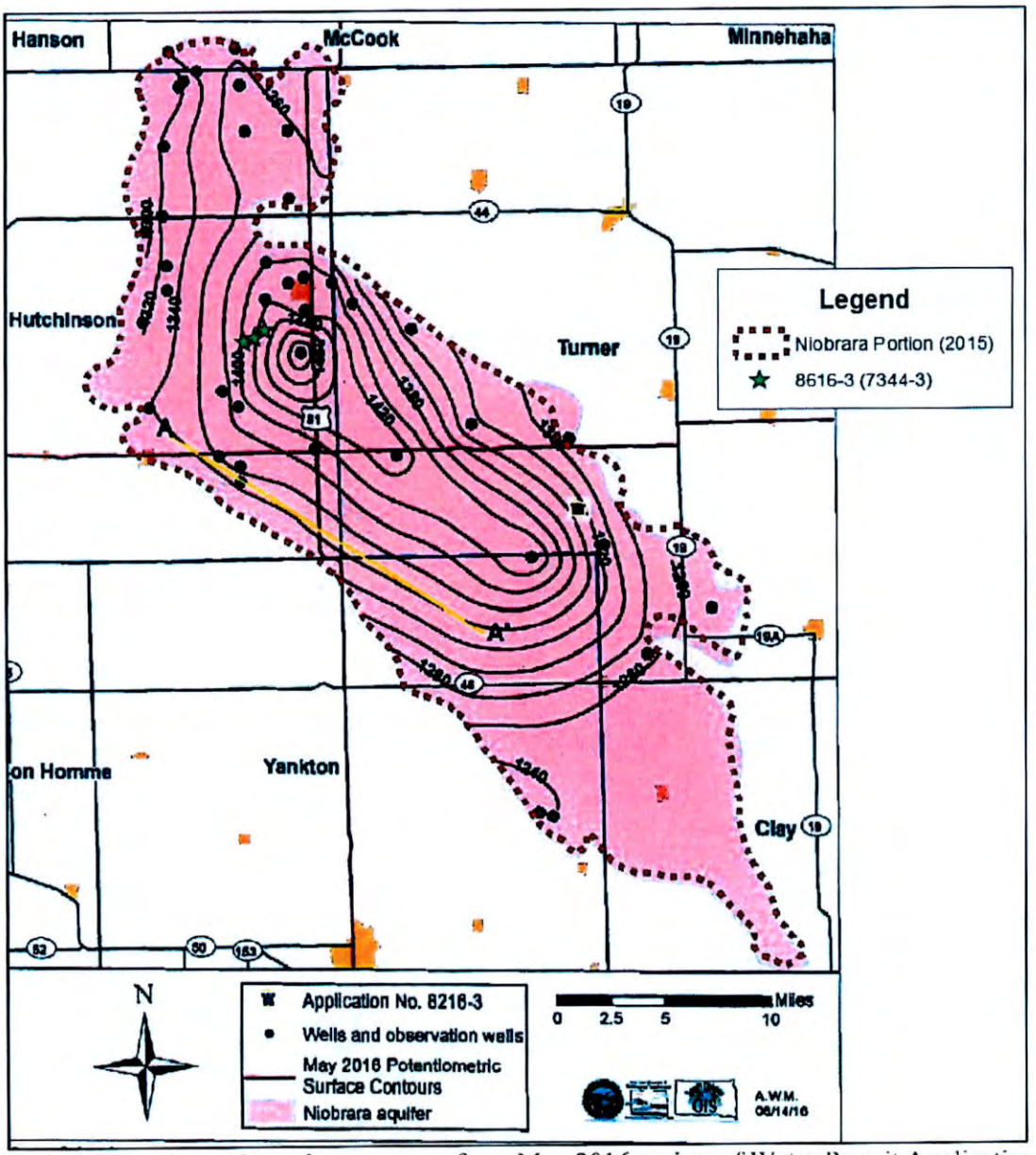

Figure 4: Potentiometric surface contours from May 2016 review of Water Permit Application No. 8216-3 (Mathiowetz, 2016). Elevation reference NGVD29.

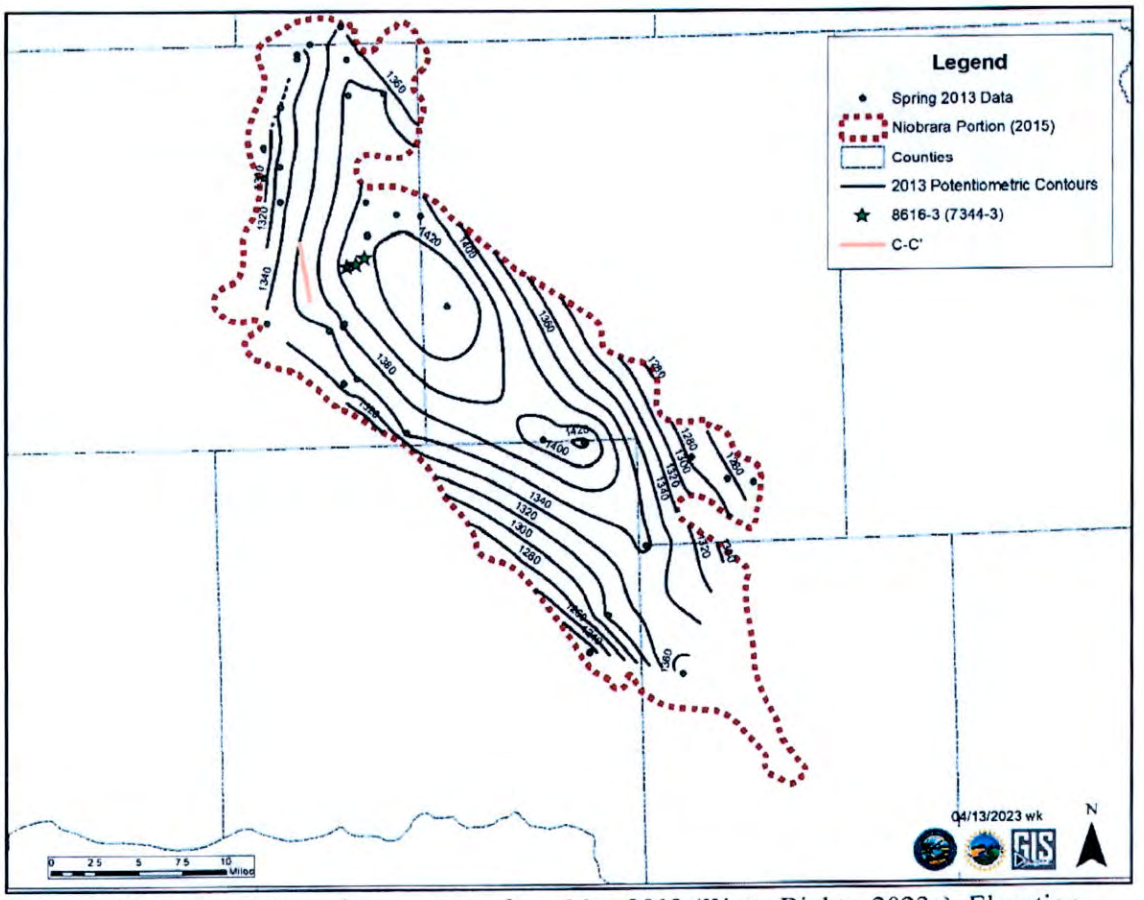

Figure 5: Potentiometric surface contours from May 2013 (Water Rights, 2023a). Elevation reference NAVD88.

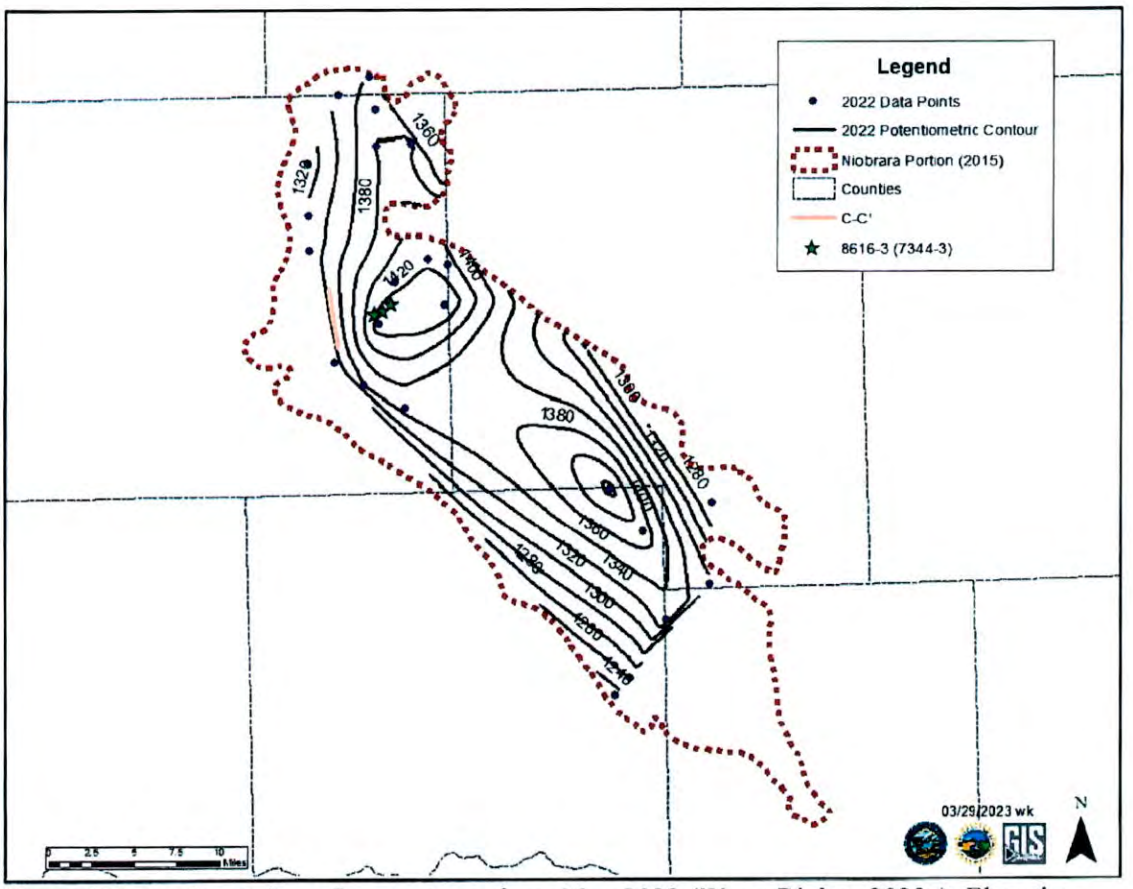

Figure 6: Potentiometric surface contours from May 2022 (Water Rights, 2023a). Elevation reference NAVD88.

Table 2: Summary of Potentiometric Surface Mapping			
Time Period	**Figure**	**Data Points**	**Sources**
November 1986	Figure 3	16	Lindgren and Hansen (1990)
May 2016	Figure 4	41	Mathiowetz (2016)
May 2013	Figure 5	34	Water Rights, 2023a and 2023c
May 2018	Appendix B	17	Water Rights, 2023a and 2023c
May 2022	Figure 6	23	Water Rights, 2023a and 2023c

The springtime period is typically chosen by the Water Rights Program for potentiometric surface mapping to map conditions as close to natural as possible. Natural groundwater flow goes from areas of recharge to areas of discharge. In Figures 3-6, the general direction of groundwater movement is from the central area of this portion of the Niobrara aquifer to the edges. This indicates two things this portion of the Niobrara aquifer is likely discharging to aquifers located within the bedrock valleys surrounding this portion of the Niobrara aquifer and second, there is likely a higher rate of recharge near the edges of the overlying Pierre Shale.

In the northern part of this portion of the Niobrara aquifer, the most likely possibility for a recharge source to the Niobrara aquifer is the Turkey Ridge aquifer (Lindgren and Hansen, 1990 and Kilts, 2023a). The Turkey Ridge aquifer is made up of Tertiary undifferentiated sands overlaying portions of the Pierre Shale overlaying the central portion of the aquifer (Kilts, 2023a). Near the peripheries of the Turkey Ridge aquifer there are areas where the aquifer is in direct contact with the Niobrara aquifer or separated from the Niobrara aquifer by a relatively thin layer of weathered Pierre Shale (Kilts, 2023a; SDGS, 2023; and Water Rights, 2024a). Additionally, water level comparisons by Kilts (2023a) support the Turkey Ridge aquifer as a potential source of recharge to this portion of the Niobrara aquifer, since water level elevations in the Turkey Ridge aquifer are higher than in the Niobrara aquifer. Further sources of recharge to this portion of the Niobrara aquifer are likely infiltration of precipitation through overlaying glacial deposits, especially where those deposits have a higher amount of more transmissive materials like sands and gravels (Lindgren and Hansen, 1990).

This portion of the Niobrara aquifer is surrounded by valleys in the bedrock where the Niobrara Formation has been eroded, which contain glacial outwash aquifers. Where these glacial outwash aquifers are in contact with this portion of the Niobrara (either overlaying or are adjacent to), there is potential for leakage between the aquifers based on hydraulic head. The Lower James Missouri aquifer lies in the bedrock valley to the west of this portion of the Niobrara and in some locations extends far enough east to be in contact with this portion of the Niobrara (Tomhave and Schulz, 2004; Hedges et al., 1982) as shown in Figure 7. To further illustrate the nature of this connection, select cross sections from Lindgren and Hansen (1990) are provided in Appendix A. Although these cross sections would likely have slight changes if updated to reflect additional drilling since Lindgren and Hansen (1990), they still illustrate the general nature of the connection. The Upper Vermillion Missouri aquifer lies in the bedrock valley to the east of this portion of the Niobrara aquifer and can also be hydrologically connected (Lindgren and Hansen, 1990). Stephens (1967) indicated the presence of a glacial outwash aquifer (named the Wakonda aquifer) directly overlaying and with a strong hydrologic connection to this portion of the Niobrara in portions of Clay County. However, the first occurrence of aquifer materials mapping by Jensen (2000) indicates that the Wakonda aquifer is unlikely to be as extensive as was mapped by Hedges et al. (1982). Lindgren and Hansen (1990) also indicate seepage into Wolf Creek in the very north part of the aquifer is possible.

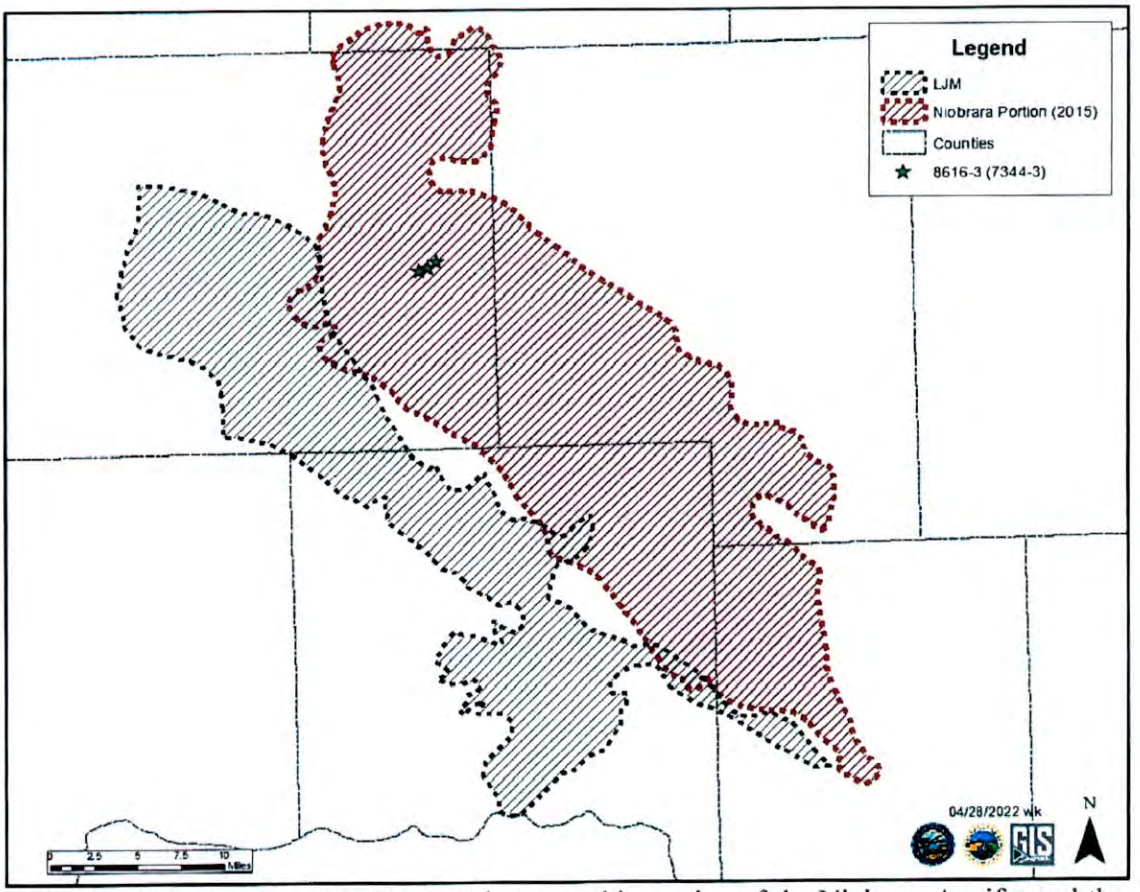

Figure 7: Approximate areas of contact between this portion of the Niobrara Aquifer and the Lower James Missouri aquifer (modified from Hedges et al., 1982; Tomhave and Schulz, 2004 and Holmes and Filipovic, 2015)

Natural Discharge

The natural discharge from this portion of the Niobrara aquifer can be estimated using information from potentiometric surface mapping in addition to other data. The flow rate for natural discharge is estimated using equation 1.

Equation 1: $Q = T * I * L * c$

Where:

Q=flow rate, units: acre-feet per year

T= Transmissivity (hydraulic conductivity times aquifer thickness), units: gallons per day per foot (gpd/ft)

I=Gradient of the Potentiometric surface, units: feet per mile (ft/mi)

L=Length of aquifer contact, units: miles

c=conversion factor equal to 365 days per year divided by 325,851.429 gallons per acre-feet=0.00112

The green C-C' line in Figures 3-6 is 3.2 miles long. It is the approximate length of the Niobrara aquifer and Lower James Missouri aquifer connection downgradient of the proposed wellsite for this application. Due to limited data availability along the edge of the aquifer, for analysis the discharge line had to be shifted slightly upgradient of the actual area of connection between the two aquifers. This length, 3.2 miles, is used for "L" in equation 1. Pumping data from both domestic and appropriative wells were used to calculate specific capacity, which was then used to estimate transmissivity and hydraulic conductivity. This information is summarized in Table C1 of Appendix C. Table C1 is split into three section data within one mile of the B-B' line (Section 1), data from the rest of the aquifer (Section 2), and outlier data. The calculation of hydraulic conductivity was used as a check of calculated transmissivity values, Appendix C includes further discussion of data points tagged as outliers. Appendix C estimates an average transmissivity for this portion of the Niobrara aquifer of 4,293.2 gallon per day per foot, a review of the data points used in Appendix C indicated there was not a sufficient concentration of non-outlier transmissivity data within one mile of line C-C' for the calculation of a localized transmissivity estimate. The average gradient of the potentiometric surface, I, across line C-C' for each time period is shown in Table 3. The estimated flow across C-C' for each time period is summarized in Table 3. Average estimated discharge across C-C' is 346 acre-feet per year.

Table 3: Estimated Discharge Across C-C'

Year	Gradient (ft/mi)	Transmissivity (T) (gpd/ft)	Length (mi)	Discharge (acre-feet/yr)
1986	30	4,293.2	3.2	461.60
2016	15	4,293.2	3.2	230.80
2013	15	4,293.2	3.2	230.80
2018	insufficient data coverage			n/a
2022	30	4,293.2	3.2	461.60
Average				**346**

Kilts (2024) estimated flow through the discharge area to the Lower James Missouri aquifer directly south of this discharge area (shown in Figure 8 as the green B-B' line) to be 173 acre-feet per year. Kilts (2023b) estimated discharge from this portion of the Niobrara aquifer to the Upper Vermillion Missouri: West aquifer downgradient of the well site for Water Permit No. 8684-3 to range between 685 to 890 acre-feet per year. Kilts (2023b) also noted there was likely additional natural discharge potential to the Upper Vermillion Missouri: South aquifer and other adjacent aquifers along the eastern edge of this portion of the Niobrara aquifer that have not yet been quantified.

Rather than estimate discharge to the Lower James Missouri aquifer utilizing local discharge area estimates (as done above and in Kilts (2023b and 2024)), Mathiowetz (2016) used a single line (the yellow A-A' line in Figure 4) with a total length equal to the various areas of connection between this portion of the Niobrara aquifer and the Lower James Missouri aquifer to estimate total natural discharge to the Lower James Missouri aquifer. Mathiowetz (2016) used equation 1 with a L of 17.5 miles, a I of 20 ft/mi, and a T of 25,092 gpd/ft to estimate a total natural discharge to the Lower James Missouri aquifer from this portion of the Niobrara aquifer of approximately 9,837 acre-feet per year. Mathiowetz (2016) estimated transmissivity using data

from 27 high-capacity wells (primarily for irrigation use) authorized by water rights/permits, several of the data points used by Mathiowetz (2016) were tagged as outliers in Table C1. Given that water movement in the Niobrara aquifer is dominated by secondary porosity features, the average transmissivity of Mathiowetz (2016) only represented areas of higher transmissivity within the aquifer that are capable of supporting high capacity well yields and only captured an average of the very high end of transmissivity within the aquifer. The non-outlier average transmissivity (4,293.2 gpd/ft) presented in Table C1 (which includes domestic well data) is a transmissivity that is more representative of average conditions in the aquifer then the transmissivity estimate of Mathiowetz (2016). Recalculation of the total natural discharge to the Lower James Missouri aquifer for May 2016 using the more representative value for transmissivity for this aquifer results in an estimated total natural discharge to the Lower James Missouri aquifer from this portion of the Niobrara aquifer of 1,803 acre-feet. Given that this discharge estimate uses a more representative value for transmissivity for this aquifer, 1,803 acre-feet per year is a closer estimate of the magnitude of natural discharge occurring from this aquifer to the Lower James Missouri aquifer. In looking at Table 3, Kilts (2024), and Kilts (2023b) found the localized natural discharge estimates for May 2016 are consistently at the lower end of the range for the time periods examined, so this estimate could be considered slightly conservative.

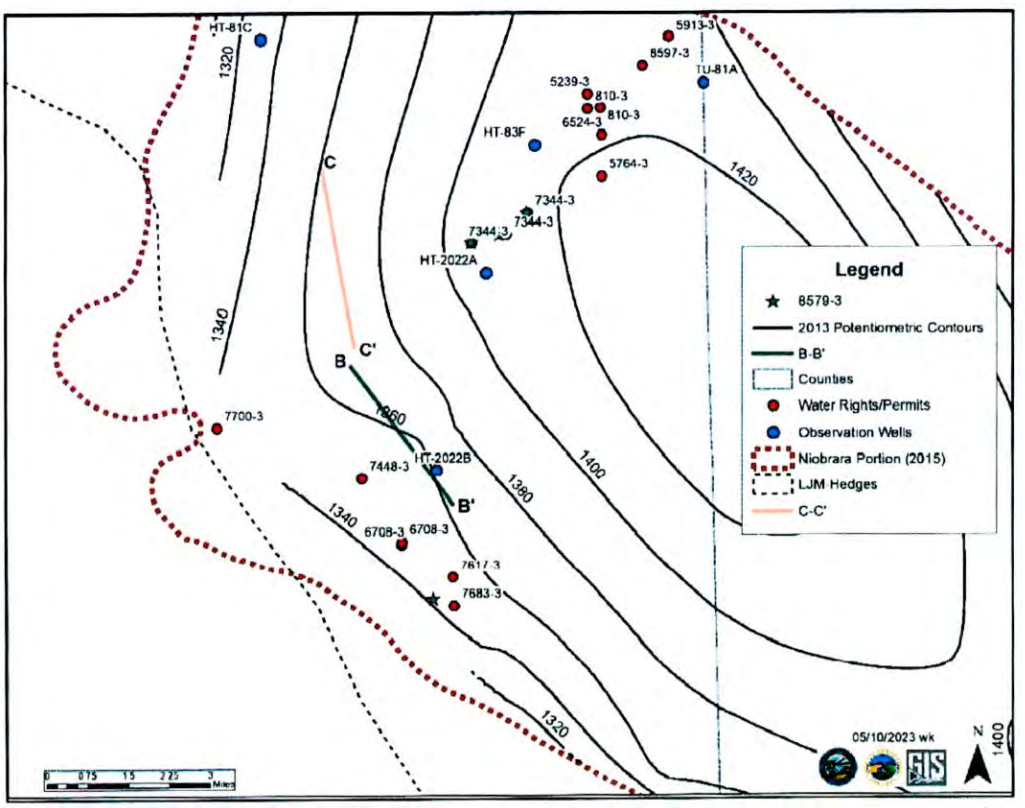

Figure 8: Location of reference lines used to estimate localized natural discharge for this application and Kilts (2024). Also shown for refence is the approximately boundary of the Lower James Missouri (LJM) aquifer (Hedges et al., 1982) and the May 2013 potentiometric surface contours.

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 there is unappropriated water available for the applicant's proposed use, that the diversion point can be developed without unlawful impairment of existing domestic water uses and water rights, and that the proposed use is a beneficial use and 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 water uses and water rights within this portion of the Niobrara aquifer.

Water Availability

Water Permit Application No. 8616-3 proposes to appropriate water from the Niobrara aquifer for irrigation use. The probability of unappropriated water being available from an 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." If the source of the water is older or lower than the Greenhorn Formation and the application is for a water distribution system defined in SDCL 46-1-6 (17), the Board need not consider the recharge/withdrawal issue. The Niobrara Formation is neither older or stratigraphically lower than the Greenhorn Formation and this application is not for a water distribution system as defined in SDCL 46-1-6 (17); therefore, the withdrawal/recharge issue must be considered.

Observation Well Data

In determining the availability of unappropriated water for a permit application, Administrative Rule 74:02:05:07 requires the Water Management Board to rely on 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 annual recharge.

The DANR Water Rights Program monitors 13 observations well completed into this portion of the Niobrara aquifer locations shown in Figure 12 (Water Rights, 2024c). Two of those observation wells (HT-2022A and HT-2022B) were installed in 2022 and have a limited period of record, so their data is of limited usefulness in evaluating long term water availability. During the winter of 2022 and early spring of 2023, a programing error in the dataloggers resulted in no data collection during that time. The hydrographs for these two wells also include both data logger data and manual readings. The nearest observation well to the well locations for this application is observation well HT-2022A located approximately 0.7 miles to the south of the well locations for this application. The next nearest observation well is HT-2022A located approximately 5.9 miles to the north of the proposed well site for this application. The hydrographs for these observation wells are shown in Figure 9.

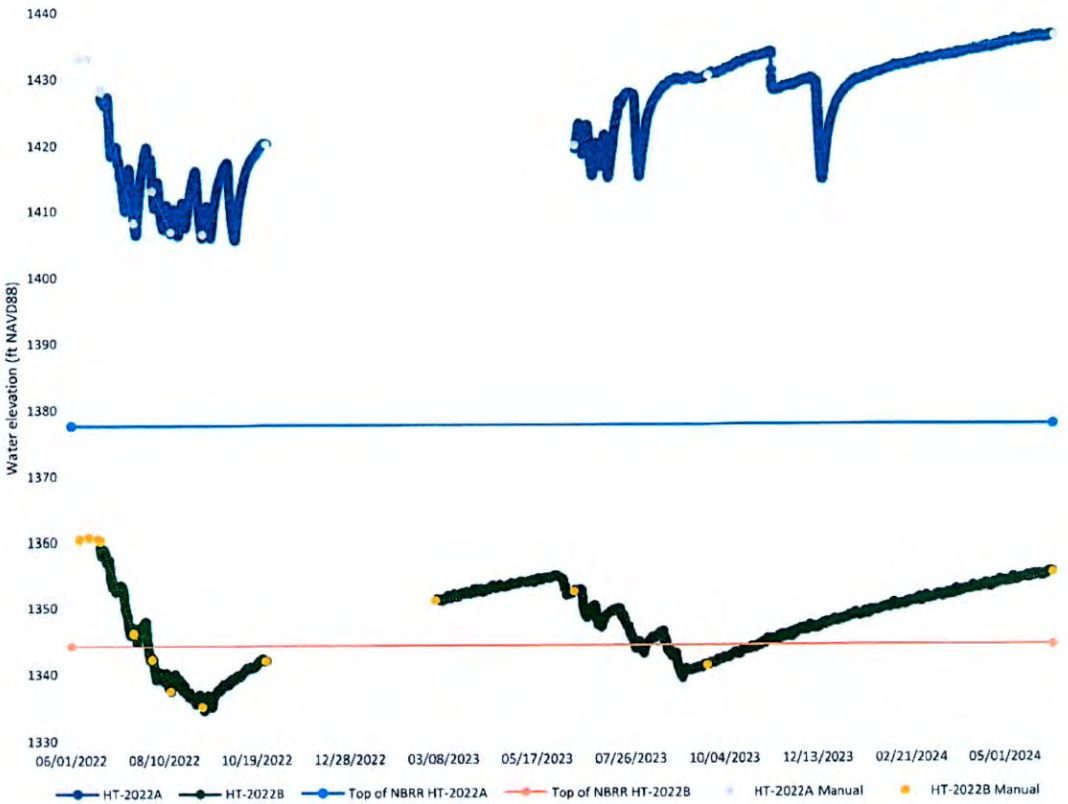

Figure 9: Hydrograph of Observation Wells HT-2022A and HT-2022B (Mathiowetz, 2024 and Water Rights, 2024c).

Of note in the hydrograph for observation well HT-2022A, is what appears to be a response in the water levels to a nearby high capacity well operating in November of 2023. In talking to the holder of the closest permit (Water Permit No. 7344-3 held by Michael Schultz), Mr. Schultz indicated he likely operated the Niobrara wells associated with Permit No. 7344-3 around that time (Schultz, 2024). The system for Permit No. 7344-3 includes a storage pond and typically irrigation is done out of the storage pond. Depending on the pond level, water is sometimes added to the storage pond outside of the irrigation season in preparation for the next season (Schultz, 2024 and Water Rights, 2024b). Mr. Schultz indicated he does not track when he runs his wells for the annual irrigation questionnaire to the Water Rights Program, just when he irrigates, but believed he ran the wells last winter to partially refill the pond (Schultz, 2024). This response is not seen in the hydrograph for HT-2022B either the pumping did not go on for a long enough period of time to reach the observation well or some hydrogeologic property of the aquifer limits the impacts of pumping of the wells for Water Permit No. 7344-3 from reaching HT-2022A.

In looking at the hydrograph for HT-2022B during both the 2022 and 2023 irrigation seasons, the water level drops below the top of the Niobrara Formation. Although the period of record is limited for HT-2022B, the hydrograph indicates that during periods of dry climatic

conditions and higher than average pumping (Table 7) water levels likely do not fully recover from the previous year's irrigation seasons prior to the start of the next irrigation season. However, the period of record is not long enough to determine if, long-term, the combination of wetter climatic periods with less irrigation and dry climatic periods with increased irrigation will result in stable, increasing, or decreasing water levels in this area of the aquifer. Also, in looking at the hydrograph for HT-2022B, response to a single pumping well cannot be distinguished from the cumulative pumping in the area.

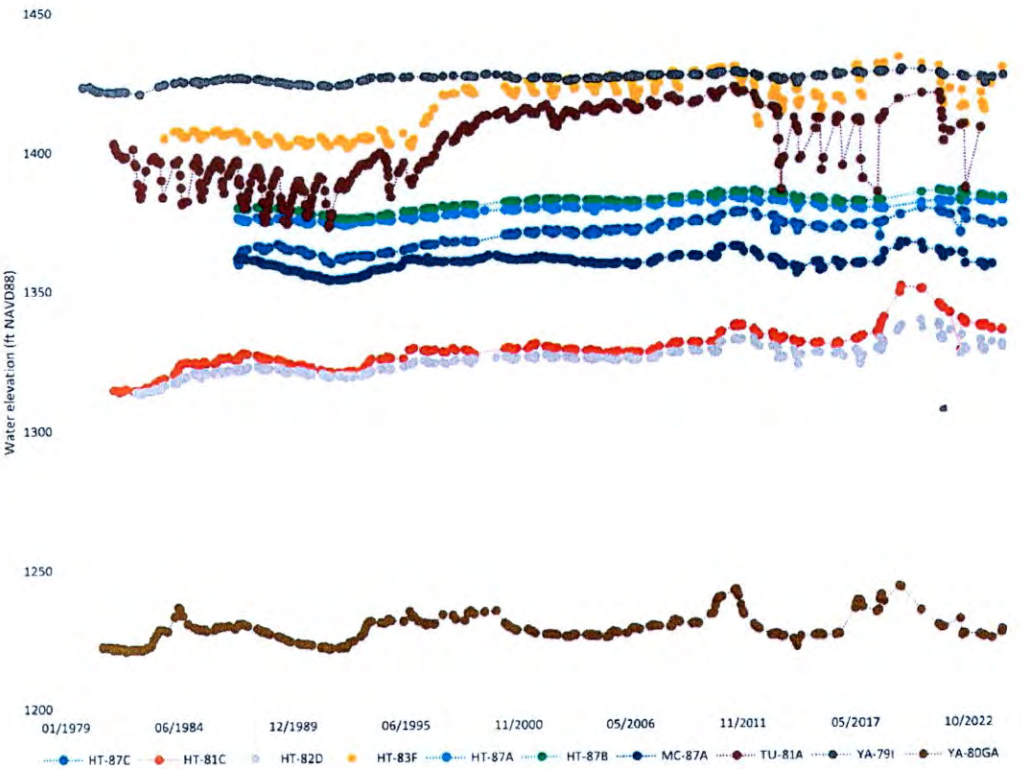

Figure 10: Hydrographs for observation wells monitoring this portion of the Niobrara aquifer with over 20 years of data (Water Rights, 2024c)

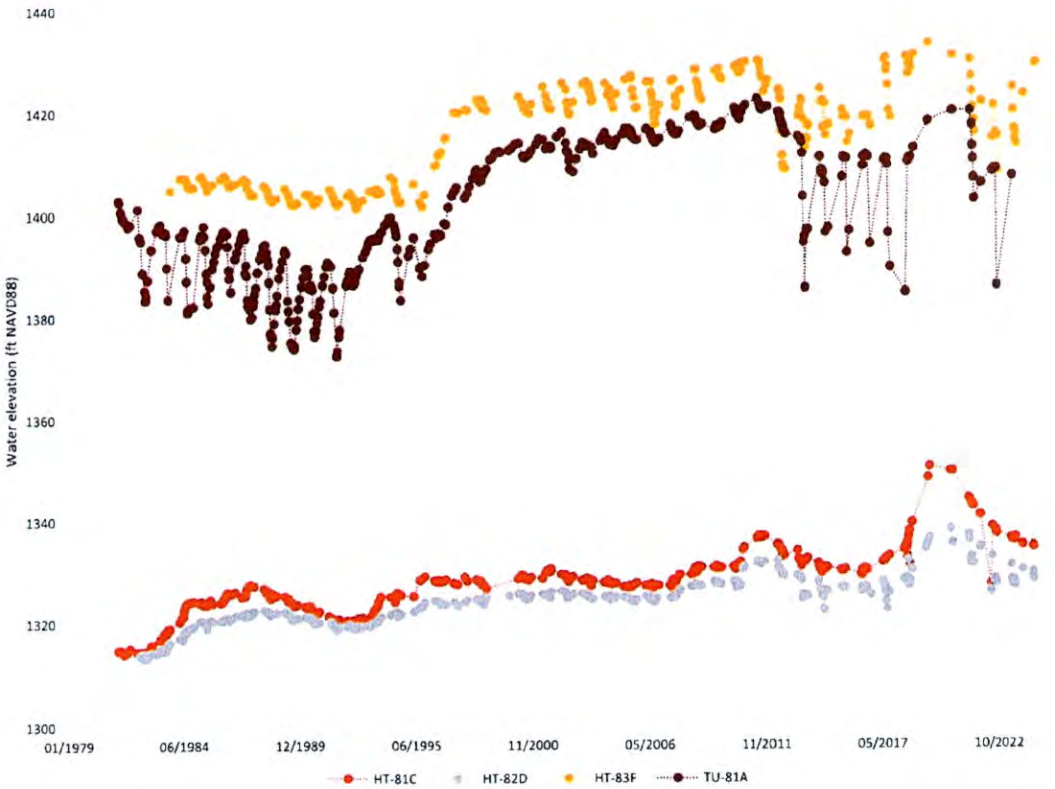

Figure 11: Hydrographs for the observation wells within approximately 10 miles of the well site for this application monitoring this portion of the Niobrara aquifer with over 20 years of data (Water Rights, 2024c). Note these wells are also shown in Figure 10. The top of the Niobrara elevation (NAVD88) is approximately 1,281 ft at HT-81C, 1,292 ft at HT-82D, 1,403 ft at HT-83F, and 1,284 ft at TU-81A (Water Rights, 2024c).

The hydrographs shown in Figures 10 and 11 are representative of the longer term (approximately 35 to 42 years) showing stable to slightly to moderately increasing water level trends in this portion of the Niobrara aquifer. The magnitude of shorter period fluctuations in response to wet and dry climatic cycles varies between observation wells. For example, see the variation in the hydrographs for observation wells YA-79I and YA-80GA. Several observation wells (for example HT-83F and TU-81A) in close proximity to irrigation wells show localized seasonal dips in measured water levels during the irrigation season in response to pumping (Water Rights, 2024b and 2024c). This is representative of the artesian head pressure of the aquifer in the area responding to seasonal irrigation pumping. However, water levels recover after the end of the irrigation season when pumping ends. Around 1996, behavior changes in both TU-81A and HT-83F is noticeable; this is approximately when The Town of Freeman began using rural water (Water Rights, 2024b). HT-83F is approximately 1 mile from the town's wells and TU-81A is approximately 2 miles away. TU-81A appears to start responding to seasonal pumping in 2013; this corresponds with Water Right No. 5913-3 located 1.1 miles to the north-northwest starting to consistently report a higher volume of water use during the irrigation season.

Water levels in the observation wells monitoring this aquifer generally rise during wet periods and decline to stable levels during drier periods. This type of behavior, along with aquifer recovery following the irrigation season, is indicative that climatic conditions, and therefore the effects of recharge to and natural discharge from the aquifer, govern the long-term fluctuations in water levels in the aquifer instead of pumping. Since recharge to and natural discharge from an aquifer can be captured for pumping, there is a reasonable probability that unappropriated water is available from this portion of the Niobrara aquifer for the proposed appropriation.

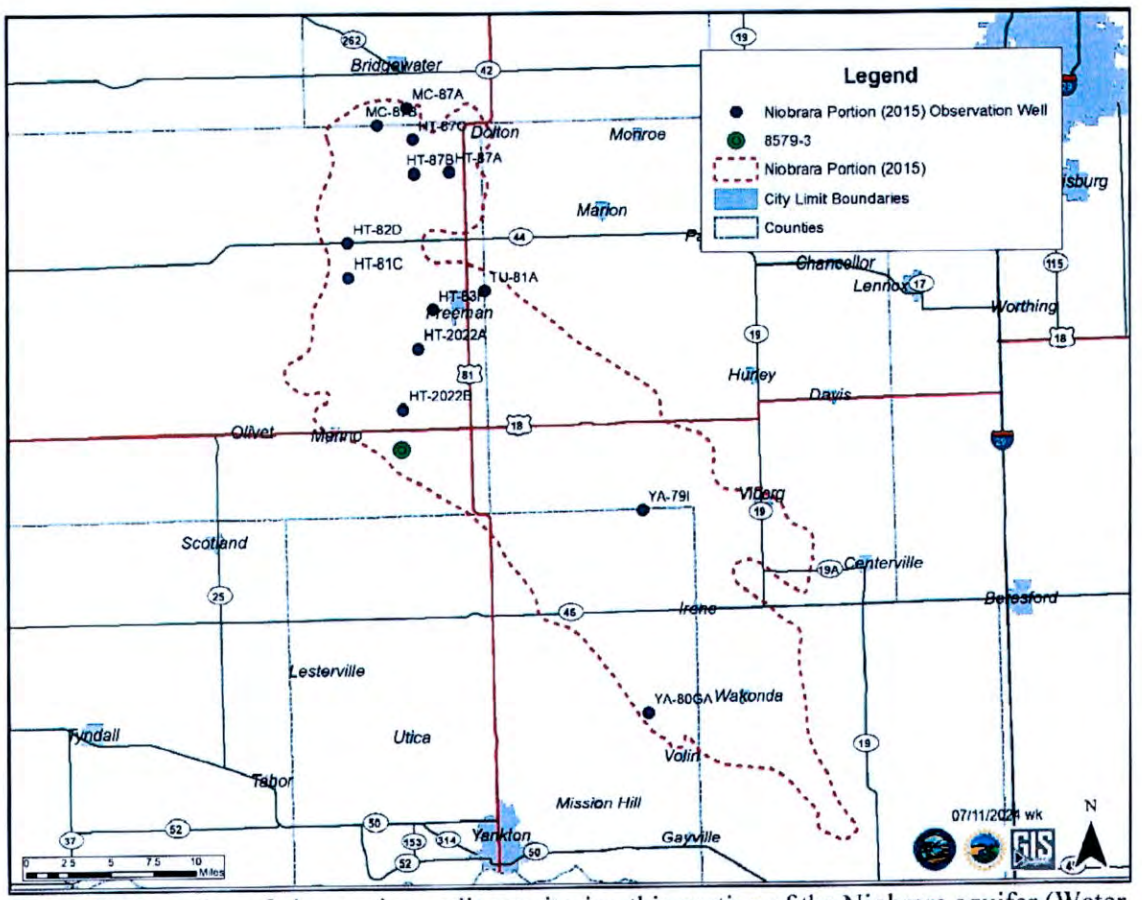

Figure 12: Location of observation wells monitoring this portion of the Niobrara aquifer (Water Rights, 2024c)

Hydrologic Budget

Direct comparison of average annual withdrawals to average annual recharge is statutorily required to determine whether water is available for appropriation from an aquifer. However, other components of an aquifer's budget can be used to examine the approximate status of water availability (or provide a general idea of the magnitude of recharge to an aquifer) in an aquifer or area of an aquifer. In general, for aquifers under natural conditions (no artificial withdrawals), the hydrologic budget of an aquifer can be represented by equation 2. When using equation 2 to look at the natural conditions of an aquifer, the change in storage is typically estimated to average out to zero over the longer term. However, the shorter-term recharge and discharge fluctuate from year to year based on climatic conditions. Thus, the shorter-term changes can be examined to estimate water movement through the aquifer.

Equation 2: $\Delta S = R - D$

Where:

$\Delta S = change\ in\ storage$

R=recharge (water entering the aquifer)

D=discharge (water leaving the aquifer)

In general, once pumpage (artificial withdrawals) from the aquifer starts, the discharge component of the equation can be broken down into pumping withdrawals and natural discharges (i.e. seepage to other aquifers, evapotranspiration, seepage to surface water, etc.), shown in equation 3.

Equation 3: $\Delta S = R - (W + D_{nat})$

Where:

$\Delta S = change\ in\ storage$

R=recharge (water entering the aquifer)

D_{nat}=natural discharge (water leaving the aquifer through natural means)

W=withdrawals (water leaving the aquifer through artificial means (e.g. pumpage)

Given the management requirements, that the quantity of water withdrawn from a groundwater source not exceed the quantity of the average estimated annual recharge to the groundwater source, the goal is long-term change in storage in the aquifer be zero or be positive. In order for this balance to be achieved, either additional recharge has to occur (e.g. by pumping the target aquifer in close proximity to a connected aquifer creating a gradient to allow flow from the connected aquifer into the target aquifer) or natural discharge to other connected water sources has to decrease (or a combination of the two). Ultimately, there is a limit to how much recharge can increase, and natural discharge can decrease to support increasing withdrawals; when this limit is exceeded, depletion of the water in storage in an aquifer begins. Equation 3 also illustrates how natural discharge estimates can be used as part of monitoring an aquifer's hydrologic budget, since groundwater tends to move from areas of recharge to areas of discharge (which can be seen in the potentiometric surface map of an aquifer). Ideally the location of the natural discharge estimate is at the location of the discharge; however, data limitations typically prevent this.

There are two approaches to dealing with data limitations when doing natural discharge estimates. Approach one is estimating water movement across a cross section between the recharge and pumping area of an aquifer and the discharge area of an aquifer (similar to the C-C' line in Figure 8). Approach two is estimating water movement across a cross section between the recharge area of an aquifer and the discharge and pumping area of an aquifer (similar to the B-B' line in Figure 8).

For natural discharge estimates, water levels from the late April to May time period are targeted to minimize the impact of local pumping (drawdown from an individual pumping well) on the estimate, since by late April to May water levels have typically recovered to the greatest extent possible at the current climatic conditions from the prior irrigation season and pumping on the next irrigation season has not yet begun. Additionally, critical to using natural discharge estimates from an aquifer to examine the status of the hydrologic budget is having observation well data to approximate the direction of storage changes in an aquifer over the long term (e.g. increasing, stable, or decreasing). While changes in the water level in an observation well under confined conditions is not a direct measurement of the change in storage of an aquifer, depending on aquifer characteristics in confined observation wells with limited artesian head pressure (less than 50 ft or so) changes in water level can still be indicative of changes in aquifer storage. Especially when water level can be seen to be dropping below the top of the formation during the year, for example HT-2022B. In the Niobrara aquifer where factures and solution cavities are the main means of water movement and the compressibility of the aquifer material itself is limited, confined observation wells in this type of aquifer material with limited artesian head pressure can be indicative of changes in water storage in the aquifer.

Recharge

Recharge to this portion of the Niobrara aquifer is primarily from groundwater inflow from adjacent or overlying aquifers due to leakage from these hydrologically connected aquifers when the potentiometric gradients are favorable (a higher hydraulic head in the connected overlying or adjacent aquifer than in the Niobrara aquifer indicates potential for leakage into the Niobrara aquifer). Kilts (2023a) presents the support for the Turkey Ridge aquifer being a source of recharge to this portion of the Niobrara aquifer. Some recharge is also likely from infiltration from precipitation where the Niobrara is at or near ground surface, and leakage through till (Lindgren and Hansen, 1990).

There is no estimate of average annual recharge to this portion of the Niobrara aquifer or the Niobrara aquifer in general available for South Dakota (Hedges et al., 1985). However, of the Niobrara aquifer in South Dakota, Hedges, et al. (1985) noted the Niobrara aquifer had such high storage and low use it was unlikely that withdrawals are approaching or exceeding recharge and there was no evidence of significant head loss in the aquifer to suggest that use is exceeding recharge at that time. As documented in the observation well section of this report, the additional years of observation well data collected since Hedges, et al. (1985) still show no evidence of significant long term head loss across the entirety of the aquifer (Water Rights, 2024b).

Discharge

Discharge from this portion of the Niobrara aquifer is due to well withdrawals and leakage to hydrologically connected aquifers where the potentiometric gradients are favorable (a higher water level elevation in the Niobrara aquifer than in an overlying or adjacent aquifer would indicate potential for discharge from the Niobrara) and some limited seepage to surface water. There are currently 24 active water rights/permits in this portion of the Niobrara aquifer, and two pending irrigation applications with priority dates junior to this application for irrigation use (summarized in Table 1). The approximate location of the diversion point or points for these water rights/permits and pending applications is shown in Appendix B Figure B2. Of the water rights/permits, 16 are for irrigation use, 3 for municipal use, 4 for commercial use, and 1 for institutional use.

The eight non-irrigation water rights/permits are summarized in Table 4. The Town of Irene and the City of Freeman both purchase their water from a rural water system but keep their water rights on standby for emergency use, so their average annual withdrawal is estimated to be zero (Drinking Water, 2023). Historically, average water use by non-irrigation appropriations limited solely by instantaneous diversion rate have been estimated as pumping 60% of the time at the maximum permitted diversion rate. For water rights/permits limited to an annual volume, full use of that volume is assumed for estimation of average annual withdrawal. Appropriative non-irrigation water use is summarized in Table 4. The estimated average annual appropriative non-irrigation use from this portion of the Niobrara aquifer is 539.7 acre-ft per year. There are domestic wells completed into this portion of the Niobrara aquifer that do not require appropriative water permits or report annual pumpage. Due the development of rural water systems in the area and to their relatively limited diversion rates, it is assumed the volume pumped from domestic wells is negligible to the hydrologic budget for this aquifer.

Table 4: Non-irrigation Use (Water Rights, 2024b)

Permit No.	Name of Permit Holder	Priority Date	Status	Use	Rate (cfs)	Annual Volume Limit (acre-ft)	Estimated Average Annual Use (acre-ft per yr.)
810-3	City of Freeman	01/01/1950	LC	MUN	1.26	n/a	0 (system on standby)
1229-3	Town of Irene	01/01/1915	LC	MUN	0.56	n/a	0 (system on standby)
5239-3	City of Freeman	10/17/1988	LC	MUN	0.33	n/a	0 (system on standby)
6524-3	Freeman Jr College & Freeman Academy	07/19/2004	LC	INS	0.07	n/a	30
6706-3	Pheasant Run Farm	02/21/2006	PE	COM	0.1	n/a	43
8216-3	B&K Dairy Farms LLC	02/01/2016	PE	COM	0.67	460	460
8597-3	CHS Farmers Alliance	02/22/2022	PE	COM	0.1	1.3	1.3
8626-3	Tri-Cross Renewable Energy	03/28/2022	PE	COM	0.1	4.6	4.6
						Total	**539.7**

LC-water right, PE-water permit, MUN-municipal, INS-institutional, COM-commercial

The majority of water rights/permits for irrigation in South Dakota are required to report annual irrigation usage to the Water Rights Program. The 16 active irrigation water rights for this aquifer are summarized in Table 5. Reported use for 15 of the 16 active water rights/permits for irrigation from this portion of the Niobrara aquifer are summarized in Table 6. Water Permit No. 8684-3 is still in its five-year construction period and has not yet started irrigation. Water Right No. 5913-3 incorporated portions of another permit when licensed, so reported irrigation usage for the incorporated permit is also included in Table 6.

Table 5. Summary of Irrigation Water Rights/Permits (Water Rights, 2024b)

Permit No.	Name of Permit Holder	Priority Date	Status	Rate (cfs)	Acres	Comments
5764-3	City of Freeman	03/15/1993	LC	0.24	27.5	irrigation reporting started in 2016
5913-3	Roger Schmidt	04/02/1981	LC	0.77	123	incorporates portions of 4679-3, starts being consistent in 2013
6708-3	David Huber	04/03/2006	LC	1.78	271	
7344-3	Michael Schultz	04/09/2012	PE	5.33	399	has been inspected, developed 21 extra acres
7448-3	Robert Heckenlaible	10/03/2012	LC	6.67	560	
7515-3	Greg Wirth	10/24/2012	PE	2.28	160	
7526-3	Derrick Walter	11/15/2012	PE	3.56	257	
7617-3	Brett Guthmiller	01/07/2013	LC	1.34	119	
7683-3	Roger Guthmiller	01/28/2013	LC	1.34	134	
7700-3	David Huber	02/14/2013	LC	2.22	160	
7893-3	Wayne or Trina Knutson	09/03/2013	LC	0.07	1.2	allows up to 3 acre-feet per year
8162-3	Don Schellpfeffer	05/28/2015	LC	1.78	122.65	
8260-3	Cameron Johnson	12/27/2016	LC	1.67	117.35	
8326-3	Jerry Nelsen	01/08/2018	PE	2.00	120	reported system destroyed in 2020 & no water available since
8416-3	Jerome Poeschl	12/02/2019	LC	1.56	116	
8684-3	Matthew Wirth	11/30/2022	PE	2.11	300	not yet irrigating

LC-license, PE-permit

Average reported irrigation usage for the water rights/permits for irrigation from this portion of the Niobrara aquifer is 233 acre-ft per year over the entire period of record. Since the number of irrigation water rights/permits has continued to increase, the estimated average annual withdrawal rate for irrigation appropriations for the entire period of record may not accurately reflect the current level of development. The average annual withdrawal rate for irrigation appropriations from 2013 to 2023 better represents the current level of irrigation development in this portion of the Niobrara aquifer. Average reported irrigation usage from 2013 to 2023 for the water rights/permits in this portion of the Niobrara aquifer is 773 acre-ft per year. Water Permit Application No. 8616-3 is the result of a licensing inspection for Water Permit No. 7344-3, to reflect an additional 21 acres being irrigated by the irrigation systems authorized under Water Permit No. 7344-3. Since irrigation of these acres is being reported as part of water use under Water Permit No. 7344-3, the water use proposed by Application No. 8616-3 is assumed to be already reflected in the reported irrigation data. Typically, average irrigation rates in eastern South Dakota are less than 10 inches per acre per year (Water Rights, 2024b). Water Permit Nos. 8326-3 and 8684-3 have yet to report any use, so using this rate, average annual water usage is estimated at less than 350 acre-feet per year. Application No. 8779-3 and Application No. 8587-3 propose to irrigate a total of 166 new acres, estimated average annual water use for these applications is less than 138 acre-feet per year. Total estimated average annual irrigation use from this portion of the Niobrara aquifer is less than 1,261

Table 6: Reported Irrigation use (Water Rights, 2024e)

Year	No. Permits	Reported Pumping (acre-feet)
1981	1	0.0
1982	1	69.7
1983	1	35.6
1984	1	42.0
1985	1	50.0
1986	1	50.0
1987	1	120.0
1988	1	72.9
1989	1	136.6
1990	1	92.8
1991	1	106.1
1992	1	6.6
1993	1	0.0
1994	1	33.1
1995	1	29.4
1996	1	6.6
1997	1	9.0
1998	1	0.0
1999	1	0.0
2000	1	0.0
2001	1	0.0
2002	1	25.2
2003	1	7.7
2004	1	0.0
2005	1	0.0
2006	1	0.0
2007	2	23.1
2008	2	49.5
2009	2	28.3
2010	2	0.0
2011	2	141.4
2012	3	381.6
2013	13	999.1
2014	14	928.9
2015	15	724.6
2016	16	518.1
2017	17	616.8
2018	18	98.0
2019	18	20.5
2020	19	815.0
2021	19	1024.5
2022	19	1451.1
2023	15	1310.7
Max	**19**	**1451.1**
Min	**1**	**0**
1981-2023 Avg	**5.2**	**233.1**
2013-2023 Avg	**16.6**	**773.4**

Natural discharge from an aquifer can be used to gain understanding into the status of an aquifer's hydrologic budget when an estimated average annual recharge value is not available. The updated May 2016 estimate of natural discharge occurring from this aquifer to the Lower James Missouri aquifer is 1,803 acre-feet per year. Since this estimate is for a single point in time (May 2016), this value does not represent an average annual value for discharge from the aquifer but does offer insight into the magnitude of discharge from the western flank of the aquifer at the time the analysis was performed. Actual natural groundwater discharge from this aquifer (and therefore recharge to) is likely higher than indicated by this estimate. This is due to the direction of groundwater flow being generally from the center of the aquifer outward to the edges of the aquifer and this estimate is only for natural discharge from the western side of the aquifer. Additionally, Kilts (2023b) estimated discharge from this portion of the Niobrara aquifer to the Upper Vermillion Missouri: West aquifer downgradient of the well site for Water Permit No. 8684-3 to be 685 to 890 acre-feet per year. Kilts (2023b) also noted there was likely additional natural discharge potential to the Upper Vermillion Missouri: South aquifer and other adjacent aquifers that have not yet been quantified. Therefore, there is a reasonable probability that over the total extent of this portion of the Niobrara aquifer, water is available for this application and the other applications summarized in Table 1. However, since this natural discharge estimate only serves as an indicator of the magnitude of discharge from the aquifer at the point in time of the estimate, it is worth emphasizing the importance of observation well data as part of assessing water availability in this aquifer.

Balance

Estimated average appropriative withdrawals from this aquifer, including the applications summarized in Table 1, is less than 1,801 acre-feet per year (irrigation: 1,123 acre-feet, non-irrigation: 540 acre-feet, Application Nos. 8587-3 and 8779-3: 138 acre-feet). There is no recharge estimate for this portion of the Niobrara aquifer. However, natural discharge estimates can be used to gain an understanding of the approximate amount of recharge an aquifer is receiving. Estimated overall natural discharge from this portion of the Niobrara aquifer to the Lower James Missouri aquifer to approximately 1,803 acre-feet per year for May of 2016. Kilts (2023b) estimated natural discharge to the Upper Vermillion: West on the eastern side of the aquifer ranging between 685 to 890 acre-feet per year. This totals an estimated natural discharge ranging from 2,488 to 2,693 acre-feet per year based on the points in time the discharge was calculated. Kilts (2023b) also noted there is likely additional natural discharge occurring to the Upper Vermillion: South aquifer from this portion of the Niobrara aquifer. Based on these estimates of natural discharge from the aquifer, there is a reasonable probability that water is available from the overall extent of this portion of the Niobrara aquifer for the appropriation requested by this application.

Localized Budget

Localized budgets are utilized in subareas of aquifers where (based on the engineering judgment of Water Rights staff) a combination of significant hydrogeology characteristics and appropriative water use results in a locally distinct subarea of water availability from the overall water availability in an aquifer. Examples of where subareas are routinely utilized would be the Madison, Minnelusa, and Inyan Kara aquifers at locations in close proximity to the aquifer outcrop

areas in the Black Hills (Water Rights, 2024b). For this portion of the Niobrara aquifer the potentiometric surface mapping consistently indicates that water movement is generally from the central area of the aquifer to the outer edges of the aquifer indicates potential for differing water availability between the various flanks of the aquifer.

Figure 8 shows the water rights/permits in the vicinity of the localized natural discharge estimate summarized in Table 3 and in Kilts (2024). The water rights/permits associated with the localized natural discharge estimate shown in Table 3 (approximately 346 acre-feet per year) are Water Right Nos. 7344-3 and 7700-3. Given the close proximity of Water Right No. 7700-3 to the natural discharge area to the south (B-B' line) of the one represented by the C-C' line, Water Right No. 7700-3 is likely also utilizing some amount of natural discharge occurring to the south of the discharge area being examined in this localized budget. Water use for the water rights associated with the localized natural discharge estimate summarized in Table 3 is shown in Table 7. Water Right No. 7700-3 reported no pumping in 2022, due to the system having been damaged in a storm (Water Rights, 2023e).

Table 7: Reported Irrigation by Year in the Local Budget Area in Acre-Feet (Water Rights, 2024e)

Permit No.	7344-3	7700-3	Total	Comments
Priority Date	04/09/2012	02/14/2013		
Permitted Acres	420	146	566.0	
Total Appropriation	840	292	1132.0	
2023	233.3	58.9	292.2	
2022	259.55	0.00	259.6	system for 7700-3 damaged in a storm
2021	155.6	15.5	171.1	
2020	227.0	51.6	278.6	
2019	0.0	0.0	0.0	
2018	51.7	0.0	51.7	
2017	168.8	42.4	211.2	
2016	205.1	28.3	233.3	
2015	316.9	56.6	373.4	
2014	181.4	120.2	301.6	
2013	228.0	141.4	369.4	
2012	109.4	n/a	109.4	
Average (2012-2023)			221.0	

This application is seeking to permit 21 acres for irrigation that have already been developed, water use for this application is already reflected in Table 7 under the use for Water Permit No. 7344-3. This results in a localized estimated average annual water use of 221 acre-feet per year. The estimated localized natural discharge in this area is 346 acre-feet per year (Table 3). Withdrawals exceeding recharge and groundwater movement into a localized area, can result in a localized long-term decreasing trend in local water levels (that does not eventually stabilize in relation to withdrawals) governing local water levels rather than climatic conditions. However, for this local budget, estimated local natural discharge exceeds withdrawals indicating that on the local scale water is available. Since this natural discharge estimate only serves as an indicator of the magnitude of recharge to a localized aquifer area at the points of time of the estimate, it is worth emphasizing the importance of observation wells as part of monitoring this aquifer. The only observation well in this localized area is HT-2022B for which limited data is available, depending

on the aquifer it takes five to ten years of data (depending on climatic conditions) before conclusions can be drawn on average water availability from observation well data.

In the instance of this localized budget for a subarea of this portion of the Niobrara aquifer, the localized area presented is not considered a separate groundwater source pursuant to SDCL 46-6-3.1. The localized budget is presented in the water availability section of this report for general information. The review of this localized budget serves more as a check of potential for cumulative appropriative use in a localized area to result in unlawful impairment of existing domestic water users and water rights over a longer-term time scale than is typically reviewed as part of the potential for unlawful impairment. The potential for unlawful impairment review generally focuses more on the potential for direct impact and unlawful impairment of existing users as a result of drawdown created from pumping by just the proposed appropriation.

Potential for Unlawful Impairment

Area water rights/permits completed into this portion of the Niobrara aquifer are shown in Figure 8 and summarized in Tables 4 and 5. The nearest water right/permit to the well site for this application is Water Permit No. 5764-3 for irrigation of 27.5 acres located approximately 1.5 miles to the northeast. The nearest domestic well on file with the Water Rights Program not under the last name of Schultz is for O. Stahl drilled in 2017 located approximately 0.7 miles to the west based on the location information provided by the well driller (Water Rights, 2023a). There could potentially be other domestic wells completed into the Niobrara aquifer near the diversion point that are not on file with the DANR-Water Rights Program. Since this application is in response to a licensing inspection that found an additional 21 acres have been developed and are being irrigation, no additional impacts from pumping are expected if this application is approved.

In 2013, the Water Rights Program received a complaint of a domestic well being impacted in this portion of the Niobrara aquifer in the general area of Application No. 8579-3; however, when investigated, it was determined that the well had likely collapsed and was not an adequate well as defined by Administrative Rules of South Dakota (ARSD) 74:02:04:20(6) (Water Rights, 2023d). ARSD 74:02:04:20(6) defines an adequate well as, "a well constructed or rehabilitated to allow various withdrawal methods to be used, to allow the inlet to the pump to be placed not less than 20 feet into the saturated aquifer or formation material when the well is constructed, or to allow the pump to be placed as near to the bottom of the aquifer as is practical if the aquifer thickness is less than 20 feet". In 2015, a complaint was received that Water Permit No. 7526-3 (near the northern edge of this portion of the Niobrara aquifer) was impacting springs; however, the springs were identified as artesian in nature and artesian head pressure is not protected as a means of delivery. Therefore, it was concluded that no unlawful impairment was occurring (Water Rights, 2023d), since in the case of Water Permit Application No. 2313-2 for the Coca-Cola Bottling Company of the Black Hills the Water Management Board adopted findings that noted that if the increased costs or decreased production as a result of the impacts of legitimate users on artesian head pressure could be considered an adverse impact, it would conflict with SDCL 46-1-4 (Water Rights, 1995). SDCL 46-1-4 requires the water resources of the state be put to beneficial use to the maximum extent of which they are capable (Water Rights, 1995).

On May 4th, 2022, the South Dakota Water Management Board took action to defer Application No. 8579-3 for up to two years to allow for study to determine if existing irrigation in the area was unlawfully impairing two adequate domestic wells located approximately 3.2 miles to the south of the well site for this application (Water Rights, 2023b). As a result, Application No. 8616-3 (this application) was given a deferral recommendation based on its proximity to the domestic wells (Mehlhaf wells) and held in abeyance. On January 10th, 2023, the Water Rights Program was notified that the water supply from the adequate domestic wells in question had been replaced with connections to a rural water system. Kilts (2023b) included extended discussion on the potential for unlawful impairment if new acres were to be permitted for irrigation under Application No. 8579-3. Kilts (2023b) concluded that development in the area of Application No. 8579-3 in this portion of the Niobrara aquifer is reaching the point where potential for unlawful impairment of existing adequate domestic wells (beyond the domestic users who have connected to rural water) is starting to become possible. This is due to a combination of a dry climatic period and the cumulative effects of heavy irrigation pumping in this area of the aquifer. Kilts (2023b) also noted a more in-depth analysis requires a combination of further information and an extensive groundwater modeling effort using specialized groundwater modeling software to account for the locally complex hydrogeologic conditions in this area and cumulative impacts from the multiple appropriative wells in the area.

The initial complaint of unlawful impairment of two domestic wells was made in Fall of 2021. Water Permit No. 7344-3 was not included as part of the Fall 2021 shut down based on the available hydrogeologic information indicating the most likely irrigation wells causing an impact were those located downgradient (based on the 1986 and May 2016 potentiometric surface mapping) of the domestic wells. Water Permit No. 7344-3 was only added to the complaint after the domestic well owner indicated that domestic well recovery was notable after the irrigation system to the north shut down. Later information from the permit holder for Water Permit No. 7344-3 indicated that in Fall of 2021, he was pumping from the storage pond and not the Niobrara wells.

To look at the potentiometric surface of the aquifer in this area under a combination of a dry climatic periods and the cumulative effects of heavy irrigation pumping Kilts (2023b) generated potentiometric surface mapping for Fall 2022. This mapping is shown in Figure 13. While the Fall 2022 potentiometric surface mapping does not exclude Water Permit No. 7344-3 from contributing to cumulative drawdown in the area of the domestic wells, it does suggest that the water right/permits downgradient of the domestic wells and in closer proximity to the domestic wells than Permit No. 7344-3 have a larger contribution to cumulative pumping impacts in the area of the domestic wells.

There are also several other indicators that, while not conclusive, are suggestive of Water Permit No. 7344-3 having limited contribution to the cumulative drawdown in the area of the domestic wells. In considering observation wells HT-2022A and HT-2022B, HT-2022A (Figure 9) appears to be responding more to a single well or wells pumping and shutting down on the same schedule. HT-2022B (Figure 10) appears to be responding to cumulative impacts of multiple irrigation wells operating on different schedules. Distinctive recovery behavior in HT-2022B is only seen after the shut off order (July 20, 2022, to July 27, 2022) and at the end of the irrigation season. But HT-2022A has clear distinctive recovery behavior showing up multiple times during

the irrigation season which is consistent with an observation well responding to a single well or wells pumping and shutting down on the same schedule.

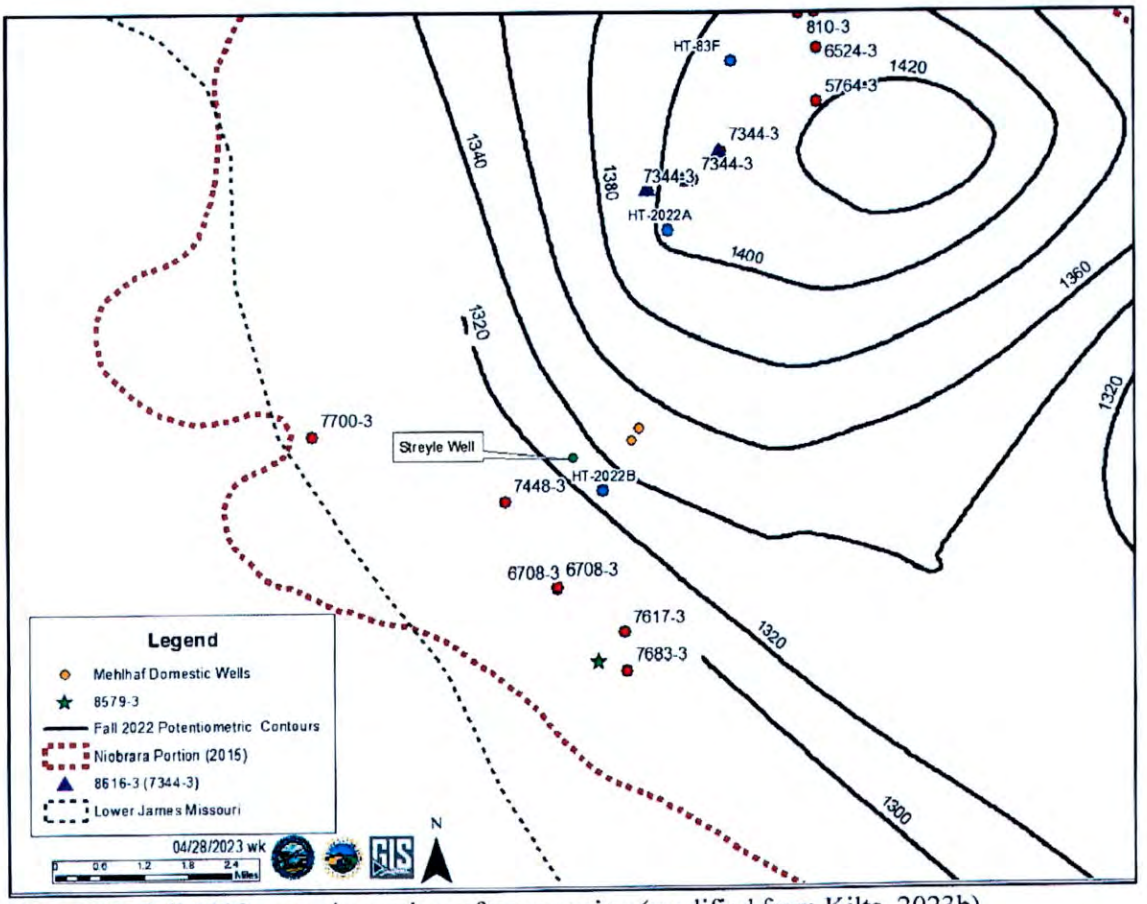

Figure 13: Fall 2022 potentiometric surface mapping (modified from Kilts, 2023b)

While it cannot be relied upon to make an official decision, anecdotal information (Huber, 2023) suggests that to the immediate north of the Mehlhaf domestic wells there is an area of the Niobrara Formation that does not have sufficient transmissivity to act as an aquifer. Additionally, the more northern of the two Mehlhaf domestic wells has a very low estimated transmissivity value (Appendix C) and the initial attempt to drill this well slightly to the north resulted in a dry hole into the Niobrara Formation (Water Rights, 2023a). If an area exists where the Niobrara Formation does not have sufficient transmissivity to act as an aquifer between the wells for this application and the domestic wells, the area would act as a boundary (or partial boundary depending on the exact extent of the area) limiting pumping impacts from the wells for this application on the Mehlhaf domestic wells. Additionally, if this area exists where the Niobrara Formation does not have sufficient transmissivity to act as an aquifer, it could exacerbate pumping impacts from high-capacity wells to wells between the high-capacity wells and the area where the Niobrara Formation does not have sufficient transmissivity to act as an aquifer. This is typically referred to as a negative boundary condition. In the case of a negative boundary condition, drawdown is greater between

the negative boundary condition and the pumping well than if the negative boundary condition was not present.

During the 2022 irrigation season appropriative pumping was shut down in the area of observation wells HT-2022A and HT-2022B. Water Rights/Permit Nos. 7244-3, 7700-3, 7448-3, 7682-3, 7617-3 were issued shutoff orders from July 20, 2022, to July 27, 2022 (Water Rights, 2024b). The location of these water rights/permits and observation wells in relation to each other is shown in Figure 8. The water level data collected by datalogger for 2022 for these two observation wells is shown in Figure 13 along with the date period of the shutoff order. The water levels in HT-2022A can be seen to make faster recovery with the cessation of pumping than in HT-2022B. There are couple of things this response can be indicative of. The magnitude of the seasonal response of water levels in the aquifer due to pumping near HT-2022A may be affected more by the pumping of a single permit rather than cumulative drawdown caused by several permits. Another possibility is that HT-2022A could be closer to a recharge source than HT-2022B. Figure 13 and Figure 9 also point to water levels in the aquifer at HT-2022A making a quicker and more complete recovery with the cession of pumping at the end of the irrigation season than HT-2022B.

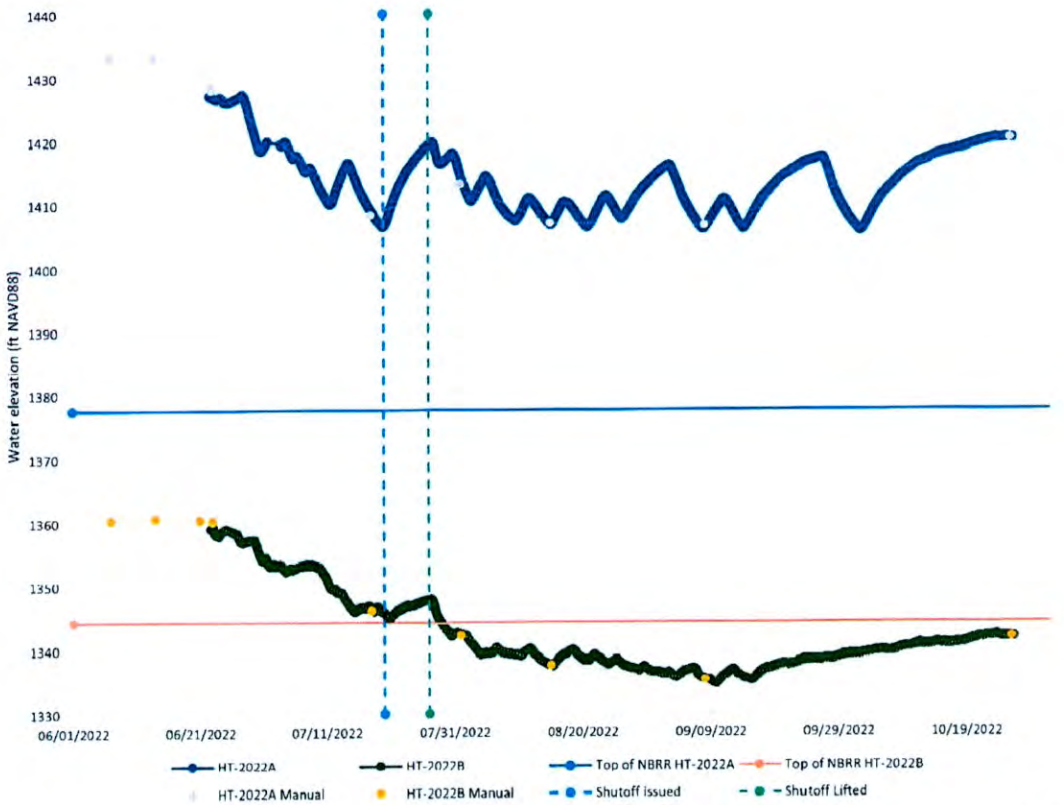

Figure 13: Water level data collected by datalogger for June 2022 to November 2022 for observation wells HT-2022A and HT-2022B (Mathiowetz, 2024 and Water Rights, 2024c).

A more in-depth analysis would require a combination of further information and an extensive groundwater modeling effort using specialized groundwater modeling software to account for the locally complex hydrogeologic conditions and cumulative impacts from the multiple appropriative wells in the area.

Conclusions

1. Water Permit Application No. 8616-3 proposes the irrigation of an additional 21 acres with no additional diversion rate from the wells authorized by Water Permit No. 7344-3 completed into the Niobrara aquifer.

2. Water Permit No. 7344-3 appropriates 5.33 cfs for three wells completed into the Niobrara Aquifer located near the center of the SE ¼ Section 8; NE ¼ SW ¼, SE ¼ NE ¼ Section 9; all in T98N-R56W for the irrigation 399 acres. A storage pond/reservoir is in the W1/2 SE1/4 section 9-T98N-R56W. An investigation of the permit found the system capable of diverting 2.56 cfs from the existing wells and irrigating an additional 21 acres. The irrigated acreage, including the 21 additional acres for this application, is in the SE ¼, S ½ NE ¼ Section 8; SW ¼, S ½ NW ¼, NE ¼, N ½ SE ¼ Section 9; all in T98N-R56W. Combined this application, if approved, and Water Permit No. 7344-3 will authorize a total diversion rate of 2.56 cfs for irrigation of 420 acres.

3. On an aquifer wide scale, based on the hydrologic budget and observation well data, there is a reasonable probability that water is available in the aquifer to meet the water use proposed by this application.

4. Based on a localized hydrologic budget, there is a reasonable probability that water is available in the aquifer to meet the water use proposed by this application.

5. This application is in response to a licensing inspection that found an additional 21 acres being irrigated. Therefore, no additional impacts beyond what already exists is expected to domestic uses or existing water right/permits with adequate wells.

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Natural Resources Engineer III
SDDANR-Water Rights Program

References

Allen, J.C., Iles, D.L., and Petres, A.K. 1985. Analysis of Groundwater and Streamflow Data Western Dakotas Region of South Dakota Tasks 3A.B.C. and 4A.B.: Groundwater

Resource Inventory Final Report. U.S. Army Corps of Engineers Contract DACW 45-82-C-0151. SD DANR-Geological Survey. Vermillion, South Dakota.

Aqtesolv. 2019. Representative Values of Hydraulic Properties. Updated Nov 23, 2019. Accessed April 17, 2023. < http://www.aqtesolv.com/aquifer-tests/aquifer_properties.htm>

Aqtesolv. 2023. Transmissivity from Specific Capacity. Accessed March 2023. < http://www.aqtesolv.com/forum/transcap.asp>

Bugliosi, E. F. 1986. Water Resources of Yankton County, South Dakota. Water-Resources Investigation Report 84-4241. United States Geological Survey. Huron, SD.

Drinking Water. 2023. South Dakota Drinking Water System Information. SDDANR-Water Rights Program. Accessed February 24, 2023. <https://danr.sd.gov/OfficeOfWater/DrinkingWater/default.aspx>.

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: Bedrock Topography and Distribution, Task 2: Extent of Aquifers, Task 3: Ground-Water Storage, Task 4: Computerized Data Base, Final Report. U.S. Army Corps of Engineers Contract DACW 45-80-C-0185.

Hedges, L.S., Allen, J. and 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. U.S. Army Corps of Engineers Contract DACW 45-80-C-0185.

Holmes, S. L. and Filipovic, D. 2015. Hydrogeologic Investigation of the Upper-Vermillion-Missouri Aquifer. Open-File Report 93-UR. SD Geological Survey Program. Vermillion, SD.

Huber, J. 2023. Personal Communication. Phone call. April 6, 2023.

Jensen, A. R. 2000. First Occurrence of Aquifer Materials in Clay County, South Dakota. Aquifer Materials Map 1. South Dakota Geological Survey. Vermillion, SD.

Kilts, W. 2023a. Report to the Chief Engineer on Water Permit Application No. 8654-3: Schultz Dairy. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Kilts, W. 2023b. Report to the Chief Engineer on Water Permit Application No. 8684-3: Matthew Wirth. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Kilts, W. 2024. Report to the Chief Engineer on Water Permit Application No. 8579-3: Brett Guthmiller. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Lindgren, R.J. and Hansen, D.S. 1990. Water Resources of Hutchinson and Turner Counties, South Dakota. Water Resources Investigations Report 90-4093. USGS. Huron, SD.

Mathiowetz, A. 2016. Report to the Chief Engineer on Water Permit Application No. 8216-3. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Mathiowetz, 2024. Compiled Datalogger Data for Observation Wells HT-2022A and HT-2022B. SD DANR-Water Rights Program, Joe Foss Bldg., Pierre, South Dakota.

Schultz, M. 2024. Personal communication by phone on Water Permit No. 7344-3. June 27, 2024.

SDGS. 2023. South Dakota Geological Survey Lithologic Logs Database. Accessed February 2023. <http://cf.sddenr.net/lithdb/>.

Stephens, J.C. 1967. Geology and Hydrology of Clay County South Dakota: Part II Water Resources. Bulletin 19. SDGS. Vermillion, SD.

Tomhave, D. T. and Schulz, L.D. 2004 Bedrock Geologic Map Showing Configuration of the Bedrock Surface in South Dakota East of the Missouri River. General Map 9, scale 1:500,000. South Dakota Geological Survey. Vermillion, South Dakota.

Water Rights. 2023a. Well Completion Reports. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota.

Water Rights. 2023b. Water Right/Permit Files. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota.

Water Rights. 2023c. Observation Well Files. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota.

Water Rights. 2024a. Well Completion Reports. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota.

Water Rights. 2024b. Water Right/Permit Files. SD DANR-Water Rights Program, Joe Foss Building, Pierre, South Dakota.

Water Rights. 2024c. Observation Well Files. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota.

Water Rights. 2024d. Water Rights County Complaint Files. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota. Accessed June 2024.

Water Rights. 2024e. Water Rights Irrigation Reporting Data. SD DANR-Water Rights Program. Joe Foss Building, Pierre, South Dakota. Accessed June 2024.

Appendix A: Select Geologic Cross Sections from Lindgren and Hansen, (1990)

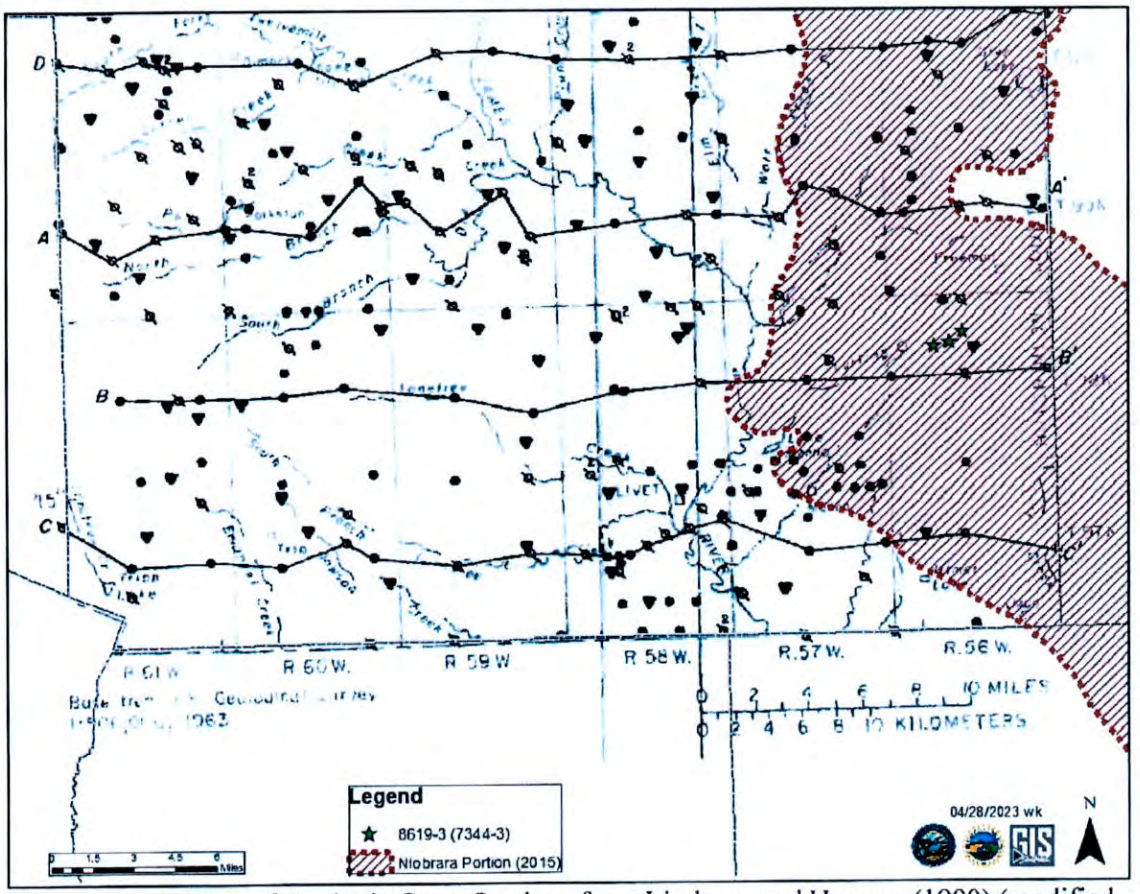

Figure A1: Location of Geologic Cross Sections from Lindgren and Hansen, (1990) (modified from Lindgren and Hansen, 1990).

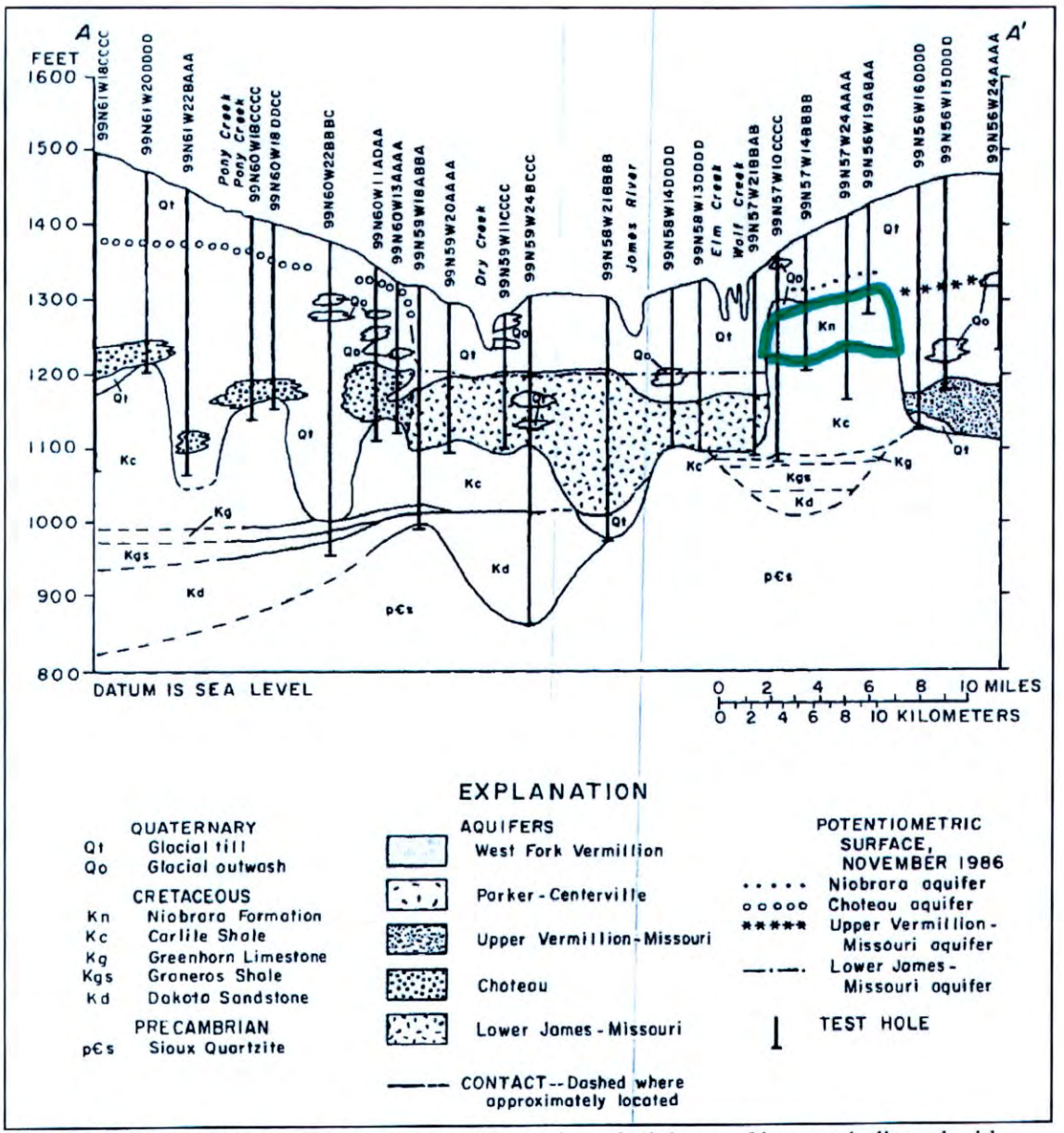

Figure A2: Geologic Cross Section A-A` with portion of Niobrara of interest indicated with green highlight (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

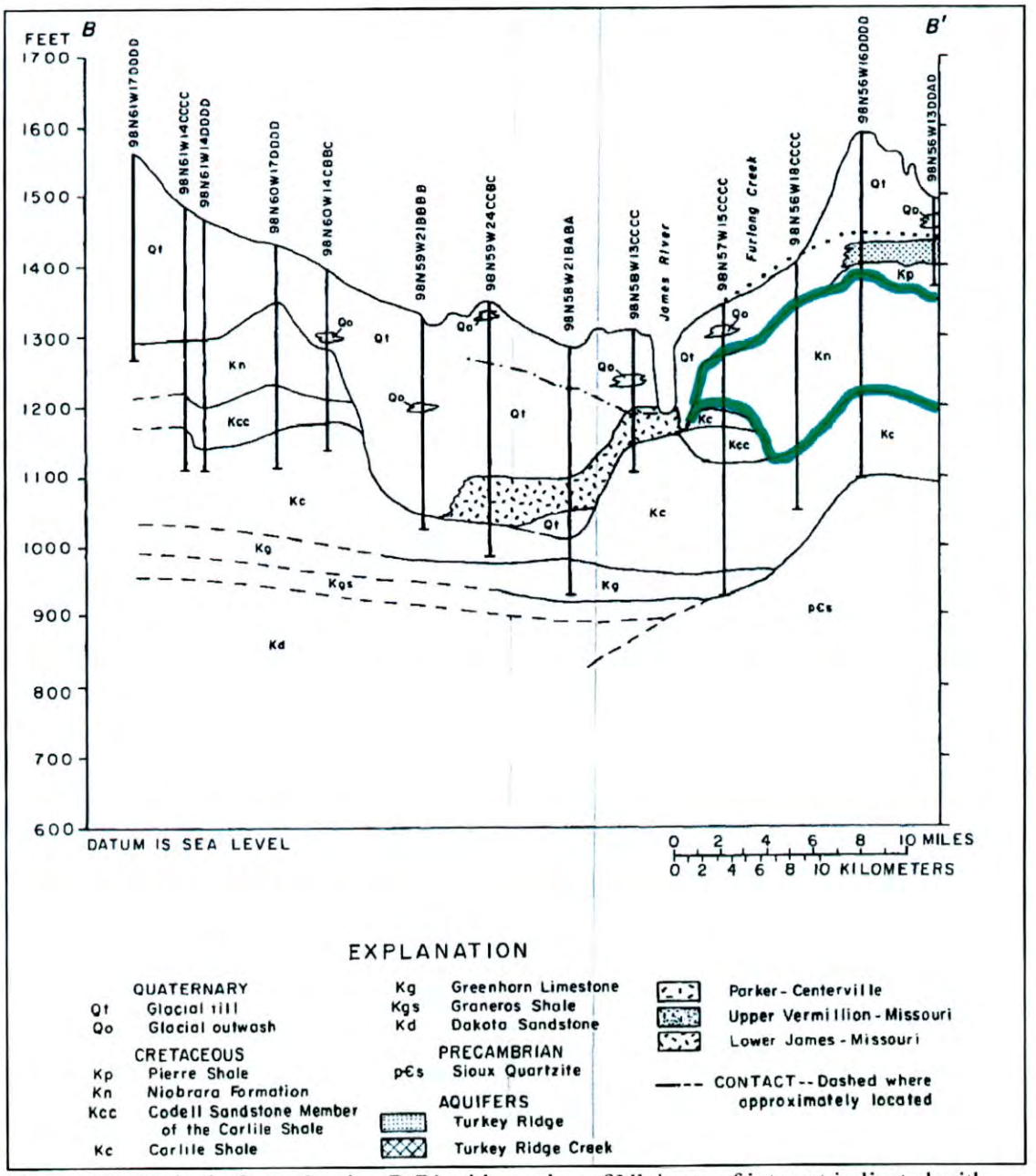

Figure A3: Geologic Cross Section B-B' with portion of Niobrara of interest indicated with green highlight (modified from Lindgren and Hansen, 1990). Elevation reference NGVD29.

Appendix B: Additional Maps

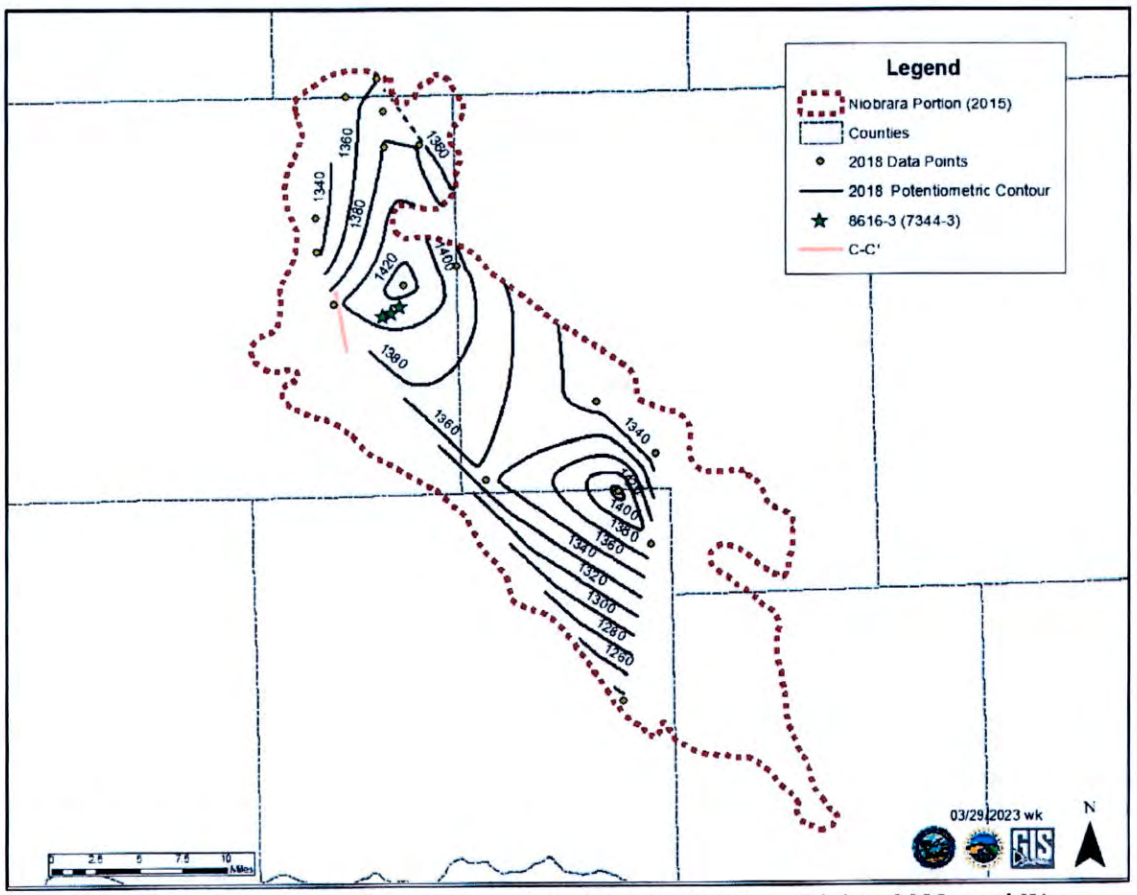

Figure B1: Potentiometric surface contours from May 2018 (Water Rights, 2023a and Water Rights, 2023c). Elevation reference NAVD88.

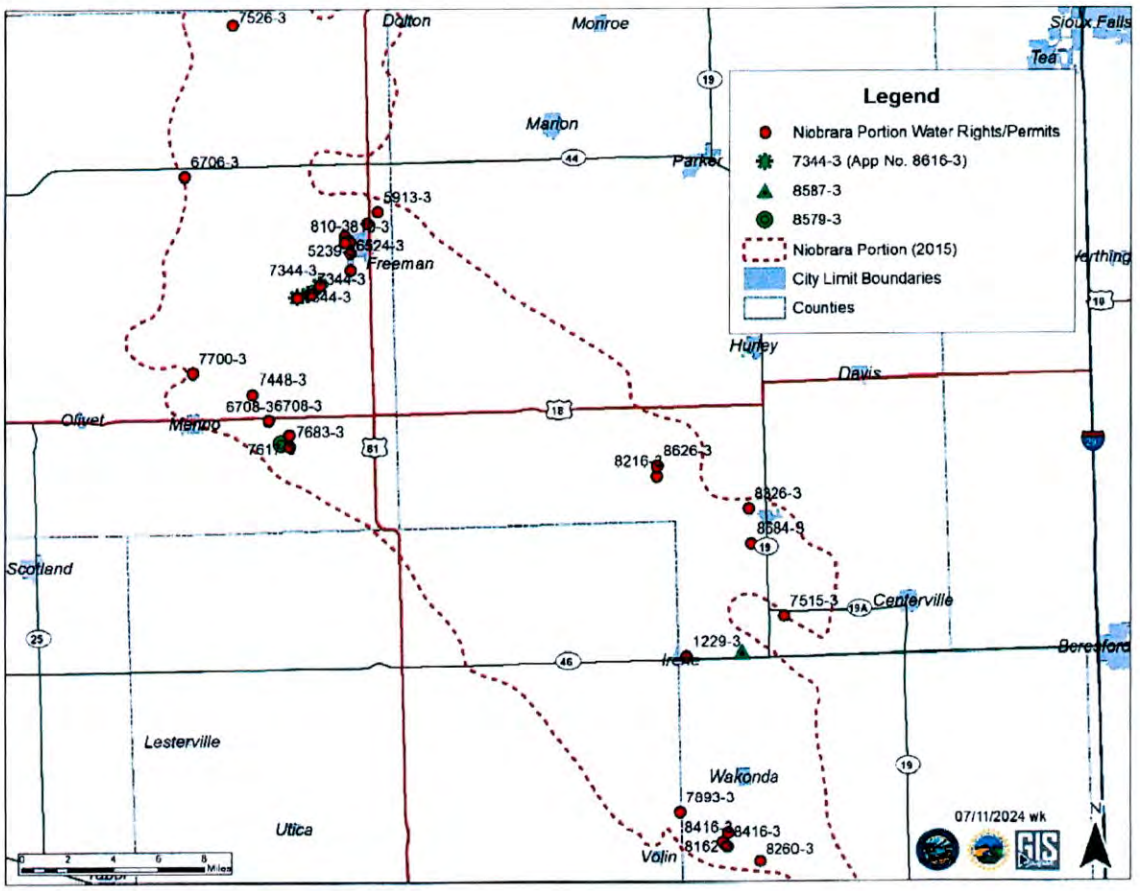

Figure B2: Location of active water rights/permits and pending applications from this portion of the Niobrara aquifer (Water Rights, 2024a and Water Rights, 2024c).

Appendix C: Estimated Transmissivity from Specific Capacity

Pumping data from both domestic and appropriative wells were used to calculate specific capacity, which was then used to estimate transmissivity and hydraulic conductivity. This data is summarized in Table C1. All well completion reports on file with the Water Rights Program for this portion of the Niobrara (Water Rights, 2023a) for sufficient pumping data to calculate specific capacity. The Aqtesolv online conversion tool was then used to estimate transmissivity from specific capacity (Aqtesolv, 2023). Aquifer thickness and/or screened interval was then used to calculate hydraulic conductivity from transmissivity. Typical values for hydraulic conductivity for different geologic materials in shown in Figure C1.

Tomhave and Schulz (2004) define the Niobrara Formation as "White to dark-gray argillaceous chalk, marl, and shale. Weathers yellow to orange. Contains thin, laterally continuous bentonite beds, chalky carbonaceous shale, minor sand, and small concretions." Chalk is a carbonate rock and the well completion reports, along with other available information suggest that this portion of the Niobrara aquifer is much more fractured than cavernous (Water Rights, 2023a). Therefore, values for hydraulic conductivity would be expected to be on the lower end of the range for carbonate rocks (0.001 to 10 ft/d), especially since the Niobrara Formation can contain shale which has an even low range for hydraulic conductivity. In looking at Table C1, the middle well for No. 7526-3 appeared to have a non-typical amount of sand in the screened interval compared to other wells in this portion of the Niobrara aquifer, based on all of this information, the transmissivity estimate for the middle well for No. 7526-3 and the other higher value estimates were categorized as outliers and not included in the calculation of average transmissivity values for this portion of the Niobrara aquifer.

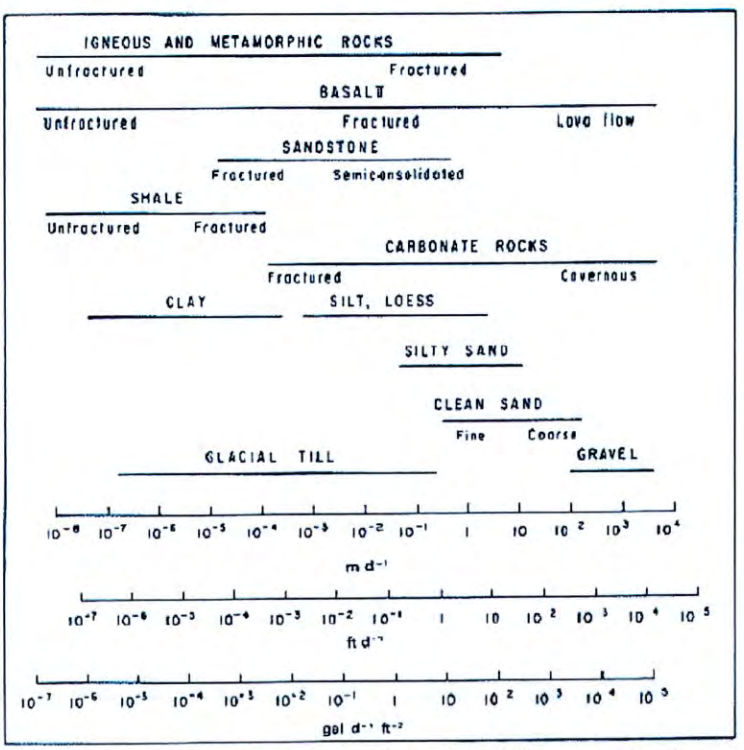

Figure C1: Typical values for hydraulic conductivity for different geologic material (Aqtesolv, 2019)

Table C1: Table of Estimate Transmissivity and Hydraulic Conductivity from Specific Capacity Data (Aqtesolv, 2023; Water Rights, 2023a)

Well*	Construction Year	Specific Capacity (gpm/ft drawdown)	Transmissivity (square ft per day)	Hydraulic Conductivity (ft/d)	Comment
Section 1: Data for wells within 1 mile of C-C'					
Melhaf	2019	0.50	133.69	6.68	
Bradley	2018	4.29	1145.91	11.94	
Section 1 Average		**2.39**	**639.80**	**9.31**	
Section 2: Data for other wells					
Taylor	1994	0.05	13.83	0.13	
Kramer	1981	0.08	21.39	0.31	
Berberich	1991	0.15	40.11	0.50	
Pekron	2010	0.11	28.14	0.55	
Waltner	2002	0.09	22.92	0.62	
Swenson	2009	0.09	24.95	0.71	
Graber-well 2	2018	0.18	48.91	0.80	
Ryken	2009	0.18	48.61	0.81	
6706-3	2005	0.30	81.41	0.93	
Hofer	1983	0.11	28.15	0.94	
Houser	2022	0.14	38.20	0.95	
D. Melhalf	2012	0.22	59.42	0.97	
Hofer	1986	0.24	64.54	1.09	
Langeland	2013	0.28	73.59	1.34	
Boars	2019	0.31	81.85	1.44	
Aman	2014	0.33	87.51	1.51	
Graber-well 1	2018	0.37	97.82	1.60	
stahl	2017	0.29	77.13	1.84	
Gross	1981	0.23	60.16	2.15	
Eisenbeis	2008	0.50	133.69	2.30	
Mehlhaff	2013	0.43	114.59	2.34	
Hanson	1993	0.40	106.95	2.43	
Plate	2015	0.56	148.54	2.97	
Olsen	2021	0.35	92.84	3.09	
Highland 2	2015	0.70	188.16	3.14	
7654-3	2013	0.71	190.99	3.18	
T. Nelson	2021	0.50	133.69	3.34	
Koerner	1980	0.50	133.69	3.61	
6524-3	2005	0.90	240.64	3.82	
Highland 1	2015	0.50	133.69	4.46	
Deckert	2002	0.60	160.43	4.58	
Madsen	1999	1.03	276.60	4.69	
8626-3	2017	2.62	699.74	5.00	
Zimmarmen	1991	0.80	213.90	5.35	
8162-3 North	2014	1.54	410.16	5.47	
7344-3 well 2	2012	3.16	844.34	5.59	
Streyle	2012	0.94	250.67	5.97	
Hofer	1982	1.00	267.38	6.08	
5764-3	1992	2.50	668.45	6.68	
Kleinsasser	1987	0.55	147.06	9.19	
Schultz	2008	0.78	208.89	9.95	
5239-3	1988	2.17	581.28	10.57	
Streyle	2016	2.50	668.45	11.14	
Gross	1982	1.00	267.38	12.15	
7526-3 north	2013	4.59	1227.76	12.28	
Vandewalle	2022	2.14	572.95	15.49	
Booth	2013	3.60	962.57	16.04	
7893-3	2013	2.50	668.45	16.71	
Rang	1982	1.00	267.38	16.71	
8067-3 well2	2015	6.98	1399.06	17.94	
T. Melhalf	2012	2.14	572.96	18.48	
Glanzer	2015	3.75	1002.67	18.92	
L. Hofer	1984	1.88	501.34	20.05	
7344-3 well 1	2012	7.69	2056.68	21.65	
Waltner	2013	5.00	1336.90	22.28	
H. Waltner	1988	3.75	1002.67	22.79	
8067-3 well 1	2015	5.45	1458.42	24.31	
7617-3	2013	13.27	3546.87	24.46	
8162-3 south	2012	7.14	1909.85	27.28	
Schrag	2013	1.06	283.11	28.31	
T. Waltner	1988	2.25	601.60	28.65	
Fliginger	1986	2.00	534.76	35.65	
8760-3	2016	11.17	2986.69	37.81	
Olsen	2018	3.00	802.14	40.11	
Stone	2015	3.00	802.14	40.11	
Waltner	1998	4.50	1203.21	57.30	"well fractured chalk"
Perterson-north	2007	4.50	1203.21	60.16	siltstone
Perterson-south	2007	4.50	1203.21	63.33	siltstone
Massey	2018	11.54	3085.15	81.19	
W. Waltner	1984	2.14	572.96	95.49	
Section 2 Average		**2.16**	**572.08**	**14.57**	
Section 1 & 2 Average		**2.17**	**573.96**	**14.42**	
Section 3: Outlier well data based on Hydraulic Conductivity and well log information					
7526-3 middle	2014	41.67	11140.78	139.26	sand in screened interval
7683-3	2013	81.25	21724.60	192.25	
Wirth	2014	25.00	6684.49	222.82	

*Well name based on either permit number or last name on well completion report (no attempt was made to verify spellings)

AFFIDAVIT OF PUBLICATION

YANKTON DAILY PRESS AND DAKOTAN

MICHAEL SCHULTZ
43721 281ST ST
FREEMAN SD 57029

STATE OF SOUTH DAKOTA
COUNTY OF YANKTON

KELLY HERTZ, BEING FIRST DULY SWORN ON OATH DEPOSES AND SAYS THAT (S)HE IS THE MANAGING EDITOR OF YANKTON MEDIA INC, A CORPORATION, THE PRINTER AND THE PUBLISHER OF THE YANKTON DAILY PRESS AND DAKOTAN, A LEGAL DAILY NEWSPAPER PUBLISHED AND CIRCULATED IN THE CITY OF YANKTON, SAID COUNTY AND STATE, AND ONE OF THE OFFICIAL NEWSPAPERS OF THE SAID COUNTY OF FACTS STATED IN THIS AFFIDAVIT; THAT THE ANNEXED NOTICE OF HEARING ON APPL

TAKEN FROM THE PAPER, IN WHICH IT WAS LAST PUBLISHED IN THE NEWSPAPER ON THE 28th DAY OF August, 2024
THAT THE FULL AMOUNT OF THE FEE CHARGED FOR THE PUBLICATION OF SAID NOTICE TO WIT $80.32 ENSURES TO THE BENEFITS OF THE PUBLISHER OF SAID NEWSPAPER AND THAT NO AGREEMENT AND UNDERSTANDING FOR THE DIVISION THEREOF HAS BEEN MADE WITH ANY OTHER PERSON, AND THAT NO PART THEREOF HAS BEEN AGREED TO BE PAID TO ANY PERSON WHOMSOEVER.

PUBLISHED ON: 08/28/2024

FILED ON: 08/28/24

SUBSCRIBED AND SWORN TO BEFORE ME THIS 28th DAY OF August, 2024

NOTARY PUBLIC, SOUTH DAKOTA
MY COMMISSION EXPIRES 07/15/2028

Ad text :

NOTICE OF HEARING on Application No. 8616-3 to Appropriate Water

Notice is given that Michael Schultz, 43721 281st St, Freeman SD 57029 has filed an application for a water permit to irrigate an additional 21 acres. Water Permit No. 7344-3 appropriates 5.33 cubic feet of water per second (cfs) from three wells completed into the Niobrara Aquifer (163, 180, and 209 feet deep) located near the center of the SE 1/4 Section 8; NE 1/4 SW 1/4, SE 1/4 NE 1/4 Section 9; all in T98N-R56W for irrigation of 399 acres. The permit also authorized a storage pond/reservoir which is located in the W 1/2 SE 1/4 Section 9-T98N-R56W. An investigation of the permit found the system capable of diverting 2.56 cfs from the existing wells and irrigating an additional 21 acres. The irrigated acreage, including the 21 additional acres, is located in the SE 1/4, S 1/2 NE 1/4 Section 8; SW 1/4, S 1/2 NW 1/4, NE 1/4, N 1/2 SE 1/4 Section 9; all in T98N-R56W. Water can be pumped from the three wells to the storage pond and then applied to the acreage. This application, if approved, and Water Permit No. 7344-3 will authorize a total diversion rate of 2.56 cfs for irrigation of 420 acres. This site is located approximately 2 miles southwest of Freeman SD.

South Dakota Codified Law (SDCL) 46-2A-4(10) provides that ?if the applicant does not contest the recommendation of the Chief Engineer and no petition to oppose the application is received, the Chief Engineer shall act on the application pursuant to the Chief Engineer's recommendation and no hearing may be held before the board, unless the Chief Engineer makes a finding that an application, even if uncontested, presents important issues of public policy or public interest that should be heard by the board.? In this case, the Chief Engineer finds that this application presents important issues of public interest that should be heard by the Water Management Board.

Pursuant to SDCL 46-2A-2, the Chief Engineer recommends APPROVAL of Application No. 8616-3 with qualifications 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. The Chief Engineer's recommendation with qualifications, the application, and staff report are available at https://danr.sd.gov/public or contact Ron Duvall for this information, or other information, at the Water Rights Program address provided below.

The Water Management Board will consider this application at 10:00 AM (Central Time) on October 2, 2024, in the Matthew Training Center, Joe Foss Bldg, 523 E. Capitol Ave., Pierre SD. The Chief Engineer's recommendation is not final or binding upon the Board. The Board is authorized to 1) approve, 2) approve with qualifications, 3) defer, or 4) deny this application based on the facts presented at the public hearing.

Any person who intends to participate in the hearing shall allege that the application, upon approval, will cause injury to the person that is unique from any injury suffered by the public in general. The injury must concern a matter either within the regulatory authority found in SDCL 46-2A-9 for approval or denial of the application, or other matter concerning the application within the regulatory authority of the board to act upon as defined by SDCL 46-2-9 and 46-2-11, or both. Any person meeting the petitioner requirements and wishing to be a party of record in a contested case hearing shall file a written petition to oppose the application with BOTH the applicant and Chief Engineer. A petition opposing the application shall be filed on a form provided by the Chief Engineer. The petition form is available online at https://danr.sd.gov/public or by contacting the Chief Engineer. The Chief Engineer's address is "Water Rights Program, Foss Building, 523 E Capitol, Pierre SD 57501? or call (605) 773-3352. The applicant's mailing address is given above. If contesting the Chief Engineer's recommendation, the applicant shall also file a petition. A petition filed by either an interested person or the applicant must be filed by September 9, 2024.

The petition shall be in writing and shall include a statement describing the unique injury upon approval of the application on the petitioner, the petitioner's reasons for opposing the application, and the name and mailing address of the petitioner or the petitioner's legal counsel, if legal counsel is obtained. The hearing is an adversary proceeding and any party has the right to be present at the hearing and to be represented by a lawyer. These and other due process rights will

be forfeited if they are not exercised at the hearing and decisions of the Board may be appealed to the Circuit Court and State Supreme Court as provided by law.

The October hearing date will be automatically delayed for at least 20 days upon written request to the Chief Engineer from the applicant or any person who has filed a petition to oppose the application. The request for an automatic delay must be filed by September 9, 2024. If an automatic delay is requested, the hearing will be rescheduled for a future Board meeting and personal notice will be provided to the applicant and all petitioners regarding the time, date, and location.

Any interested person may file a comment on the application with the Chief Engineer. The comment shall be filed on a form provided by the Chief Engineer and is available online at https://danr.sd.gov/public or by calling (605) 773-3352 or writing the Chief Engineer at the address provided above. Filing a comment does not make the commenter a party of record or a participant in any hearing that may be held. Any comment must be filed by September 9, 2024.

Notice is given to individuals with disabilities that the meeting is being held in a physically accessible location. Individuals requiring assistive technology or other services in order to participate in the meeting or materials in an alternate format should contact Brian Walsh, Nondiscrimination Coordinator, by calling (605) 773-5559 or by email at Brian.Walsh@state.sd.us as soon as possible but no later than two business days prior to the meeting in order to ensure accommodations are available.

Under SDCL 1-26-17(7) notices must state that ?if the amount in controversy exceeds $2,500.00 or if a property right may be terminated, any party to the contested case may require the agency to use the Office of Hearing Examiners by giving notice of the request to the agency no later than ten days after service of a notice of hearing issued pursuant to SDCL 1-26-17.? This is a Notice of Hearing, service is being provided by publication, and the applicable date to give notice to the Chief Engineer is September 9, 2024. However, since this particular matter is a water permit application and not a monetary controversy in excess of $2,500.00 or termination of a property right the Chief Engineer disputes the applicability of this provision and maintains that the hearing must be conducted by the Board.

As applicable, the following provides the legal authority and jurisdiction under which the hearing will be held and the particular statutes and rules pertaining to this application: SDCL 1-26-16 thru 1-26-28; SDCL 46-1-1 thru 46-1-9, 46-1-13 thru 46-1-16; 46-2-3.1, 46-2-9, 46-2-11, 46-2-17; 46-2A-1 thru 46-2A-12, 46-2A-14, 46-2A-15, 46-2A-20, 46-2A-21, 46-2A-23; 46-5-1.1, 46-5-2 thru 46-5-26, 46-5-30.2 thru 46-5-30.4, 46-5-31, 46-5-32 thru 46-5-34.1, 46-5-38 thru 46-5-39, 46-5-46, 46-5-47, 46-5-49; 46-6-1 thru 46-6-3.1, 46-6-6.1, 46-6-10, 46-6-13, 46-6-14, 46-6-21, 46-6-26; and Board Rules ARSD 74:02:01:01 thru 74:02:01:25.02; 74:02:01:35.01.

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Report to the Chief Engineer

On Reexamining James River Management

September 19, 2024

Introduction

The James River in South Dakota has been through numerous investigations and management changes through the decades to place the waters of the state to maximum beneficial use, while at the same time maintaining enough flow for existing rights and domestic uses. River systems in South Dakota pose a challenge for water management because streamflow and weather are unpredictable and often change quickly. The best policies in water management are those that can adapt to a wide range of water availability and water use scenarios.

There is currently a set appropriation threshold of 300 cubic feet of water per second on the James River set by the Water Resources Commission in 1965. A recent influx of water permit applications has prompted the Water Rights Program to investigate James River management once again because, since the late 1990's, there has been a near 300% increase in mean annual James River streamflow compared to previous streamflow records.

This report will investigate the history of James River management in South Dakota, the amount of streamflow required for existing rights and domestic use, the probabilities of available flows using daily discharge data dating back to 1946, possible causes to the increasing streamflow and the likelihood of increased flow continuing in the future, the determination of possible new methods of managing appropriations and qualifications for any new Water Permits that may be established on the James River, and how existing rights and domestic water use can be protected given the variability of streamflow in the James River.

South Dakota Codified Law (SDCL)

In general, South Dakota Codified Law (SDCL) Chapter 46-1 provides that the waters of the state belong to the people of the state, shall be placed to maximum beneficial use, and that water will not flow to waste. This chapter also provides the Water Management Board (WMB) with authority to issue water right permits, rules, and qualifications for water right permits, as well as to modify any qualifications. The pertinent statutes to this report are listed in full in the Appendix as **Attachment A1**.

Review of the James River

Originating in North Dakota, the James River flows southward across South Dakota and discharges into the Missouri River east of Yankton. In South Dakota, the river occupies a relatively flat plain between the highlands of the Coteau du Missouri to the west and the Coteau des Prairies on the east (Benson, 1983).

The James River is extremely meandering and has very little vertical gradient. The river is estimated to have approximately one inch of drop per mile in southern Brown County. This is one of the flattest slopes of any river of similar length in North America (Benson, 1983). Downstream of Redfield, the channel capacity and the slope increase, although the average gradient of the river in South Dakota is still only approximately 0.7 feet of drop per mile. Water

in the James River moves slowly, and travel times of water are measured in weeks, rather than by hours or days (USACE, 2018). The natural channel is shallow and wide, with low banks that often overtop during high flows. The river has been said to "belly up" during these events, when water widely covers the flat, low plain around the channel. Extended periods of no flow during late summer and winter can also be expected (Benson, 1983). Due to the flat gradient of the James River, the river occasionally flows backwards, creating negative discharge values in the northern reach of South Dakota at the confluence of tributaries during high flow events (USACE, 2014).

Primarily, to the extent that James River flows are controllable, Jamestown and Pipestem reservoirs in North Dakota and the operation of the impoundments on Sand Lake National Wildlife Refuge in South Dakota affect flows in the river in South Dakota (James River Technical Committee Model Studies, 1985). During high flow periods, the primary objective at Pipestem and Jamestown is to evacuate both pools as quickly as possible, following the spring runoff. The dams also conserve water during the spring of low flow years and water is released as constantly as possible during June, July, and August from the two reservoirs to sustain fish, irrigation, recreation, and wildlife (USACE, 2014). Two low head dams are located on the mainstem of the James River near Huron. They are the James Diversion Dam and the Third Street Dam. Several other smaller dams were privately constructed, and some serve primarily as recreation areas on the river (James River Technical Committee Model Studies, 1985).

The United States Geological Survey (USGS) operates a streamflow gaging station network in the United States, collecting realtime streamflow data, and retaining historical records (USGS, 2019). Stream gaging stations located on the James River are listed in **Table 1.** The records are usually continuous, although missing data or zero flow years may be present. These data were used to construct flow frequency curves for certain streamgages on the James River.

Table 1. Current streamflow data stations on the James River mainstem (USGS, 2019).

Station Number	Station Name	Years of Daily Discharge Data
06468170	James River near Grace City, North Dakota	56
06468250	James River above Arrowwood Lake near Kensal, North Dakota	39
06470000	James River at Jamestown, North Dakota	96
06470500	James River at LaMoure, North Dakota	74
06470878	James River at North Dakota/South Dakota State Line	43
06471000	James River at Columbia, South Dakota	79
06472000	James River near Stratford, South Dakota	74
06473000	James River at Ashton, South Dakota	79
06475000	James River near Redfield, South Dakota	74
06476000	James River at Huron, South Dakota	81
06477000	James River near Forestburg, South Dakota	74
06478000	James River near Mitchell, South Dakota	71
06478500	James River near Scotland, South Dakota	96
06478513	James River near Yankton, South Dakota	43

Prior Actions of the Water Resources Commission and Water Management Board

In 1965, the Water Resources Commission (a predecessor to the Water Management Board) set a provisional 300 cfs threshold on appropriations from the James River. James River appropriations up to 300 cfs were to have an August 10th cutoff date with the possibility of several hundred additional cfs being approved with a July 1st cutoff date (Water Resources Commission, 1965). The basis for setting the threshold and cutoff dates was a significant number of pending applications resulting in a report prepared for the Water Resources Commission entitled "James River; Stream Flows and Water Right Permits." The report stated that flow records indicate that there was usually more than sufficient water in the early spring and early summer and little or no flow in the late summer. The report concluded with a recommendation to approve the existing applications with an August 10th cutoff date; permits do not authorize diversion of water at any time when the river flow is obviously low; diversions to be in accordance with any written orders issued by the Commission or its representative; a combined diversion of 200 cfs of water could be approved above Huron; and that a combined diversion of 300 cfs could be approved above the Yankton-Hutchinson County line. The report included that when 300 cfs was reached, several hundred additional cfs could be approved with a July 1st cutoff date (Water Resources Commission, 1965).

Water permits continued to be approved from the James River until May 1968 when 300 cfs was reached. Despite the mention in the 1965 report to the Water Resources Commission of allowing issuance of permits in excess of 300 cfs, all applications for the James River were deferred until September 1975 when staff reported that some permits were not fully developed, and others could be cancelled, allowing new permits to be considered. Consequently, further permits were issued at that time to bring the total permitted appropriations up to 300 cfs. Additional applications received after November 1975 were deferred and then advertised for the January and March meetings in 1979. The Water Resources Commission decided in March 1979 to withdraw the James River from further appropriation for one year until additional study was conducted to determine if there was unappropriated water available. In July of 1980, based on the studies conducted by the Water Rights Program, the Water Management Board adopted Findings of Fact, Conclusions of Law and a Final Decision to issue water permits on the James River beyond a 300 cfs threshold. Two of those decisions were: 1) Based on such studies of actual irrigation development and use, it is projected that a maximum of 50 percent of permitted acres will be irrigated at any one time, and 2) Those permits applying beyond a 300 cfs threshold could be approved with a July 15th cutoff date (Water Management Board, 1980).

Inspections of water rights/permits in the spring of 1985 found that the total water appropriation from the James River was 254.07 cfs. Previously, the total James River water appropriation had been 443.92 cfs based on existing records. The WMB meeting in May 1987 approved a recommendation that all James River water rights/permits with July 15th cutoff dates be amended to replace the July 15th cutoff date with the August 10th cutoff date (Duvall, 1987). Appropriations on the James River have not exceeded 300 cfs since inspections during the spring of 1985 found the total water appropriation to be 254.07 cfs.

In 2007, the WMB adopted standardized qualifications for the James River (Beck, 2007). The James River was divided into three river reaches: 1) ND-SD border to the USGS gage at Ashton, SD; 2) USGS gage at Ashton, SD to USGS gage at Huron, SD, and 3) USGS gage at Huron, SD to the Yankton-Hutchinson County line. Existing water rights/permits were amended to include standardized qualifications with the intent of using the same qualifications on future James River water rights/permits. To address times when water availability is scarce, the WMB placed the following qualifications on certain James River permits: 1) Permits do not authorize diversion of water from the James River after August 10th of each calendar year, unless written orders have been issued by the Chief Engineer. Diversions are subject to senior water rights and any written orders issued by the Chief Engineer, and 2) Permits do not authorize diversion from the James River when there is less than 20 cfs bypassing the USGS streamgage where the closest downstream gage is at Ashton, at Huron, or near Scotland.

Since 1965, appropriations from the James River have been issued both within, and in excess, of 300 cfs with certain cutoff dates. The James River has undergone multiple studies by the Water Rights Program to evaluate existing permits/rights, amendments to qualifications, and the availability of water.

This year multiple new permit applications have requested to place to beneficial use water from the James River. These applications, if approved, would result in excess of 300 cfs being appropriated from the river. This report intends to be an updated study by the Water Rights Program to determine under what conditions, if any, appropriations beyond a 300 cfs threshold can be approved and, if approved, what qualifications need to be attached to protect domestic users and existing water right/permit holders. The James River is the only river in South Dakota where a specific cfs value (300 cfs) is associated with the amount of water appropriated from the river and what qualifications get assigned to permits depending on whether the permit is issued within a total of 300 cfs or in excess of 300 cfs.

Review of Existing Water Rights/Permits

Currently there are 116 water rights/permits and two future use permits appropriating or reserving 298.92 cfs of the 300 cfs appropriation threshold between the ND-SD border and the Yankton-Hutchinson County line. Of those 116 water rights/permits, 77 are appropriating 199.19 cfs of the 200 cfs appropriation threshold between the ND-SD border and the USGS gaging station at Huron, SD (Water Rights, 2024a).

Future Use Permit No. US594-3 held by the U.S. Bureau of Reclamation reserves 500 cfs from the James River and other sources. The majority of the water reserved by this permit and attributed to the James River would have come from Missouri River return flows created by the defunded and non-constructed Oahe Project. Originally, the reservation of water was by Future Use Permit No. 1067-3 held by the Oahe Conservancy Sub-District, but the permit was transferred to the Bureau of Reclamation under Future Use Permit No. US594-3 in 1974. The remainder of Future Use Permit No. 1067-3 was cancelled by the Water Management Board in 2012. Since the source of the majority of the water reserved by US594-3 was to be from a federal irrigation project that was never constructed and has been defunded, the status of the reservation is uncertain (Water Rights, 2024a).

Attachment A2 in the Appendix lists the active water rights/permits and future use permits on the James River. **Figure 1** shows the locations of existing water rights/permits and USGS streamgages on the James River in South Dakota. The water right marker located on the Missouri River in Hughes County is Future Use Permit No. US594-3.

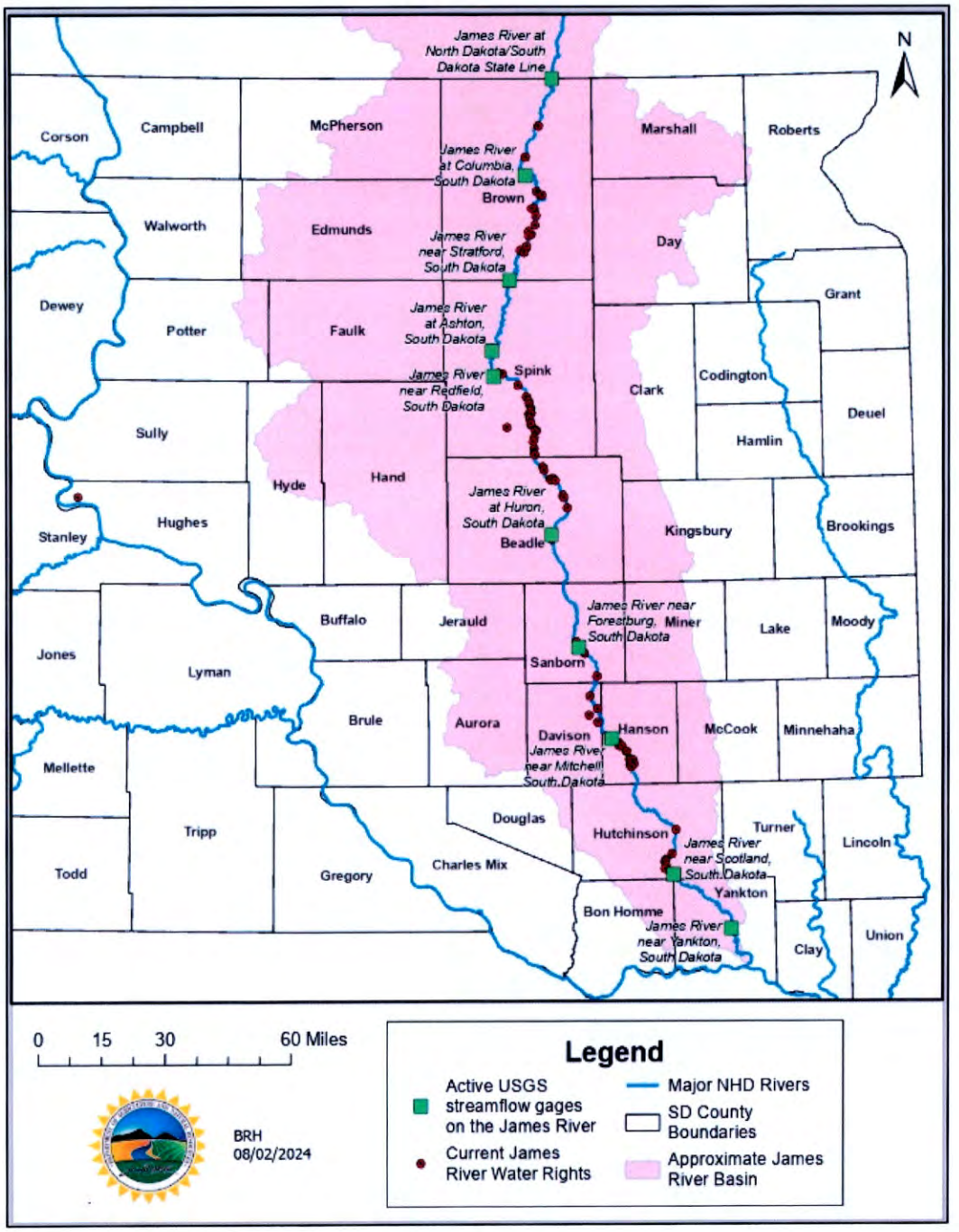

Figure 1. Map of existing James River water rights/permits between the ND-SD border and the Yankton-Hutchinson County line, active USGS streamgages on the James River in South Dakota, and an approximate boundary of the James River basin (USGS, 2019; Water Rights, 2024a).

Review of Deferred Water Rights/Permits

There are currently 14 deferred water permit applications to appropriate from the James River. Water Permit Application Nos. 8821-3, 8822-3, 8823-3, and 8824-3 for Jim or Colin Klebsch along with Water Permit Application No. 8835-3 for Nick & Scott Bebo were deferred at the May 8th 2024 WMB meeting until completion of this review on the James River. Since then, there have been nine new water permit applications for the James River, also submitted by Klebsch and Bebo. Those are Application Nos. 8859-3, 8860-3, 8861-3, 8862-3, 8863-3, 8867-3, 8868-3, 8869-3, and 8870-3, which were all deferred by the WMB at the July 10, 2024 meeting. In total, these applications are requesting 34.38 cfs to irrigate 2,603 acres from the James River, all located near Redfield, SD. Full descriptions of these applications are listed in the Appendix as **Attachment A3.**

If Water Permit Application No. 8821-3 had been approved, it would have exceeded 200 cfs in the river stretch between the ND-SD border and Huron and left 0.27 cfs below 300 cfs (Water Rights, 2024a). All of the other deferred James River applications are also located in the 200 cfs stretch of the river. This report addresses whether new applications can be approved with qualifications that protect existing water permits/rights and domestic water uses. To this end, the WMB deferred all James River applications until the Fall/Winter 2024 pending completion of this review for WMB consideration.

Current James River Appropriation

Currently, 199.19 cfs of the 200.00 cfs is appropriated on the James River between the ND-SD border and the USGS gaging station at Huron, and 298.92 cfs of the 300.00 cfs is appropriated between the ND-SD border and the Yankton-Hutchinson County line (Water Rights, 2024a).

According to the Findings of Fact and Conclusions of Law from the July 1980 WMB meeting, it is projected that a maximum of fifty percent of permitted acres will be irrigated at any one time based on studies of actual irrigation development and use. This conclusion was reached after Water Rights staff conducted detailed hydrographic surveys of the availability of water in the river and studies of the anticipated effects of approving water permits based on projected development and use by appropriators. The review to estimate maximum pumping at any given time was redone using irrigation questionnaires from 1996 to 2006 (Beck, 2007). The maximum number of acres irrigated at any given time in each river reach was as follows:

ND-SD border to USGS gage at Ashton	**52%**
USGS gage at Ashton to USGS gage at Huron	**42%**
USGS gage at Huron to Yankton-Hutchinson Co. Line	**29%**

Future Use Permit No. 8512-3 for the City of Aberdeen is assumed to be fully developable. James River water rights/permits that are limited only by an annual volume, i.e., storage dams, have not historically been included in the 300/200 cfs appropriation budget and will not be included here (**Attachment A2**) (Water Rights, 2024a). Future Use Permit No. US594-3 will also not be included in the budget since the basis for the water being available at a future date no longer exists. Since reporting for use other than irrigation is limited, 100% pumping is assumed

at any given time. Additionally, 20 cfs is budgeted for domestic use for each stretch. **Table 2** shows the current appropriated water in each of the three river stretches, and the estimated flow required for each stretch of the James River to satisfy current appropriations and domestic use.

Table 2. Estimated flow required for current appropriations and domestic use (Water Rights, 2024a; Beck, 2007)

River Stretch	Total Use (cfs)	Irrigation use	50% Irrigation	Non-Irr	Domestic	Flow Required
ND-SD Border to Ashton gage	39.14	24.14	12.07	15	20	**47.07**
Ashton gage to Huron gage	160.05	141.02	70.51	19.03	20	**109.54**
TOTAL (200 cfs limit)	**199.19**					
Huron gage to Yankton-Hutchinson Co. Line	99.73	95.95	47.975	3.78	20	**71.76**
TOTAL (300 cfs limit)	**298.92**					

James River Flow Characteristics

A dataset is a collection of measurements that are used to learn about a population. The population in this case is James River streamflow in South Dakota. USGS gages for the James River at Jamestown, ND and near Scotland, SD have 96 years of daily discharge data available (**Table 1**). While 96 years is a long time, those daily discharge data are still a sample, and using those available data to try and characterize the overall population can be a challenge (Helsel, et al., 2020). When the appropriative threshold was set in 1965, flows were only analyzed for the years 1950 to 1963 (Water Resources Commission, 1965).

A sample dataset needs to correctly characterize the population to avoid arriving at incorrect conclusions, which can be significant. The implications of a sample dataset not correctly characterizing the population are huge. For example, it is known today that the Colorado River Compact of 1922—the water allocation compact that divides Colorado River flows between the upper and lower Colorado River basin states—was signed during a period of relatively high annual flows. The first streamgages for the Colorado River were established in the 1890's, and the compact was written in the 1920's. There was an assumption that the river had a single, mean value of annual flow, and that annual variations occurred around this long-term, fixed average. This fixed average was based on the climate and hydrology of the late 1890's and of the early 1900's, which was an exceptionally wet period. It is known now that the gaged record of the Colorado River streamflow covers only a small subset of the range of natural hydroclimatic variability present over several centuries (National Research Council, 2007). Assuming that 20, 30, 40, or even 96 years of streamflow observations give a full representation of flow variability is incorrect, although the longer the period of record, the better when performing an analysis.

One method to help characterize the population of sample data is to use box plots. The boxplots are annual mean discharge data for each of the three gages of interest, for the years 1946-2023, and can be seen in **Figure 2**. In order to correctly interpret the data between stations, records examined in a multiple station study must be concurrent (Helsel et al., 2020); for example, the streamgage near Scotland has daily mean flow data going back to 1928, while the Ashton gage only has data available from 1945 to the present.

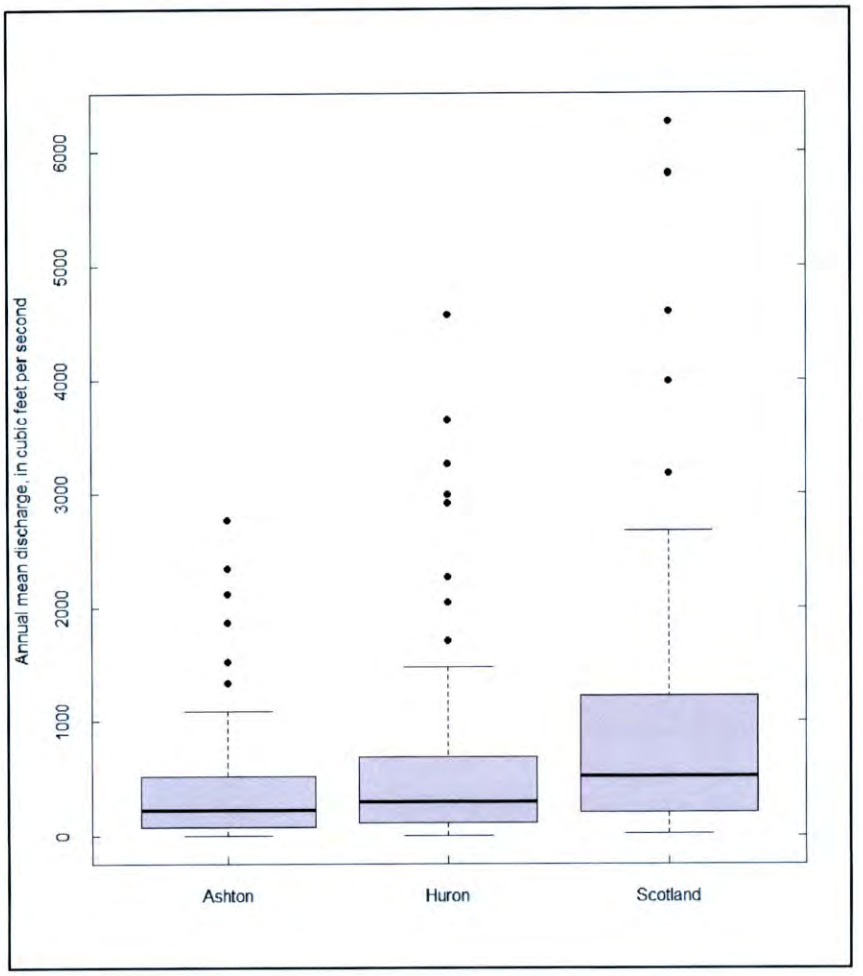

Figure 2. Three boxplots of annual mean discharge data for USGS gages James River at Ashton, at Huron, and near Scotland, South Dakota, for the water years 1946-2023 (Hirsch and De Cicco, 2015; USGS, 2019). A water year is defined as the 12-month period of October 1, for any given year through September 30, of the following year.

A boxplot is a way of displaying data based on the minimum, the first quartile (the median of the lower half of the dataset), the median of the whole dataset, the third quartile (the median of the higher half of the dataset), and the maximum. The box itself represents the middle 50% of the data (the interquartile range), with the bottom of the box being the first quartile and the top of the box being the third quartile. The minimum and maximum of the dataset are the lines at the end of the dashes (called whiskers) and are within 1.5 times the interquartile range. The outliers are the single points outside of the whiskers. Looking at **Figure 2**, the annual mean discharge data for those three sites are positively skewed, which is common in hydrologic data and represents periodic high flows that are far from the center of the distribution. This makes the mean of the data greater than the median, as the mean is strongly affected by the magnitude of any single observation (Helsel et al., 2020). The median is the central value of the distribution based on rank, with an equal number of data points above and below. The median is the solid black line within the box. In a positively skewed boxplot, the median is shifted towards the first quartile.

The positive skew is also indicated by the longer whiskers on the top of the box, and because the distance between the maximum and the box is larger than between the minimum and the box. For these James River gages, there are extreme high flow data extending beyond the whiskers, and the further downstream the gage, the greater the magnitude of high flow, and the outliers are further spread out. The Ashton gage has more tightly clustered data, since its box is shorter, compared to the Scotland gage, which has more dispersed data. All of this suggests that the available discharge data for James River streamflow has a non-normal distribution, and it is preferable to use statistical techniques that work over a wide range of situations.

Water Availability at Current Appropriation

In order to determine water availability on the James River, it is important to know the general distribution of flow during the year. **Figure 3** was constructed by finding the median flow for each month of the year using daily discharge data for each of the years 1946-2023, for three James River streamgages at Ashton, at Huron, and near Scotland. Then, the median for each of the 78 years was found for a particular month.

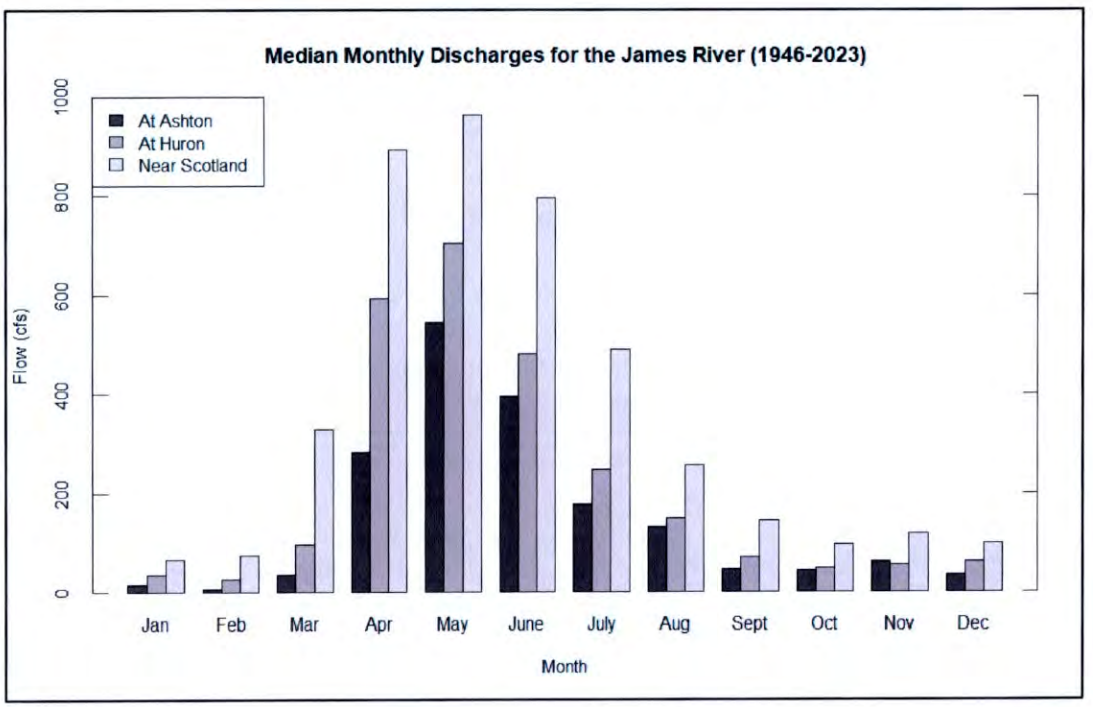

Figure 3. Bar graph of median monthly discharges for the James River at Ashton, at Huron, and near Scotland using daily mean discharge data for the years 1946-2023 (Hirsch and De Cicco, 2015; USGS, 2019).

Flows on the James River increase downstream, as seen in **Figure 3** where median monthly flows near Scotland are greater than median monthly flows at Ashton. Contributing factors include a larger drainage basin, a higher capacity channel, a larger gradient, and generally more annual precipitation in southern counties in the basin. The river has potential for relatively high flows during spring from snowmelt and during early summer from thunderstorms. Flows begin

decreasing uniformly after May and then levels out from September through December. Since approximately 87% of total flow appropriation on the James River mainstem is for irrigation use (**Table 2**), the bulk of the analysis will focus on the months of May, June, July, August, and September since these months are the typical irrigation season in South Dakota.

Flow duration curves, or flow exceedance probabilities, are a cumulative frequency curve that show the percent of time that discharges were equaled or exceeded during a given period (Benson, 1988). Small flows have a high likelihood of being exceeded, and large flows have a low likelihood. These curves provide context about the range of discharge values that are common and those that are extreme. There are factors of safety built into the analysis to assess water availability. All of the exceedance probabilities for each gage were calculated using flow data collected from the James River during years where pumping occurred. This means that using those flows to estimate the water availability based on current flow requirements (**Table 2**) upstream of a gage is an underestimation of the flow available, because pumping had already occurred in the upstream stretch of river before flows reached a downstream gage. To calculate required flow, 50% simultaneous irrigation pumping was assumed, and it was also assumed that 100% of all other uses will be pumping at the same time with 20 cfs added to account for domestic use between each stretch.

Tables 3 through 7 show annual exceedance probabilities for flows at gaging stations at Ashton, at Huron, and near Scotland for the months of May, June, July, August, and September. For example, there is an 80% chance that daily flow in May for the gage at Huron will exceed 110 cfs, calculated using all daily data for that month, for the years 1946 to 2023. The exceedance probabilities were calculated using the Weibull plotting position. By using all the daily data for a certain month, for every available year of data to calculate exceedance probabilities, all recorded low-flow and high-flow scenarios for that month are included in the flow probabilities, providing a well-rounded view of James River flows.

Table 3. Exceedance probabilities of daily mean flows (cfs) during May at streamflow gaging stations on the James River in South Dakota for the years 1946 through 2023 (USGS, 2019).

Station Name	Years	80%	75%	50%	20%	10%	4%	1%
At Ashton	(1946-2023)	91	132	573	1440	3130	4330	6820
At Huron	(1946-2023)	110	173	650	2060	4520	6370	9050
Near Scotland	(1946-2023)	208	260	917	2250	4560	6700	9130

Table 4. Exceedance probabilities of daily mean flows (cfs) during June at streamflow gaging stations on the James River in South Dakota for the years 1946 through 2023 (USGS, 2019).

Station Name	Years	80%	75%	50%	20%	10%	4%	1%
At Ashton	(1946-2023)	71	101	378	1170	2100	2930	3750
At Huron	(1946-2023)	80	112	496	1680	2980	4410	6320
Near Scotland	(1946-2023)	164	235	810	3040	4170	5600	8320

Table 5. Exceedance probabilities of daily mean flows (cfs) during July at streamflow gaging stations on the James River in South Dakota for the years 1946 through 2023 (USGS, 2019).

Station Name	Years	80%	75%	50%	20%	10%	4%	1%
At Ashton	(1946-2023)	44	61	224	1150	1770	2410	5200
At Huron	(1946-2023)	45	68	268	1450	2140	3330	7350
Near Scotland	(1946-2023)	78	105	479	1900	3160	5590	8880

Table 6. Exceedance probabilities of daily mean flows (cfs) during August at streamflow gaging stations on the James River in South Dakota for the years 1946 through 2023 (USGS, 2019).

Station Name	Years	80%	75%	50%	20%	10%	4%	1%
At Ashton	(1946-2023)	9	14	122	1060	1420	1940	4120
At Huron	(1946-2023)	8	24	151	1170	1950	2610	5560
Near Scotland	(1946-2023)	38	51	279	1290	2030	3770	8290

Table 7. Exceedance probabilities of daily mean flows (cfs) during September at streamflow gaging stations on the James River in South Dakota for the years 1946 through 2023 (USGS, 2019).

Station Name	Years	80%	75%	50%	20%	10%	4%	1%
At Ashton	(1946-2023)	0	0	46	687	1210	1680	2760
At Huron	(1946-2023)	0	0	71	789	1520	1990	3710
Near Scotland	(1946-2023)	22	30	137	898	1670	2500	4640

One observation from looking at **Tables 3 through 7** is that flows increase exponentially after 50% probability. This is because the sample data are positively skewed, and not normally distributed (**Figure 2**). Flows on the James River do not increase linearly, and this is why the flow magnitudes increase more in the lower exceedance probabilities than the higher. This is also why the median is a better indication of typical flow than the mean, because it is based on rank rather than magnitude.

The 50% exceedance probability, or the flow likely to be exceeded 1 of every 2 years, will be used for this analysis. This has been used in previous Water Rights Program reports when assessing the availability of streamflow (Water Rights, 2024a), and the current appropriation thresholds were made using "average streamflow" for the years 1950-1963 (July 1965 Findings of Fact). **Table 8** lists the current required flow upstream of each gage, the chance that the required flow will be equaled or exceeded, and the available flow at each gage based on the 50% exceedance probabilities.

Table 8. Summary of flow exceedance probabilities from **Tables 3 through 7**, required flow upstream of each gage (**Table 2**) and the available flow upstream of each gage.

Gage	Required Flow to satisfy current upstream appropriation (cfs)	Chance that the required flow will be equaled or exceeded in May, June, July, August, and September	Flow at 50% Exceedance Probability for May, June, July, August, September (cfs)	Available Flow (cfs) (Flow at 50% - Required Flow)
At Ashton	47	85%, 82%, 79%, 65%, 49%	573, 378, 224, 122, 46	526, 331, 177, 75, 0
At Huron	109	80%, 75%, 67%, 56%, 42%	650, 496, 268, 151, 71	541, 387, 159, 42, 0
Near Scotland	71	92%, 85%, 74%, 64%, 54%	917, 810, 479, 279, 137	846, 739, 408, 208, 66

The 200/300 cfs thresholds themselves are likely to be exceeded 50% of the time for May, June, and July, while the required flows at any given time in a stretch of river to satisfy existing rights and domestic use are less than the 200/300 cfs threshold. It should be noted again that these numbers are the flow available after the river has already been pumped in the upstream stretch. Consequently, the data used in **Tables 3 through 7** to calculate the likelihood of available flow for diversions already reflects removal of those diversions from the dataset, resulting in quite conservative estimates of available flow.

Considering the flow probabilities in **Table 8** during the lower flow month of August, between Huron and Scotland, there is 279 cfs of flow at the 50% exceedance probability in August, and at least a 64% chance that the required flow between Huron and Scotland would be satisfied. As for the stretch of river with the 200 cfs threshold on it (ND-SD border to Huron gage), there are 122 and 151 cfs of flow at the 50% exceedance probability in August at the Ashton and Huron gage respectively (**Table 8**), indicating that during normal years there would be approximately 75, 42, and 208 cfs available between each respective stretch. Flows in September decrease significantly, however, the river during normal years still has greater than 20 cfs of flow.

The chances that there will be enough flow for current diversions during the months of May, June, July, and August, between all three streamgages, are at least 56%. For the gage in Ashton and near Scotland, there is at least a 64% chance that the current required flow upstream of the gage would be exceeded for those four months. The gage at Huron has slightly less probability of flow being exceeded to satisfy current upstream appropriation in August, because the stretch of river between the Ashton gage and the Huron gage is the most heavily appropriated. Considering the existing August 10th shutoff date, that removal of diversions is already accounted for in the flow data, as well as the greater amount of water available during May, June, and July during normal years, there is a reasonable probability that water is available for appropriation above the current diversion rate thresholds.

Increased Streamflow on the James River

One of the largest flooding events in South Dakota on record was the 1881 flood at the confluence of the James and Missouri Rivers. Major flooding (based on NWS major flood stages) at any one of the gages at Ashton, at Huron, or near Scotland, occurred in 1922, 1950, 1952, 1960, 1962, 1969, 1978, 1984, 1986, 1987, 1993, 1994, 1995, 1997, 2001, 2007, 2008, 2009, 2010, 2011, 2019, 2020, 2022, 2023, and in June of 2024 (NWS 2023 and 2024; USGS, 2019). **Figures 4 and 5** below show the James River near Mitchell during times of regular to low flow, and during times of major flooding.

Figure 4. Landsat 5 Satellite Image of the James River on May 19, 2005, near Mitchell, SD (NASA Earth Observatory).

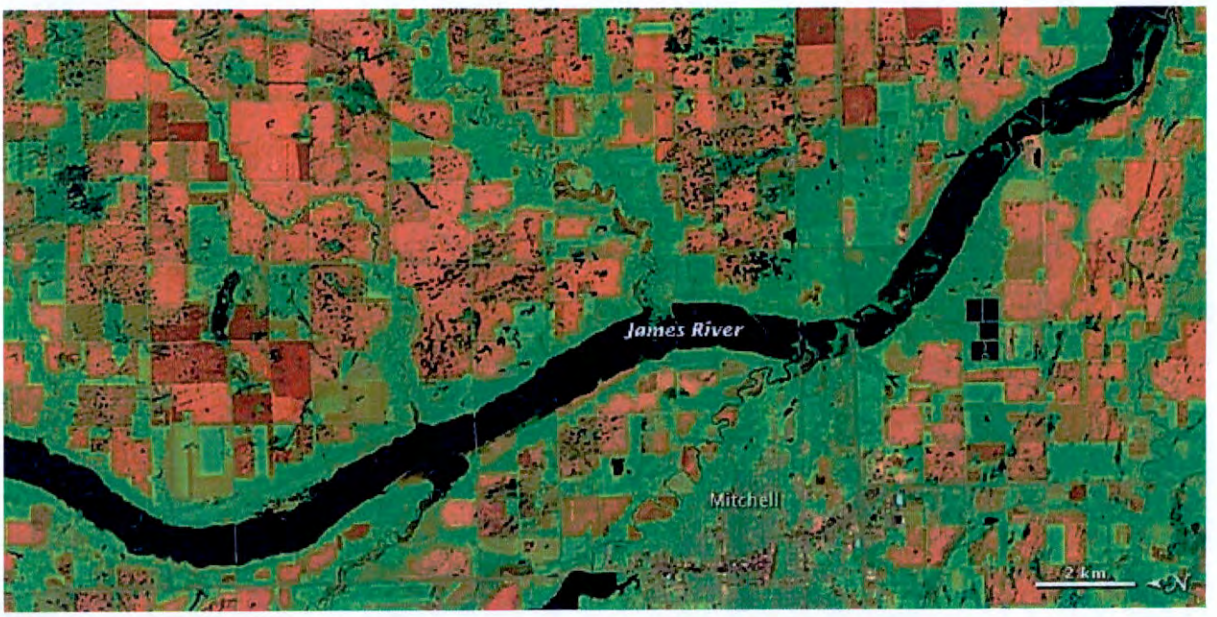

Figure 5. Landsat 5 Satellite Image of the James River on June 5, 2011, near Mitchell, SD (NASA Earth Observatory).

The James River has seen a history of flooding, but persistent flooding began in the early to mid-1990's. In 1993, there were approximately 1.2 million acres affected by the flooding in the counties that the James River passes through. In 1994, it was 1.8 million acres. In 1995, flooding affected 2.7 million acres (Water Rights, 2024b). Due to the flooding, there were long-term consequences. This includes the installation of more tile drainage, changes to reservoir

management, and the reconstruction of infrastructure in the floodplain (Norton et al., 2022; Water Rights, 2024b).

Since the flooding in the 1990's, there has been an increasing trend of streamflow in the James River (Hirsch and De Cicco, 2015; USGS, 2019). Streams in the eastern Dakotas have experienced the greatest increases in streamflow during the last 60 years in comparison to any other USGS gaged stream in the United States (Norton et al., 2022). **Figure 6** from Norton et al., 2022 highlights the increased streamflow in the eastern Dakotas compared to other gaged locations in the U.S.

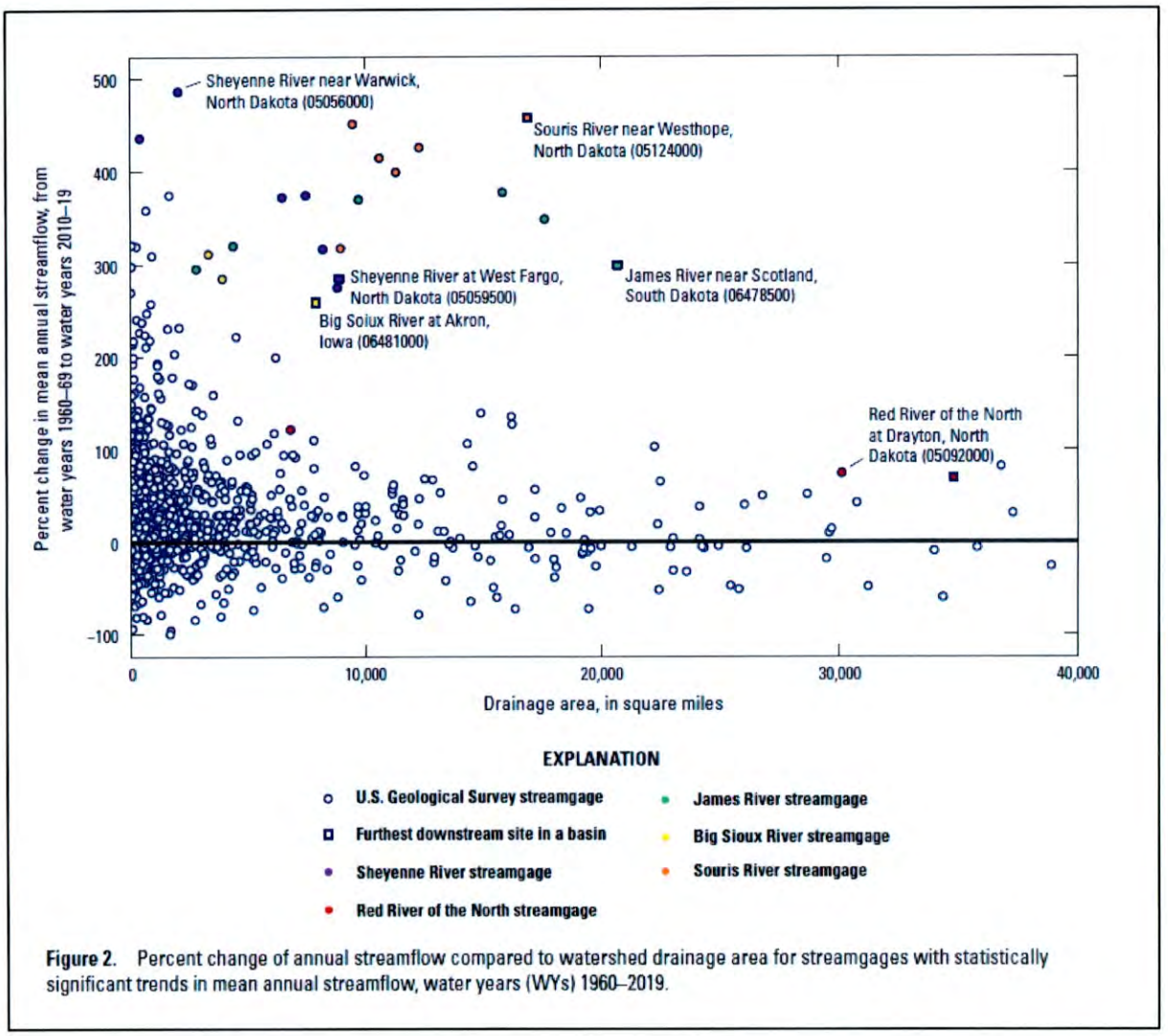

Figure 2. Percent change of annual streamflow compared to watershed drainage area for streamgages with statistically significant trends in mean annual streamflow, water years (WYs) 1960–2019.

Figure 6. Graph from Norton et al., 2022 showing percent increases in streamflow compared to watershed size for statistically significant trends in mean annual streamflow. The green dots are James River streamgages, and any colored dots represent streamgages in the eastern Dakotas.

In 2020, the USGS Gage No. 06471000 James River at Columbia, was measured above flood stage for more than 518 consecutive days (Norton et al., 2022). Since then, the National Weather

Service has updated its flood severity categories to reflect flow changes to the James River (NWS, 2023). **Figure 7** shows peak streamflow on the James River at Huron, and the previous and new National Weather Service (NWS) major flood categories. Note that the peak streamflow is not a continuous record until 1944, and that the data from 1881 to 1944 are historical floods that occurred before the period of systematic data collection at this location.

Flooding on the James River has always occurred, even during extended-year low flow conditions. Extended periods of low flows known from recorded observations occurred in the 1950's through the mid 1960's, sporadically in the 1970's, and the late 1980's to early 1990's (USGS, 2019). There was still occasional flooding during these times on the James River (**Figure 7**).

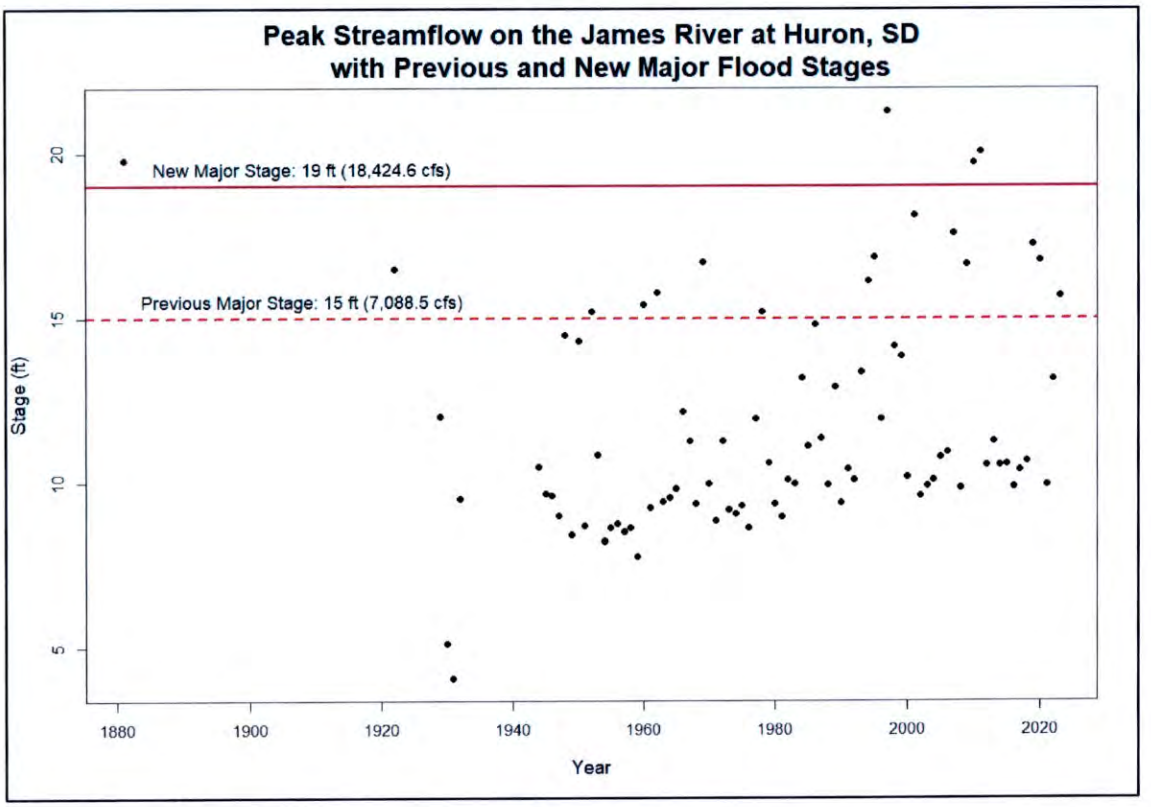

Figure 7. Peak discharges on the James River at Huron, and the stage levels of new and previous NWS major flood categories (NWS, 2023; USGS, 2022)

Figures 8 and 9 show two different discharge statistics and their smoothed values for the streamgage at Huron. The smoothing method used is based on locally weighted scatterplot smoothing (Lowess), and the curves are resistant to the influence of one or two years with extremely high or low flows (Hirsch et al., 2015). The Lowess smoothing in the graphs show the increasing flow volumes on the James River. The streamgages at Ashton and near Scotland show similar trends, and the mean annual streamflow volume at the gage near Scotland from 1960-1969 compared to 2010-2019 increased by 298%. That equates to 1,269,679 acre-feet more water being transported downstream each year. Most of the streamgages in the Norton et al.

(2022) study with the greatest increases in mean annual streamflow are on rivers in the eastern Dakotas, regardless of basin size (Norton et al., 2022).

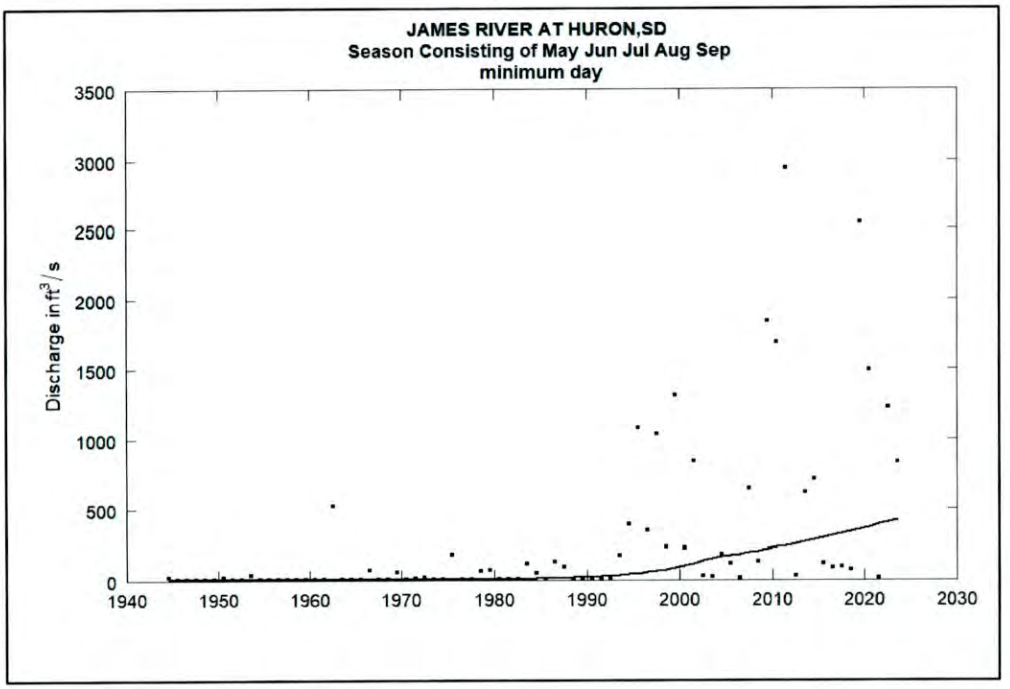

Figure 8. Minimum daily flow for the gage James River at Huron, SD during the months of May, June, July, August, and September for the years 1944 to 2023 (Hirsch et al., 2015; USGS, 2019).

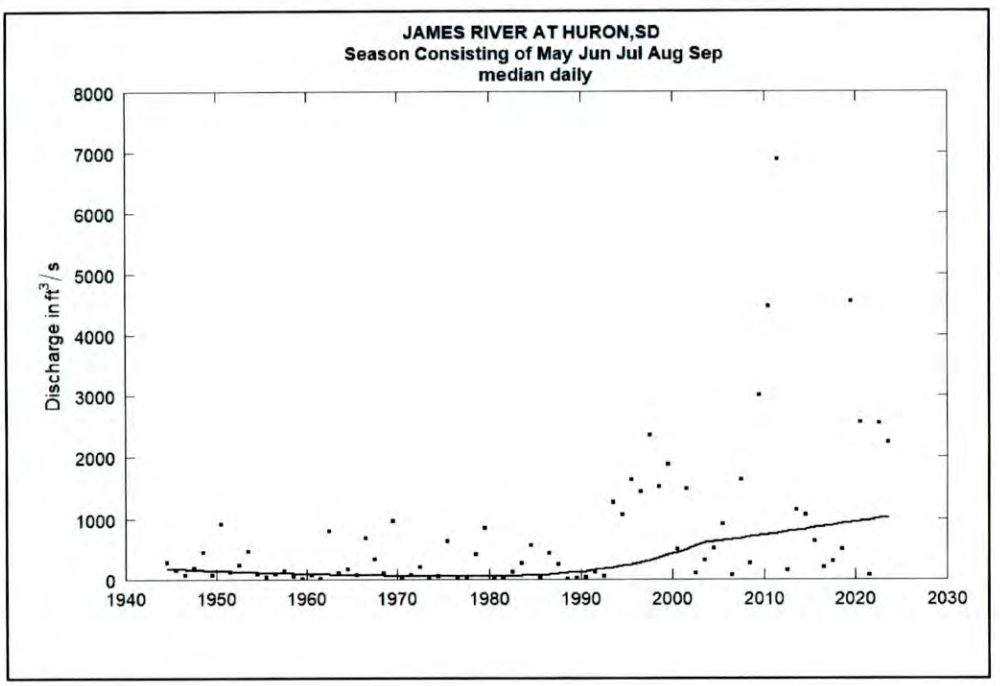

Figure 9. Median daily flow for the gage James River at Huron, SD during the months of May, June, July, August, and September for the years 1944 to 2023 (Hirsch et al., 2015; USGS, 2019).

The bar graph (**Figure 10**) below shows the 50th percentile of mean monthly streamflow at the Huron gage for the years 1944 to 2023 during three different time periods to illustrate the increasing flow. Ice is assumed to be zero flow.

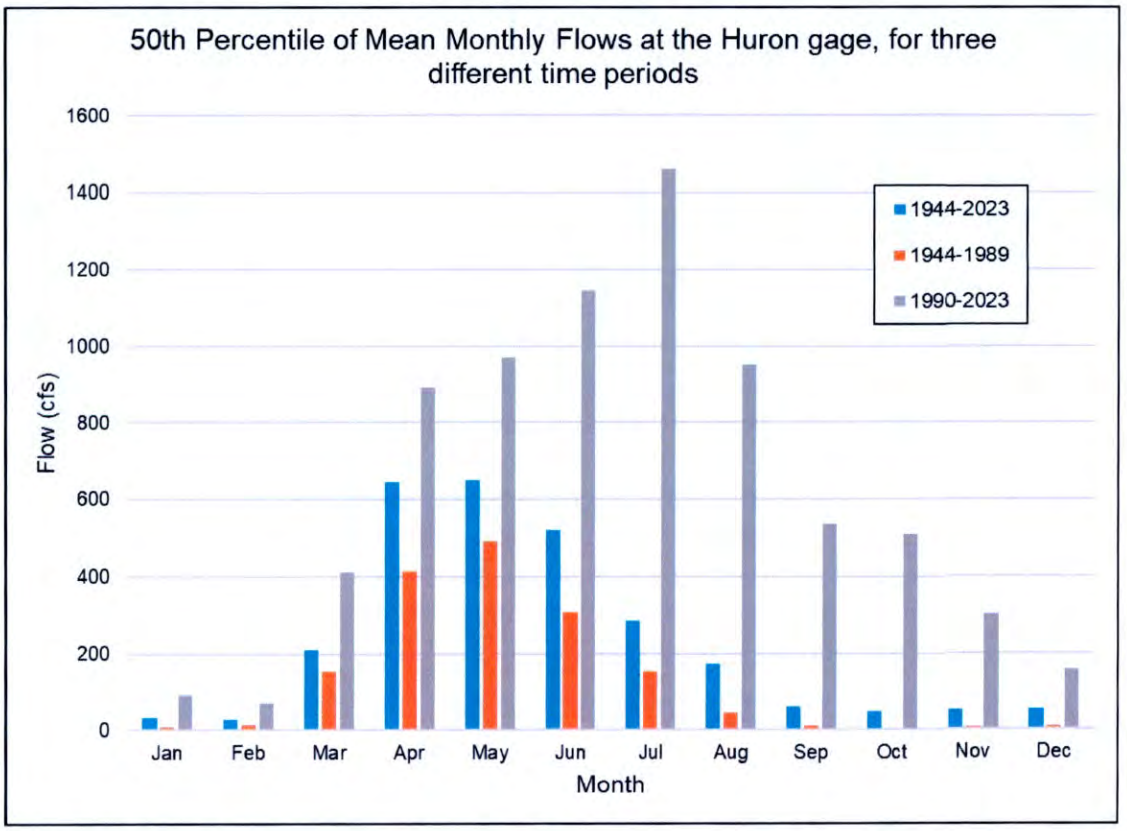

Figure 10. Bar Graph showing the 50th Percentile of mean monthly streamflow data for the years 1944-2023, for three different time periods (USGS, 2019).

Rise of Lake Levels in NE South Dakota

The effects of increased streamflow magnitudes and flooding is also seen in the rise of lake levels in closed basins in the northeast Dakotas—the Devils Lake Basin in North Dakota and the Waubay Lakes complex in South Dakota. The lake system is located on the Coteau des Prairies, a dominant highland in the eastern part of the state. These rising water levels have led to greater connectivity of the lakes in those basins, providing more paths for runoff to rivers and have contributed to flooding and increases in annual streamflow in rivers and streams (Norton et al., 2022; Water Rights, 2024c). For the Waubay Lakes chain, the net increase in water has resulted in flooding which has not been observed in the modern instrumental record, which generally begins in the mid-1920's with scattered discontinuous data, and then becomes continuous for most lakes for the years 1960 to the present (Water Rights, 2024c; USGS et al., 1999).

Lake levels were also high during the General Land Office meander survey of 1868-77, similar in size to the lakes in 1994. By 1998, the surface area of Waubay Lake was 1.3 times larger than it was during the years 1868 to 1877. Waubay Lake levels rose by almost 19 feet and more than

doubled in area from 1993 to 1999. Regardless of whether the climate is wet or dry in the next few years, flooding problems will persist in this region. It would take at least a decade of drought similar to the 1930's conditions to return the lakes back to the conditions that existed prior to 1992 (USGS et al., 1999). Since the publishing of USGS et al. (1999), several lakes in the basin have continued to rise beyond the levels in the late 1990's (Water Rights, 2024c).

Predicting Future Flow Conditions

Annual peak flow, and the minimum and median James River flows during the irrigation season have significantly increased since approximately 1993, with low-flow years interspersed within that timeframe (Hirsch et al., 2015; Norton et al., 2022; Ryberg et al., 2022). A basic assumption within the federal guidelines for peak-flow frequency analyses assumes that the statistical properties (mean, variance, and skew) of the distribution of peak flows do not change over time, and are stationary (England et al., 2018).

The common methodology is to perceive river flows as annual random fluctuations around a constant mean—this is stationarity, that flows vary within a window around a long-term mean (Koutsoyiannis, 2005; Ryberg et al., 2020), and that physical influences affecting streamflow do not change. This assumption has been called into question in recent years, and multiple publications have been researching whether the traditional stationarity assumption in peak streamflow analysis should be modified (Koutsoyiannis, 2003; Razavi et al, 2015; Sando et al., 2022; Ryberg et al., 2020; Ryberg et al., 2024).

In the past few decades, there has been a better understanding about potential climate change and land-use change, which have been prompting the study of nonstationarity in streamflow. Nonstationarity assumes that the long-term distributional properties (mean, variance, or skew) of the distribution of streamflow may change either one or more times, either gradually or abruptly. The study by Ryberg et al. (2024) is an on-going study in the north-central region of the United States to investigate the potential of assuming nonstationarity in flood-frequency methodologies.

Trend analysis is commonly used for detecting change in hydrologic time series and is used to determine if a certain variable has changed its central tendency over a period of years. The Mann Kendall trend test is a non-parametric trend test (based on rank, not magnitude) to detect falling or rising monotonic trends (where the variable in question either never decreases or never increases). The null hypothesis of the Mann Kendall test is that the data are independent and randomly ordered. Normality in a time series is not required for a Mann Kendall test, but there can't be any serial correlation (also called autocorrelation). Correlation measures the relationship between two variables—while serial correlation measures the relationship of a variable with lagged values of itself. The issue with serial correlation is that it can cause Type 1 errors, which is the false acceptance of a trend as statistically significant, when actually no trend exists. There are two types of serial correlation: short-term and long-term (Helsel et al., 2020).

Short-term persistence can be understood by thinking of a monthly river flow series, where a month with very high flow is likely to be followed by another month of high flow. Short-term persistence is when past measurements affect the subsequent measurements in a short timeframe. Long-term persistence can be conceptualized as a tendency for droughts and floods to cluster

together in periods of time. Long-term persistence is also called the Hurst phenomenon and induces serial correlation into the time series and lags greater than 1 year (Koutsoyiannis, 2003; Ryberg et al., 2024). Hydrologic time series show persistence at all time scales, and consecutive values are dependent to each other. Long-term persistence implies that there is a dependence between the present and *all* points in the past. These long-term fluctuations increase uncertainty—as the observed record is only a small portion of a longer cycle whose characteristics are difficult to infer. For a Mann Kendall trend test, these fluctuations are ignored, as the test is only looking for monotonic trends, thus decreasing uncertainty.

Using a Mann Kendall test, streamgage data on the James River have a statistically significant upward trend (Norton et al., 2022; Hirsch and De Cicco, 2015). There are methods to reduce autocorrelation in a time series, or to measure the long-term persistence in a time series before the Mann Kendall test is applied. The results for South Dakota streams using these methods to determine peak streamflow trends and relations to changes in climate have not yet been published (Ryberg et al., 2024).

The increasing streamflow trend on the James River may be a misleading way to understand the long-term behavior of the stream, because a complete picture of the series may suggest that the trend is part of a decadal or centennial fluctuation, and that maintaining stationarity in the time series would better model those fluctuations (Koutsoyiannis, 2005 and 2006; Koutsoyiannis and Montanari, 2015). Characterizing James River flows by an increasing trend reduces uncertainty—when long term persistence increases uncertainty. Regardless, as time series get longer, it is important that analyses reveal nonmonotonic trends, so that the timing and magnitude of the reversals can be better identified (Helsel et al., 2020).

Research has shown that the Red River Basin, the James River Basin, and surrounding areas in the north-central U.S. and southern Manitoba and Saskatchewan experience distinct periods of hydroclimatic persistence, alternating between wet and dry periods (Razavi et al., 2015; Ryberg et al., 2014; Ryberg et al., 2016; Ryberg et al., 2020; Shapley et al., 2005). The James River Basin stands out in national and regional flood and streamflow magnitude trend studies as an area of increasing magnitude (Norton et al., 2022); however, the magnitude trend may represent long-term persistence of the recent wet period (Ryberg et al., 2014).

If increased streamflow in the James River can be characterized by deterministic terms—that is, possible drivers that can be attributed to the increasing streamflow without randomness—then the future should be adapted to the most recent past (Koutsoyiannis and Montanari, 2015). This would include human-driven climate change or land-use changes. However, if the increasing streamflow trend on the James River is a manifestation of long-term persistence, then uncertainty is also increased, and there is no real ability to forecast flows into the future, because "the drivers of the phenomena could just as easily continue at their current levels, or reverse themselves tomorrow" (Helsel et al., 2020).

Several factors may be owing to the rising lakes, flood events, and increases in streamflow in the eastern Dakotas, but there is no *obvious* cause that can be related to water or land management actions. Some factors could include short-term or long-term climatic variation, geologic makeup

of the subsurface, and land-use changes (Norton et al., 2022). For water resources management, understanding the reasons for these changes and the potential of long-term wet or dry periods is undoubtedly important.

Land-Use Changes and Climate

The extent of land-use change contributing to increased flow in the James River is not known—but research has suggested that land-use change is not the dominant driver. There is still academic debate between land-use changes or climate as being dominant drivers of increasing streamflows and flooding. The number of drain tile projects have increased in eastern South Dakota in the 2000's (Werner et al., 2016). Only a handful of counties in eastern South Dakota have a drain tile permit program, meaning there is not a temporal or spatial record of tile drainage in the state and thus difficult to determine the extent to which tiling may have increased flow. As human manipulations increase over time, it becomes impossible to say that any hydrologic or climatic variable is free of their effects (Helsel et al., 2020).

The James River basin has high agricultural land use, and increased streamflow is frequently linked to land-use and land-cover changes, such as tile drainage, cultivation of prairies, and the increased planting of soybeans and corn, which reduces evapotranspiration. However, several studies that have associated land-use changes with higher streamflows had flawed methodology and additional analysis has shown that increased precipitation is the main driver of increased streamflows (Gupta et al., 2015). Further studies would need to be done to determine the extent of land-use change by humans and how these changes affect the increasing multi-decade streamflow in the James River.

Natural climate variability drives long-term climatic persistence and nonstationarity in streamflow, whereas "climate change" is driven by anthropogenic effects on climate (Ryberg et al., 2020). Another analysis by Ryberg et al. (2014) shows that climate explains the majority of long-term, multi-decade variability in flooding in the north-central U.S, although a portion of unexplained variability may stem from land-use change. A study by Sando et al. (2022) attributes long-term precipitation (a driver of multidecadal climate variability) increases as the primary driver to the change points in peak streamflows in the high plains region.

Runoff changes for the James River basin region are comparable to fluctuations in global ocean temperature and atmospheric pressure anomalies, indicating a relationship between runoff and climatic variability. However, for the James River basin group in the study by Ryberg et al. (2014), land-use changes contributed about equally to the increase in runoff, especially in the earlier part of the year. **Table 9** shows the changes in runoff from dry (1953-64) years to wet (1982-93 and 1998-2009) periods for two different seasons, January-June and July-December in the James River basin group. The study hypothesized that if changes in runoff do reflect land-use change, the changes likely occurred from the 1950's to the 1980's before stabilizing and remaining constant during recent decades. The dominant land-use change during this time was likely the conversion from perennial vegetation to seasonal row crops (Ryberg et al., 2014).

Table 9. Average runoff for dry and wet periods for two different seasons, for the James River basin group (Ryberg et al., 2014).

Season	Average Runoff, 1953-1964 (mm)	Average Runoff, 1982-1993 (mm)	Average Runoff, 1998-2009 (mm)
Jan-June	27.4	59.0	57.4
July-Dec	14.5	36.8	28.0

It is well established that runoff increases exponentially with an increase in rainfall, resulting in an exponential increase in streamflow (Gupta et al., 2015). Increased precipitation in September-October has consequences on surface runoff the following May-June. Much of the increase in rainfall in the eastern Dakotas has been occurring between September and November, and is more concentrated (Shapley et al., 2005). For watersheds with fine-textured soils, increased soil water storage from greater precipitation in September-October will be carried over to next spring which will result in more runoff, even if there is slightly less rainfall in May-June. This is primarily because wet soils have less infiltration capacity (Gupta et al, 2015). Nevertheless, if there is an increased intensity of precipitation, which is one anticipated impact of climate change, and the intensity exceeds the rate of infiltration, runoff occurs whether or not the soil is saturated (Ryberg et al., 2014).

During 1980-1999, many regions in the central and southern Great Plains experienced the longest and strongest increase in average annual precipitation of the century. The size of the increases ranged from 6 to 12% of mean annual precipitation, and from 25 to 60% of interannual precipitation variability (Garbrecht and Rossel, 2002). In the upper midwestern U.S., the National Climate Assessment showed a greater than 15% increase in precipitation amounts from 1991 to 2011 relative to 1901-1960 (Melillo et al., 2014). Generally, the amount of precipitation in very wet years increased less than in average and dry years. The probability of occurrence and severity of dry years was greatly reduced compared to earlier in the century, whereas the probability of average years remained about the same and the probability of wet years increased (Garbrecht and Rossel, 2002).

Table 10. Mean precipitation (inches) for the years 1991 to 2023 compared to 1901 to 1960 in Brown, Spink, Beadle, Sanborn, Davison, Hanson, Hutchinson, and Yankton Counties (NOAA, 2024).

County	Mean Precipitation (in) (1901-1960)	Mean Precipitation (in) (1991-2023)	% Increase
Brown	20.2	21.9	8.4
Spink	19.7	22.1	12.2
Beadle	19.8	23.1	16.7
Sanborn	20.7	23.8	15.0
Davison	21.4	24.7	15.4
Hanson	21.9	24.9	13.7
Hutchinson	23.3	25.7	10.3
Yankton	24.8	27.0	8.9

The study by Ryberg et al. (2014) hypothesized that the changes between wet and dry climatic conditions occur on a time scale greater than decadal. The conclusions of the study indicated that upward trends in precipitation "appear to result from transient, abrupt, and highly persistent shifts in precipitation with durations of up to a few decades." Overall, the current research suggests that climate variability is the dominant driver of streamflow and runoff increases in the north-central United States, while land-use change is the less dominant driver (Ryberg et al., 2014; Ryberg et al., 2016; Sando et al., 2022; Ryberg et al., 2024).

Tree Ring Chronologies

Long-term persistence, or the Hurst phenomenon, is a manifestation of irregular climate fluctuations on several scales—and has been verified in tree-ring width studies, which are indicators of past climate. Tree-ring chronologies demonstrate significant correlations with streamflows (Razavi et al., 2015; Koutsoyiannis, 2003). In the early 2000's, a tree-ring width study was done on trees in the Waubay Lakes complex in eastern South Dakota to reconstruct past climate. **Figure 11** shows two graphs: a time series of the bur oak core chronology in the Waubay Lake area, and a 10-year spline (smoothing) highlighting wet and dry periods in the record. The effect of slower growth with age was removed using detrending curves (Shapley et al., 2005).

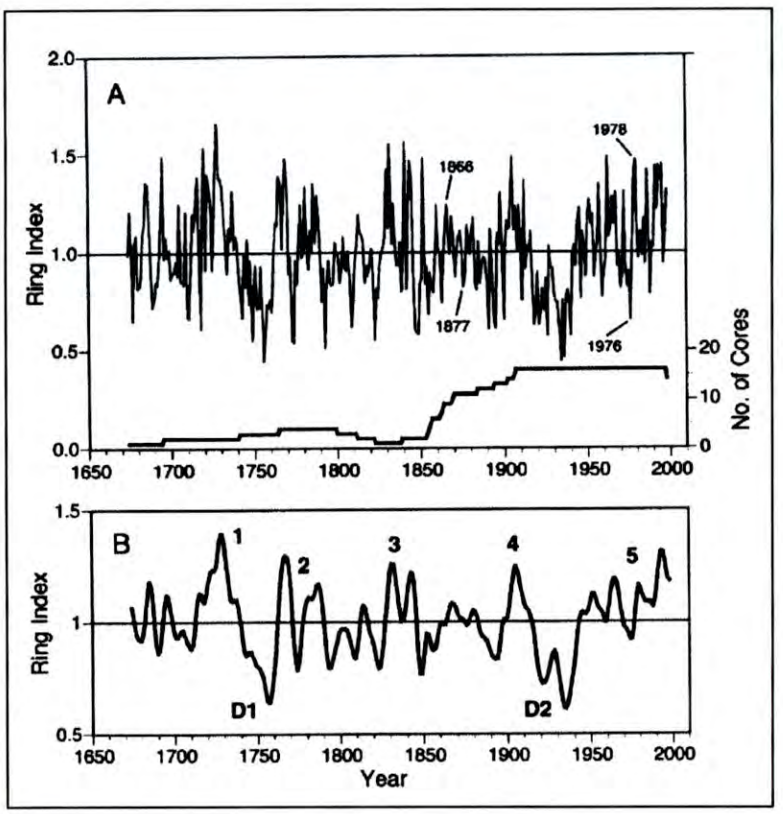

Figure 11. Complete chronology of sampled trees, covering the years 1674 to 1998, a total of 325 years, and a 10-year spline of the time series, highlighting extended wet (1-5) and dry periods (D1, D2) in the Waubay Lakes chain area. Graph from Shapley et al., 2005.

The tree-ring index time series in **Figure 11** indicates the occurrence of five wet periods over the 325-year period. The wet peaks are nearly evenly spaced, averaging 65 years in recurrence. The wet peaks are broken by the occasional dry years but were not reversed by the dry-year interval.

Other paleo-climatic studies from eastern North and South Dakota on tree rings and lake sediments indicate that similar transitions to wet periods have occurred several times in the past 1,000 to 2,000 years. There were floods documented on the upper Red River in 1726, 1727 and 1741, while 1753-1762 was quite dry in parts of the northern Great Plains, based on a 12-year moving average (Ryberg et al., 2016). Dry conditions were reported from 1861 to 1880 in the Missouri River basin, and in the early 1880's, there was another shift from dry to wet. Flooding at this time was well documented in the eastern Dakotas (SDPB, 2019). These wet/dry years from Ryberg et al. (2016) and from historical documentation match well with the time series in **Figure 11** for the Waubay Lakes climate reconstruction.

The research done by Shapley et al. (2005) provides evidence that there is a cycle of repeated and sustained wet periods punctuated by periods of notable drought. The recurrence frequency of these wet periods average approximately 140 years, prior to AD 1800, with the past two centuries having more frequent wet periods, with recurrences around 60 years. **Figure 12** shows a plot of 12-year moving average of past climate reconstructions for a study area comprising of eastern North Dakota and northeast South Dakota made in the study by Ryberg et al. (2016).

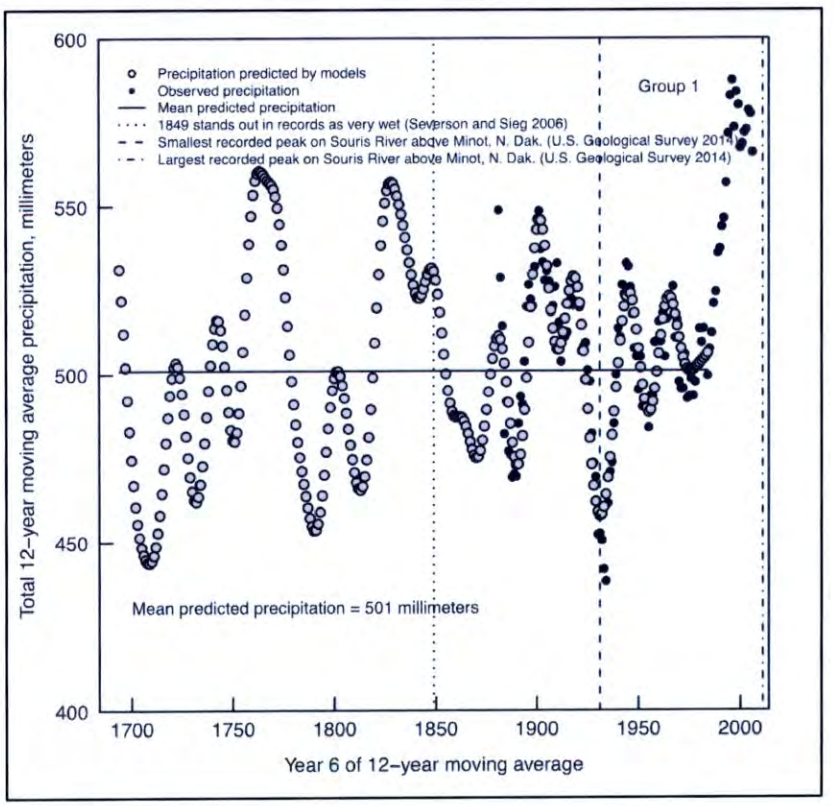

Figure 12. Twelve-year moving average annual precipitation for the southeast group of the study area defined by Ryberg et al. (2016).

The study area in the Ryberg et al. (2016) report includes the northeast portion of South Dakota, which is within the James River Basin. **Figure 12** highlights the 60-year-long pattern of increasing precipitation since the 1930's. The recent wet period starting in the mid-1970's may be similar to the wet period in the 1800's, and in the early 1900's, and is part of natural variability on a very long time scale (Ryberg et al., 2014 and 2016). The intervals between extreme wet or dry periods seem to be random rather than periodic, indicating "nonlinear dynamical behavior rather than predictable cycles" (Ryberg et al., 2014). Based on the history of repeating wet and dry periods, any decision on James River water management should assume that the current multi-year wet period on the James River will likely not continue indefinitely.

Discussion

This report is intended to assess whether there is available flow on the James River to approve applications in excess of the current 300/200 cfs thresholds. Historically, the James River has undergone numerous reports by the Water Rights Program to determine water availability and determine appropriate bypass flows for existing and new appropriators.

The best available information shows that the James River has undergone multi-year wet and dry periods on a long-time scale, and that these fluctuations are likely due to global water-land-atmosphere oscillations. Evidence suggests that increasing long-term precipitation has led to the 30-year increasing trend of streamflow and flooding events on the James River since the mid 1990's. The shifts in precipitation are likely occurring on a scale of multiple decades, and tend to begin and end abruptly. The likelihood of long-term persistence causing the increasing streamflow trend in the James River, and not deterministic causes, leads to the conclusion that incorporating uncertainty into water management is the best practice until research demonstrates increasing flows will persist due to a more fixed cause-and-effect relationship.

Despite there being uncertainty about the longevity of the past 30 years of increasing streamflows, it is recommended the 300 cfs threshold be replaced with a management system allowing more water to be placed to beneficial use, when available, while still protecting existing rights and domestic uses. Without a pre-set appropriation threshold, new applications can individually be evaluated to determine whether water is available and what qualifications are needed to protect existing users during low flow years, or if the wet cycle being experienced by the James River basin begins to wane. By analyzing incoming applications on a case-by-case basis, this allows for the inclusion of new daily discharge data in the analysis, and any new research or methodologies that may be available at the time the application is filed.

According to the July 1980 Findings of Fact, Conclusions of Law, and Final Decision, the streamflow rates in **Tables 3 through 7** are post-withdrawal, and the assumption could be made that 50 percent of authorized irrigation water rights are pumping at any given time upstream of the gage's location during the normal irrigation season. The present total appropriations are at 298.92 cfs, near the 300 cfs threshold set by the Water Resources Commission in 1965. The current 14 deferred Water Permit Applications, if approved, would increase James River appropriations by 34.38 cfs in the stretch of river between Ashton and Huron.

Since there is currently an automatic August 10th shutoff date on the river, August is the last month that pumping will occur unless written orders to continue pumping are issued by the Chief Engineer. The flow that is likely to be exceeded 50% of the time (1 of 2 years) in August will be used to determine if more water can be appropriated. The safety factors built into this analysis explained in the Water Availability at Current Appropriation section of this report, as well as using predicted August flows while upholding the automatic August 10th shutoff date, are all conservative methods when analyzing the availability of unappropriated water. The available flow between the Ashton and Huron stretch is currently 42 cfs by subtracting the required flow at the Huron gage from the August flow at a 50% exceedance probability (**Table 8**). The proposed appropriation by the deferred permits (34.38 cfs) is less than 42 cfs.

Proposed Action for Consideration by the Water Management Board

Based on the following, it is recommended the Water Management Board allow appropriations in excess of the 300 cfs threshold on the James River and manage those applications on an application-by-application basis:

- Managing surface water appropriations on an application-by-application basis is consistent with how every other watercourse is managed in South Dakota;
- There is precedent of the Water Management Board allowing appropriations in excess of 300 cfs with appropriate qualifications to protect existing water rights and domestic uses (Water Management Board, 1980);
- There has been a 30-year increase in streamflows in the James River, in both low and normal flow years, whether due to increased precipitation by a changing climate or changes in land-use practices, or both;
- Conservative measures were taken to analyze the availability of water in three stretches of the James River with existing permitted uses included in the streamflow analysis;
- SDCL 46-1-2, SDCL 46-1-4, and SDCL 46-1-14 dictate that water should be placed to beneficial use to the fullest extent possible while protecting the public interest; and
- The public interest, including existing water rights and domestic uses, can be protected by including appropriate qualifications on new permits.

To protect current existing rights and domestic uses, it is recommended that any new appropriations on the James River have bypass qualifications stricter than the 20 cfs bypass which is required of certain current senior rights. The current required flow in each stretch of river is listed in **Table 2,** assuming 50% pumping at any given time for irrigation, 100% pumping at any given time for non-irrigation, and adding 20 cfs for domestic use. To protect existing water rights/permits and domestic flow, the conditions attached to any new permits should protect both the amount of time that senior users are able to pump during low flow years, and bypass the required downstream flow. The amount of time senior users can use water can be protected by assigning an earlier cutoff date for junior users, as well as a strict flow that must be bypassed regardless of the date.

The purpose of the strict bypass flow for junior users would be to cover the amount of flow required for both domestic use and existing users. A 75 cfs bypass flow is the average flow

required between all three gages (**Table 2**). A 50 cfs bypass flow at the Ashton gage protects the required flow (47 cfs, **Table 2**) above that gage, while increased flows further downstream will accommodate downstream users. These two flows will be evaluated to see how often it may be expected for shutoff orders to be issued during dry times, and whether a bypass flow is too large, preventing reasonable use of the river during most years. **Tables 11 through 13** below list the years that James River flows were less than 20 cfs, 50 cfs, and 75 cfs at any time between May 1st and August 10th during 1946-2023, and also shows what percentage of the time (percent occurrence) that those flows were reached in the 1946-1990 timeframe and the 1991-2023 timeframe.

Table 11. Number of years and percent occurrence that 20 cfs was reached between May 1st and August 10th for the years 1946-2023 at the Ashton, Huron, and Scotland streamgages (USGS, 2019).

Time Frame	Station	No. of years where flow was less than 20 cfs between May 1st and August 10th	Years	Percent occurrence
1946-2023 (78 yrs)	Ashton	25	1946, 1951, 1955, 1956, 1957, 1958, 1959, 1961, 1963, 1964, 1970, 1971, 1973, 1976, 1977, 1980, 1981, 1985, 1988, 1989, 1990, 1991, 1992, 2006, 2021	84% (years 1946-1990), 12% (years 1991-2023)
	Huron	26	1946, 1949, 1951, 1955, 1956, 1957, 1958, 1959, 1961, 1963, 1964, 1965, 1970, 1971, 1973, 1976, 1977, 1980, 1981, 1985, 1988, 1989, 1990, 1992, 2006, 2021	88% (years 1946-1990), 9% (years 1991-2023)
	Scotland	12	1955, 1959, 1961, 1970, 1973, 1976, 1977, 1980, 1981, 1988, 1989, 1992	92% (years 1946-1990), 8% (years 1991-2023)

Table 12. Number of years and percent occurrence that 50 cfs was reached between May 1st and August 10th for the years 1946-2023 at the Ashton, Huron, and Scotland streamgages (USGS, 2019).

Time Frame	Station	No. of years where flow was less than 50 cfs between May 1st and August 10th	Years	Percent occurrence
1946-2023 (78 yrs)	Ashton	35	1946, 1949, 1951, 1952, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1963, 1964, 1965, 1968, 1970, 1971, 1972, 1973, 1976, 1977, 1980, 1981, 1982, 1985, 1988, 1989, 1990, 1991, 1992, 2002, 2006, 2017, 2021	64% (years 1946-1990), 18% (years 1991-2023)
	Huron	35	1946, 1949, 1951, 1952, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1963, 1964, 1965, 1968, 1970, 1971, 1973, 1974, 1976, 1977, 1980, 1981, 1982, 1985, 1988, 1989, 1990, 1992, 2002, 2006, 2012, 2017, 2021	64% (years 1946-1990), 18% (years 1991-2023)
	Scotland	22	1949, 1955, 1958, 1959, 1960, 1961, 1964, 1965, 1970, 1973, 1974, 1976, 1977, 1980, 1981, 1985, 1988, 1989, 1990, 1992, 2002, 2006	42% (years 1946-1990), 9% (years 1991-2023)

Table 13. Number of years and percent occurrence that 75 cfs was reached between May 1st and August 10th for the years 1946-2023 at the Ashton, Huron, and Scotland streamgages (USGS, 2019).

Time Frame	Station	No. of years where flow was less than 75 cfs between May 1st and August 10th	Years	Percent occurrence
1946-2023 (78 yrs)	Ashton	39	1946, 1949, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1963, 1964, 1965, 1968, 1970, 1971, 1972, 1973, 1974, 1976, 1977, 1980, 1981, 1982, 1985, 1988, 1989, 1990, 1991, 1992, 2002, 2003, 2006, 2012, 2017, 2021	69% (years 1946-1990), 24% (years 1991-2023)
	Huron	35	1946, 1949, 1951, 1952, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1963, 1964, 1965, 1968, 1970, 1971, 1973, 1974, 1976, 1977, 1980, 1981, 1982, 1985, 1988, 1989, 1990, 1991, 1992, 2002, 2006, 2012, 2021	64% (years 1946-1990), 18% (years 1991-2023)
	Scotland	30	1946, 1949, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1963, 1964, 1965, 1970, 1971, 1973, 1974, 1976, 1977, 1980, 1981, 1982, 1985, 1988, 1989, 1990, 1991, 1992, 2002, 2006, 2021	56% (years 1946-1990), 15% (years 1991-2023)

A notable observation from **Tables 11 through 13** is that the percent occurrence for the Ashton and Huron gage to hit 75, 50, or 20 cfs during 1946-1990 are similar, while the Scotland gage has a lower percent occurrence for all three bypass flows during 1946-1990. This means that for the Ashton and Huron gages, shutoff orders would have been issued during mostly the same years, regardless of whether the bypass flow was 50 or 75 cfs. The Ashton gage has the greatest chance of hitting low flows compared to any other gage as more water enters the system further downstream. Users above the Ashton gage are the most susceptible to being shutoff, even though the stretch between the ND-SD border and the Ashton gage has the least amount of appropriation (**Table 2**). This indicates that bypass flows are the most critical at the Ashton gage.

For the Ashton gage, 39 years from 1946 to 2023 were dry enough where flows dropped to 75 cfs between May 1st and August 10th. Of those 39 years, 25 years had flows drop to 20 cfs after an average of 17 days. Once flows drop to 75 cfs, there is approximately a 64% chance that the flows will go from 75 cfs 20 cfs before August 10th. For the Ashton gage, 35 years from 1946 to 2023 were dry enough where flows dropped to 50 cfs between May 1st and August 10th. Of those 35 years, 25 years dropped to 20 cfs after 50 cfs after an average of 12 days. This is approximately a 70% chance that flows will go from 50 cfs to 20 cfs before August 10th.

After 1992, the river tends to have random, sporadic years that are dry instead of multiple-year droughts. During years where the river recovers after an initial drop below the bypass flow, it typically isn't for long, and the river usually goes back to below that bypass flow before August 10th of that year. Another trend for streamflow on the James River during low flow years is that flows will not gradually decline but will bottom out relatively quickly when flows begin to wane.

To protect the amount of time that senior users would have to pump on the James River, a July 15th cutoff date is recommended for junior appropriators with a conditional bypass that needs to

be met at that date for those junior users to continue pumping until August 10th. This cutoff flow was determined using the Ashton gage data to find the average flow on July 15th for years where flow reached 50 cfs but did not get to 20 cfs before August 10th. All junior appropriators will still have an automatic August 10th cutoff date. The average flow on July 15th for those years at the Ashton gage is approximately 100 cfs. Comparatively, the average flow on July 15th for those years where 50 cfs was reached but not 20 cfs at the Huron gage is also approximately 100 cfs. This is the flow that is recommended to be the required bypass for junior users to pump after July 15th, to protect the amount of time that senior users may be able to pump before flows reach 20 cfs.

Conclusions

- Based on studies and evidence presented in this report, there is unappropriated water available in the James River during the spring and through August 10th of normal years.
- The determination that there is unappropriated water available is based strictly on flows naturally occurring in the James River and is not based in any way upon anticipated flows into the James River by Jamestown, Pipestem, or impoundments at Sand Lake Wildlife Refuge, though the reservoirs may supplement the river during low flow periods.
- The James River is an unreliable source of water during dry times, and the increasing streamflows may not continue into the future.
- There is a reasonable probability that unappropriated water is currently available in the James River to allow additional appropriation beyond the 300 cfs threshold. In order to place to beneficial use the waters of the state to the fullest extent to which they are capable, it is recommended that the 300 cfs appropriation threshold be exceeded with appropriate qualifications included on new permits to protect existing appropriations and domestic use. Managing the river using the streamgaging stations, which provide real-time streamflows, is an effective way to maximize use of the resource while protecting existing water users.
- Based on the best available information and the full record of discharge data on the James River, it is recommended that the Water Management Board consider approving applications beyond the 300 cfs threshold to maximize beneficial use of the resource and include the following qualifications to protect existing water users:
    a. Any application approved between the North Dakota-South Dakota border and the USGS gaging station at Ashton, SD contain the following, streamgage specific, qualifications:
        - This permit does not authorize diversions from the James River any time when there is less than 50 cfs bypassing the USGS gaging station at Ashton, SD, after pumping.
        - This permit does not authorize diversion of water from the James River after July 15th of each calendar year when there is less than 100 cfs bypassing the USGS gaging station at Ashton, SD, after pumping.
    b. Any application approved between the USGS gaging station at Ashton, SD and the USGS gaging station at Huron, SD contain the following, streamgage specific, qualifications:

- This permit does not authorize diversions from the James River any time when there is less than 50 cfs bypassing the USGS gaging station at Huron, SD, after pumping.
- This permit does not authorize diversion of water from the James River after July 15th of each calendar year when there is less than 100 cfs bypassing the USGS gaging station at Huron, SD, after pumping.

c. Any application approved between the USGS gaging station at Huron, SD and the USGS gaging station near Scotland, SD contain the following, streamgage specific, qualification:
   - This permit does not authorize diversions from the James River any time when there is less than 50 cfs bypassing the USGS gaging station near Scotland, SD, after pumping.

d. In addition to the streamgage specific qualifications, any application approved between the North Dakota-South Dakota border and the Hutchinson County-Yankton County border, also contain the following qualifications:
   - The permit does not authorize diversion of water from the James River after August 10th of each calendar year unless written orders have been issued by the Chief Engineer.
   - Diversions under the permit are subject to senior water rights and any written orders issued by the Chief Engineer.
   - Pursuant to SDCL 46-2-19, the Chief Engineer, or designated representative, may enter upon the lands authorized by this water permit for the purpose of inspecting works and determining if the irrigation system is operating.
   - This permit is approved subject to the irrigation water use questionnaire being submitted each year. [modify qualification accordingly if the use is not irrigation]
   - The Water Management Board retains jurisdiction in the event that additional information shows that changes need to be made to protect domestic uses or senior water rights.

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References

Beck, L. 2007. Report on Amendment of James River Water Permits/Rights. SD DANR Water Rights Program. Joe Foss Building. Pierre, South Dakota.

Benson, R.D. 1983. A Preliminary Assessment of the Hydrologic Characteristics of the James River in South Dakota. Water Resources Investigations Report 83-4077. U.S. Geological Survey. Huron, South Dakota.

Benson, R.D. 1988. Analysis of flood-flow frequency, flow duration, and channel forming flow for the James River in South Dakota. Water Resources Investigations Report 87-4208. U.S. Geological Survey. Huron, South Dakota.

Duvall, R. 1987. Report on Amendment of James River Water Permits/Rights with July 15 Cutoff Date. SD DANR, Water Rights Program. Joe Foss Building. Pierre, South Dakota.

England, J.F., Jr., Cohn, T.A., Faber, B.A., Stedinger, J.R., Thomas, W.O., Jr., Veilleux, A.G., Kiang, J.E., and Mason, R.R., Jr., 2018. Guidelines for determining flood flow frequency—Bulletin 17C (ver. 1.1, May 2019): U.S. Geological Survey Techniques and Methods, book 4, chap. B5, 148p. <https://doi.org/10.3133/tm4B5>

Garbrecht, J. D., and Rossel, F. E. (2002). Decade-scale precipitation increase in Great Plains at end of 20th century. Journal of Hydrologic Engineering, 7(1): 64–75.

Gupta, S. C., A. C. Kessler, M. K. Brown, and F. Zvomuya. 2015. Climate and agricultural land use change impacts on streamflow in the upper midwestern United States, Water Resour. Res., 51, 5301–5317, <https://doi:10.1002/2015WR017323>

Helsel, D.R., Hirsch, R.M., Ryberg, K.R., Archfield, S.A., and Gilroy, E.J., 2020, Statistical methods in water resources: U.S. Geological Survey Techniques and Methods, book 4, chap. A3, 458 p. <https://doi.org/10.3133/tm4a3>

Hirsch, R.M and De Cicco, L.A. 2015. User Guide to Exploration and Graphics for RivEr Trends (EGRET) and dataRetrieval: R packages for hydrologic data (version 2.0, February 2015): U.S. Geological Survey Techniques and Methods book 4, chapter A10. <https://doi.org/10.3133/tm4a10>

James River Technical Committee Model Studies. 1985. Garrison Diversion Unit, Pick-Sloan Missouri Basin Program.

Koutsoyiannis, D. 2003. Climate change, the Hurst phenomenon, and hydrological statistics. Hydrological Sciences Journal, 48(1), 3-24. <https://doi.org/10.1623/hysj.48.1.3.43481>

Koutsoyiannis, D. 2005. Hydrological Persistence and the Hurst Phenomenon. Water Encyclopedia. <https://doi.org/10.1002.047147844X.sw434>

Koutsoyiannis, D. 2006. Nonstationarity versus scaling in hydrology. Journal of Hydrology, v. 324, p.239-254. <https://doi.org/10.1016/j.jhydrol.2005.09.022>

Koutsoyiannis, D. and Montanari, A. 2015. Negligent killing of scientific concepts: the stationarity case. Hydrological Sciences Journal, 60(7-8), p. 1174-1183. <https://doi.org/10.1080/02626667.2014.959959>

Marti, M.K., and Ryberg, K.R. 2023. Method for identification of reservoir regulation within U.S. Geological Survey streamgage basins in the Central United States using a decadal dam impact metric: U.S. Geological Survey Open-File Report 2023–1034, 15 p., <https://doi.org/10.3133/ofr20231034>

Melillo, J. M., T. C. Richmond, and G. W. Yohe (2014), Climate change impacts in the United States: The third national climate assessment report. U.S. Global Change Res. Program, 841 pp., US Government Printing Press, Washington, D. C.

NASA Earth Observatory <https://earthobservatory.nasa.gov> Accessed July 17, 2024

National Research Council. 2007. Colorado River Basin Water Management: Evaluating and Adjusting to Hydroclimatic Variability. Washington, D.C: The National Academics Press. <https://doi.org/10.17226/11857>

NOAA. 2024. National Centers for Environmental Information, Climate at a Glance: County Time Series. <https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/county/time-series> Accessed July 24, 2024.

Norton, P.A., Delzer, G.C., Valder, J.F., Tatge, W.S., and Ryberg, K.R. 2022. Assessment of streamflow trends in the eastern Dakotas, water years 1960–2019: U.S. Geological Survey Scientific Investigations Report 2022–5055, 11 p., <https://doi.org/10.3133/sir20225055>

NWS. 2023. National Weather Service. James and Vermillion River Flood Category Changes. <https://www.weather.gov/fsd/JamesVermillionFloodChange> Accessed July 19, 2024

NWS. 2024. National Water Prediction Service (NWPS) <https://water.noaa.gov>

Razavi, S., Elshorbagy, A., Wheater, H., and Sauchyn, D. 2015. Toward understanding nonstationarity in climate and hydrology through tree ring proxy records. Water Resources Research, v. 51, no. 3, p. 1813-1830. <https://doi.org/10.1002/2014WR015696>

Ryberg, K.R., Lin, W., and Vecchia, A.V. 2014. Impact of Climate Variability on Runoff in the North-Central United States: Journal of Hydrologic Engineering, v. 19, no. 1, p. 148–158.

Ryberg, K.R., Vecchia, A.V., Akyüz, F.A., and Lin, W. 2016. Tree-ring-based estimates of long-term seasonal precipitation in the Souris River Region of Saskatchewan, North Dakota, and Manitoba. Canadian Water Resources Journal. v. 41, no. 3, p. 412–428.

Ryberg, K.R., Kolars, K.A., Kiang, J.E., and Carr, M.L. 2020. Flood-frequency estimation for very low annual exceedance probabilities using historical, paleoflood, and regional information with consideration of nonstationarity: U.S. Geological Survey Scientific Investigations Report 2020–5065, 89 p., <https://doi.org/10.3133/sir20205065>

Ryberg, K.R., Over, T.M., Levin, S.B., Heimann, D.C., Barth, N.A., Marti, M.K., O'Shea, P.S., Sanocki, C.A., Williams-Sether, T.J., Wavra, H.N., Sando, T.R., Sando, S.K., and Liu, M.S. 2024. Introduction and methods of analysis for peak streamflow trends and their relation to changes in climate in Illinois, Iowa, Michigan, Minnesota, Missouri, Montana, North Dakota, South Dakota, and Wisconsin, chap. A of Ryberg, K.R., comp., Peak streamflow trends and their relation to changes in climate in Illinois, Iowa, Michigan, Minnesota, Missouri, Montana, North Dakota, South Dakota, and Wisconsin: U.S. Geological Survey Scientific Investigations Report 2023–5064, 27 p., <https://doi.org/10.3133/sir20235064A>

Sando, R., Sando, S.K., Ryberg, K.R., and Chase, K.J. 2022. Attribution of monotonic trends and change points in peak streamflow in the Upper Plains region of the United States, 1941–2015 and 1966–2015, chap. C of Ryberg, K.R., ed., Attribution of monotonic trends and change points in peak streamflow across the conterminous United States using a multiple working hypotheses framework, 1941–2015 and 1966–2015: U.S. Geological Survey Professional Paper 1869, p. C1–C36. <https://doi.org/10.3133/pp1869>

SDPB (South Dakota Public Broadcasting). 2019. "A Meandering Past," by Brad Van Osdel. <https://www.sdpb.org/blogs/images-of-the-past/a-meandering-past/> Accessed July 17, 2024

Shapley, M.D., Johnson, W.C., Engstrom, D.R., and Osterkamp, W.R. 2005. Late-Holocene flooding and drought in the Northern Great Plains, USA, reconstructed from tree rings, lake sediments and ancient shorelines. The Holocene, v. 15, no. 1, p. 29-41

USACE. 2014. U.S. Army Corps of Engineers. Water Control Manual, Pipestem Dam & Reservoir, James River Basin. Omaha, Nebraska

USACE. 2018. U.S. Army Corps of Engineers. Water Control Manual, Gavins Point Dam- Lewis and Clark Lake. Missouri River Mainstem Reservoir System. Omaha, Nebraska.

USGS, NGPWRRC (Northern Great Plains Water Resources Research Center), SDSU (South Dakota State University), USACE (U.S. Army Corps of Engineers). 1999. FEMA-Federal Emergency Management Agency. Studies of the Waubay Lakes Chain and Adjoining Closed Basins in Northeastern South Dakota, Task 1 through Task 5.

USGS. 2019. Water data for the Nation: U.S. Geological Survey National Water Information System database <https://doi.org./10.5066/F7P55KJN>

USGS. 2022. Peak streamflow for the Nation: U.S. Geological Survey National Water Information System database. <https://doi.org./10.5066/F7P55KJN>

Water Management Board. 1980. July 1980 Findings of Fact, Conclusions of Law. SD DANR, Water Rights Program. Joe Foss Building. Pierre, South Dakota.

Water Resources Commission. 1965. July 1965 Findings of Fact, Conclusions of Law. SD DANR, Water Rights Program. Joe Foss Building. Pierre, South Dakota.

Water Rights. 2024a. Water Right/Permit Files. SD DANR, Water Rights Program. Joe Foss Building. Pierre, South Dakota.

Water Rights. 2024b. Program Records. SD DANR, Water Rights Program. Joe Foss Building. Pierre, South Dakota.

Water Rights. 2024c. Lake Level Database. SD DANR, Water Rights Program. Joe Foss Building. Pierre, South Dakota.

Werner, B., Tracy, J., Johnson, C.W., Voldseth, R.A., Guntenspergen, G.R., and Millett, B. 2016. Modeling the Effects of Tile Drain Placement on the Hydrologic Function of Farmed Prairie Wetlands. Journal of the American Water Resources Association (JAWRA) 52(6): 1482-1492. <https://doi.org./10.1111/1752-1688.12471>

Whitfield, P.H. 2012. Floods in future climates: a review: Journal of Flood Risk Management, v. 5, no. 4, p. 336–365.

Attachment A1. List of pertinent statutes

SDCL 46-1-2

"It is hereby declared that the protection of the public interest in the development of the water resources of the state is of vital concern to the people of the state and that the state shall determine in what way the water of the state, both surface and underground, should be developed for the greatest public benefit."

SDCL 46-1-4

"It is hereby declared that, because of conditions prevailing in this state, the general welfare requires that the water resources of the state be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable method of use of water be prevented, and that the conservation of such water is to be exercised with a view to the reasonable and beneficial use of the water in the interest of the people and for the public welfare. The right to water or to the use or flow of water in or from any natural stream or watercourse in this state is limited to an amount of water reasonably required for the beneficial use to be served, and such right does not extend to the waste or unreasonable use or unreasonable method of diversion of water."

SDCL 46-1-14

"The Water Management Board may issue any permit or license subject to terms, conditions, restrictions, qualifications, quantifications, or limitations on perpetuity consistent with this chapter which it considers necessary to protect the public interest and which are related to matters within the jurisdiction of the board. Water rights issued pursuant to this section may be amended by the board and priority is retained upon amendment. Upon amendment the board may alter terms, conditions, restrictions, qualifications, or quantifications consistent with this chapter."

SDCL 46-2A-2

"Within sixty days of receipt of a completed application, the chief engineer shall recommend in writing approval, disapproval or deferral until further notice and shall schedule the application for hearing by the Water Management Board. The recommendation shall include any terms, conditions, restrictions, qualifications, quantifications, or limitations on perpetuity which are consistent with this chapter, necessary to protect the public interest and related to matters within the jurisdiction of the chief engineer or the board."

SDCL 46-5-6

"In the issuance of permits to appropriate water for irrigation or in the adjudication of rights to the use of water for such purpose, the amount allowed may not be in excess of the rate of one cubic feet of water per second for each seventy acres, or the equivalent thereof, delivered on the land for a specified time each year. The Water Management Board may allow a greater diversion, in volume or rate or both, if the method of irrigation, any time constraints on diversion of water, or the type of soil so requires. However, no annual volume may be greater than three acre-feet per acre delivered to the land. The above rate of one cubic foot per second for each seventy acres does not apply in cases of flood water at such times when the flow of the stream is much in excess of the total recorded and approved rights on the stream."

Attachment A2.							
Permit No.	**County**	**Name**	**Priority Date**	**Status**	**Primary Use**	**Diversion Rate (cfs)**	**Annual Volume (ac-ft)**
8512-3	BN	CITY OF ABERDEEN	04/27/2021	FU	MUN	8.5	6,154
US594-3	HU/SP/BN	US BUREAU OF RECLAMATION*		FU	DOM/MUN/IND/ FWP		500
7888-3	BN	SVARSTAD	08/22/2013	PE	IRR	1.89	
6427-3	BN	GRASSE	06/26/2003	PE	FWP	6.00	50
8460-3	BN	SUELTZ	11/30/2020	PE	IRR	3.56	
8240A-3	BN	SVARSTAD	09/26/2016	PE	IRR	1.91	
8241-3	BN	SVARSTAD	09/26/2016	PE	IRR	1.91	
7890-3	BN	SVARSTAD	08/29/2013	PE	IRR	1.91	
8044-3	BN	ROSSOW	08/29/2014	PE	IRR	3.30	
US1-3	BN	US FISH/WILDLIFE SERVICE	10/16/1934	LC	FWP	0.00	
5516-3	BN	US FISH/WILDLIFE SERVICE*	03/08/1991	LC	FWP	0.00	295
27-3	BN	TACOMA PARK ASSOC	03/31/1941	LC	FWP	0.50	
1817-3	BN	GAME FISH & PARKS*	01/01/1935	LC	REC	0.00	60
5924-3	BN	THUROW*	04/03/1996	LC	FWP	0.00	180
1125-3	BN	SPERRY	08/19/1964	LC	IRR	1.98	
1491-3	BN	SPERRY	01/15/1968	LC	IRR	1.94	
5925-3	BN	LOCKEN	08/28/1975	LC	IRR	2.00	
5277-3	BN	LOCKEN	01/25/1989	LC	IRR	2.30	
2629-3	BN	LOCKEN FARMS	11/17/1975	LC	IRR	1.44	
1841-3	BN	GAME FISH & PARKS*	01/01/1935	LC	REC	0.00	21
1172-3	SP	BEBO	03/08/1965	LC	IRR	1.50	
1421-3	SP	FISHER GROVE COUNTRY CLUB	06/15/1967	LC	IRR	0.67	
2129-3	SP	BINDENAGEL	10/10/1974	LC	IRR	1.69	

Permit No.	County	Name	Priority Date	Status	Primary Use	Diversion Rate (cfs)	Annual Volume (ac-ft)
6589A-3	SP	GLENDALE HTTRN BRTH	02/16/1970	LC	IRR	3.83	
6587-3	SP	GLENDALE HTTRN BRTH	11/04/1968	LC	IRR	5.68	
6590-3	SP	GLENDALE HTTRN BRTH	11/04/1968	LC	IRR	7.46	
1450-3	SP	GLENDALE HTTRN BRTH	10/12/1967	LC	IRR	4.44	
1538-3	SP	SPINK HTTRN BRTH	03/19/1968	LC	IRR	4.00	
2396-3	SP	SPINK HTTRN BRTH	10/10/1975	LC	IRR	1.88	
5737-3	SP	SPINK HTTRN BRTH	12/17/1992	LC	IRR	1.78	144
6375-3	SP	BIXLER FARMS	01/02/2003	LC	IRR	5.35	
6738-3	SP	ENANDER	07/05/2006	LC	IRR	1.78	
6398-3	SP	WOLLMAN	09/24/1975	LC	IRR	1.89	
1979-3	SP	COLLINS HUTTERIAN BRETHREN INC	03/27/1973	LC	IRR	3.76	
6182-3	SP	OSCAR INC	02/22/2000	LC	IRR	7.03	
7183-3	SP	OSCAR INC	06/06/1959	LC	IRR	1.89	
7234-3	SP	OSCAR INC	03/01/2011	LC	IRR	1.78	
6183-3	SP	OSCAR INC	02/22/2000	LC	IRR	7.83	
1027-3	BD	US BUREAU OF RECLAMATION *	01/01/1936	LC	MUN	0.00	4,875
7395-3	BD	HURON HTTRN BRTH	03/31/2005	LC	IRR	7.13	
2390A-3	BD	HURON HTTRN BRTH	09/26/1975	LC	IRR	1.89	
5651-3	BD	HURON HTTRN BRTH	04/01/1947	LC	IRR	0.18	

Permit No.	County	Name	Priority Date	Status	Primary Use	Diversion Rate (cfs)	Annual Volume (ac-ft)
2387-3	BD	KLEINSASSER	12/12/1966	LC	IRR	3.50	
5027-3	BD	LAKE BYRON WATERSHED DIST	06/14/1984	LC	REC	12.00	3,400
1276-3	BD	RIVERSIDE HTTRN BRTH	01/01/1949	LC	IRR	2.22	
4866-3	BD	RIVERSIDE HTTRN BRTH	01/01/1949	LC	IRR	1.56	31
2643-3	BD	KLUDT	02/06/1976	LC	IRR	1.62	
1022-3	BD	CITY OF HURON*	01/01/1936	LC	MUN	0.00	2,320
5321-3	BD	GOSCH	04/27/1989	LC	COM	0.03	
755-3	BD	CITY OF HURON*	12/23/1960	LC	MUN	0.00	600
9-3	BD	CITY OF HURON	04/22/1914	LC	MUN	5.00	
2049A-3	BD	CITY OF HURON	10/04/2021	LC	MUN	2.00	90
8523-3	SP	BEBO	07/02/2021	PE	IRR	1.10	
8292A-3	SP	GLENDALE HTTRN BRTH	05/30/1972	PE	IRR	1.89	
8385-3	SP	GLENDALE HTTRN BRTH	12/12/2018	PE	IRR	1.45	
8292C-3	SP	GLENDALE HTTRN BRTH	09/11/2012	PE	IRR	0.00	
8292E-3	SP	GLENDALE HTTRN BRTH	09/11/2012	PE	IRR	0.59	
7479-3	SP	GLENDALE HTTRN BRTH	10/25/2012	PE	IRR	3.56	
8352-3	SP	OSCAR INC	04/26/2018	PE	IRR	6.86	
8292D-3	SP	GLENDALE HTTRN BRTH	09/11/2012	PE	IRR	0.59	
7425-3	SP	SPINK HTTRN BRTH	09/11/2012	PE	IRR	6.67	
7427-3	SP	SPINK HTTRN BRTH	09/11/2012	PE	IRR	8.18	

Permit No.	County	Name	Priority Date	Status	Primary Use	Diversion Rate (cfs)	Annual Volume (ac-ft)
7424-3	SP	SPINK HTTRN BRTH	09/11/2012	PE	IRR	3.84	
7444A-3	SP	OSCAR INC	09/12/2012	PE	IRR	0.47	
8353A-3	SP	OSCAR INC	04/26/2018	PE	IRR	2.28	
7839-3	SP	OLSEN	03/07/2013	PE	IRR	0.51	
7444-3	SP	OSCAR INC	09/28/2012	PE	IRR	1.46	
7619-3	SP	OSCAR INC	01/04/2013	PE	IRR	0.00	
8604-3	SP	PETERSON	02/14/2022	PE	IRR	2.29	
8605-3	SP	PETERSON	02/14/2022	PE	IRR	2.29	
8350-3	SP	PETERSON	04/20/2018	PE	IRR	2.28	
8123-3	BD	HURON HTTRN BRTH	02/17/2015	PE	IRR	0.00	
7906A-3	BD	HURON HTTRN BRTH	09/10/2013	PE	IRR	0.00	
7906-3	BD	HURON HTTRN BRTH	09/10/2013	PE	IRR	0.00	
7905-3	BD	HURON HTTRN BRTH	09/10/2013	PE	IRR	1.78	
8498-3	BD	WIETING	03/17/2021	PE	IRR	0.41	
8473-3	BD	WIETING	01/14/2021	PE	IRR	1.78	
7186-3	BD	RIVERSIDE HTTRN BRTH	02/23/2010	PE	IRR	6.62	
8006-3	BD	RIVERSIDE HTTRN BRTH	04/25/2014	PE	IRR	1.78	
8785-3	SA	UPLAND HUTTERIAN BRETHREN	07/27/2023	PE	IRR	2.15	
7697-3	HS	ROSEDALE HTTRN BRTH	02/08/2013	PE	IRR	16.94	
7697A-3	HS	ROSEDALE HTTRN BRTH	02/08/2013	PE	IRR	2.63	

Permit No.	County	Name	Priority Date	Status	Primary Use	Diversion Rate (cfs)	Annual Volume (ac-ft)
7696-3	HS	ROSEDALE HTTRN BRTH	02/08/2013	PE	IRR	6.34	
8047-3	HS	ROCKPORT HTTRN BRTH	09/04/2014	PE	IRR	2.96	
8046-3	HS	ROCKPORT HTTRN BRTH	09/04/2014	PE	IRR	5.17	
8048-3	HS	ROCKPORT HTTRN BRTH	09/04/2014	PE	IRR	2.48	
8048A-3	HS	ROCKPORT HTTRN BRTH	09/04/2014	PE	IRR	2.37	
8447-3	HS	SHANNON HTTRN BRTH	09/18/2020	PE	IRR	4.23	
8305A-3	HS	ROCKPORT HTTRN BRTH	09/16/1971	PE	IRR	0.43	
8305B-3	HS	ROCKPORT HTTRN BRTH	09/16/1971	PE	IRR	0.43	
8048B-3	HS	ROCKPORT HTTRN BRTH	09/04/2014	PE	IRR	0.50	
8448-3	HS	ROCKPORT HTTRN BRTH	09/18/2020	PE	IRR	2.00	
8449-3	HS	ROCKPORT HTTRN BRTH	09/18/2020	PE	IRR	5.14	
7339-3	HS	ROCKPORT HTTRN BRTH	03/20/2012	PE	IRR	6.68	
7973-3	HS	ROCKPORT HTTRN BRTH	02/19/2014	PE	IRR	1.23	
8045-3	HS	ROCKPORT HTTRN BRTH	09/04/2014	PE	IRR	2.45	
1902A-3	HS	ROCKPORT HTTRN BRTH	09/16/1971	PE	IRR	3.64	
8305C-3	HS	ROCKPORT HTTRN BRTH	09/16/1971	PE	IRR	0.49	

Permit No.	County	Name	Priority Date	Status	Primary Use	Diversion Rate (cfs)	Annual Volume (ac-ft)
7834-3	HT	NEUHARTH	04/15/2013	PE	IRR	1.78	
550-3	BD	SCHNABEL	09/10/1958	LC	IRR	0.60	
5357-3	SA	CASSENS*	01/01/1936	LC	REC	0.00	370
5500-3	SA	BEEDLE	03/06/1991	LC	IRR	0.25	7
1917-3	DN	MORRISON	12/22/1971	LC	IRR	1.74	
5207-3	DN	JIM-REC-AG CORPORATION	04/20/1957	LC	IRR	5.58	
5022-3	DN	DAVISON RWS	06/19/1984	LC	RWS	2.90	
699B-3	DN	PUETZ LEGACY TRUST	03/02/1960	LC	IRR	1.63	
5121-3	HS	MITCHELL QUARRY	01/28/1987	LC	IND	0.88	
1900-3	HS	MILLBROOK HTTRN BRTH	09/16/1971	LC	IRR	1.55	
436-3	HS	ROSEDALE HTTRN BRTH	04/05/1945	LC	IRR	1.05	
4656-3	HS	ROSEDALE HTTRN BRTH	09/16/1971	LC	IRR	3.88	
4717A-3	HS	ROCKPORT HTTRN BRTH	09/16/1971	LC	IRR	1.67	
2411-3	HS	ROCKPORT HTTRN BRTH	10/20/1975	LC	IRR	2.00	
2385-3	HT	BAUER	09/23/1975	LC	IRR	1.30	
6131-3	HT	NEUHARTH	03/22/1999	LC	IRR	0.77	
6506-3	HT	RAMES	04/26/2004	LC	IRR	0.00	
5392A-3	HT	NICOLAI	03/01/1990	LC	IRR	1.34	
6132-3	HT	ULMER	03/22/1999	LC	IRR	0.85	
2631A-3	HT	SPENCER QUARRIES INC	11/25/1975	LC	IRR	1.70	

*Not included in budget for flow appropriation (Table 3); BN: Brown; HU: Hughes; SP: Spink; BD: Beadle; SA: Sanborn; HS: Hanson; HT: Hutchinson; DN: Davison; PE: Permit; LC: License; MUN: Municpial; DOM: Domestic; IND: Industrial; FWS: Fish & Wildlife Propagation; IRR: Irrigation; REC: Recreation; COM: Commercial; RWS: Rural Water System

Attachment A3. Descriptions of Deferred James River Applications

1. **Application No. 8821-3** for Jim or Colin Klebsch proposes to appropriate 0.81 cubic feet of water per second (cfs) from the James River located in the NW ¼ SE ¼ of Section 13, for the irrigation of 100 acres located in the SE ¼ of Section 13, all in T117N-R64W. This site is located approximately 4.5 miles northeast of Redfield, South Dakota in Spink County.
2. **Application No. 8822-3** for Jim or Colin Klebsch proposes to appropriate 5.34 cubic feet of water per second from the James River located in the NW ¼ NE ¼ of Section 31 for the irrigation of 250 acres located in the NW ¼, NE ¼, SE ¼ of Section 31, all in T117N-R63W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 3 miles northeast of Redfield, South Dakota in Spink County.
3. **Application No. 8823-3** for Jim or Colin Klebsch proposes to appropriate 1.56 cubic feet of water per second from the James River located in the NE ¼ SW ¼ of Section 24 for the irrigation of 100 acres located in the SE ¼ of Section 23 and the N ½ SW ¼, SW ¼ SW ¼ of Section 24, all in T117N-R64W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located approximately 3.5 northeast of Redfield, South Dakota in Spink County.
4. **Application No. 8824-3** for Jim or Colin Klebsch proposes to appropriate 0.75 cubic feet of water per second from the James River located in the NW ¼ SE ¼ of Section 13 for irrigation of 100 acres located in the SE ¼ of Section 13, all in T117N-R64W. This site is located approximately 4.5 miles northeast of Redfield, South Dakota in Spink County.
5. **Application No. 8835-3** for Nick & Scott Bebo proposes to appropriate 6.65 cubic feet of water per second (cfs) from the James River at a point located in the NW ¼ SW ¼ of Section 28 for the irrigation of 466 acres located in the NW ¼ of Section 28, S ½, NW ¼ of Section 21; all in T117N-R63W. This site is located in Spink County, approximately five miles northeast of Redfield, South Dakota.
6. **Application No. 8859-3** for Nick & Scott Bebo proposes to appropriate 3.0 cubic feet of water per second (cfs) from the James River located in the NE ¼ SW ¼ of Section 34 for the irrigation of 305 acres located in the N ½ of Section 27, all in T117N-R63W. The site is located in Spink County, approximately six miles northeast of Redfield, South Dakota.
7. **Application No. 8860-3** for Nick & Scott Bebo proposes to appropriate 2.6 cubic feet of water per second (cfs) from the James River located in the NW ¼ NE ¼ of Section 12 for the irrigation of 260 acres located in the NE ¼, E ½ SE ¼, SW ¼ SE ¼ of Section 12, all in T117N-R64W. The site is located in Spink County, approximately six miles northeast of Redfield, South Dakota.
8. **Application No. 8861-3** for Nick & Scott Bebo proposes to appropriate 2.2 cubic feet of water per second (cfs) from the James River located in the NE ¼ SW ¼ of Section 34 for the irrigation of 220 acres located in the S ½ NW ¼, SW ¼ of Section 34, all in T117N-R63W. This site is located in Spink County, approximately five and one-half miles northeast of Redfield, South Dakota.
9. **Application No. 8862-3** for Nick & Scott Bebo proposes to appropriate 1.10 cubic feet of water per second (cfs) from the James River located in the SE ¼ SE ¼ of Section 20 for the irrigation of 110 acres located in the SE ¼ of Section 20, all in T117N-R63W. The

site is located in Spink County, approximately five miles northeast of Redfield, South Dakota.

10. **Application No. 8863-3** for Nick & Scott Bebo proposes to appropriate 0.80 cubic feet of water per second (cfs) from the James River located in the SE ¼ NE ¼ of Section 29 for the irrigation of 80 acres located in the E ½ NE ¼ of Section 32, all in T117N-R63W. This site is located in Spink County, approximately five miles northeast of Redfield, South Dakota.
11. **Application No. 8867-3** Jim or Colin Klebsch proposes to appropriate 1.56 cubic feet of water per second (cfs) from the James River located in the SW ¼ SE ¼ of Section 13 for the irrigation of 80 acres located in the NE ¼ of Section 24, all in T117N-R64W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located in Spink County, approximately four and one-half miles northeast of Redfield, South Dakota.
12. **Application No. 8868-3** Jim or Colin Klebsch proposes to appropriate 1.56 cubic feet of water per second (cfs) from the James River located in the SW ¼ SE ¼ of Section 13 for the irrigation of 80 acres located in the S ½ SE ¼ of Section 24, all in T117N-R64W. The applicant is requesting a diversion rate greater than the statutory limit of 1 cfs per 70 acres. This site is located in Spink County, approximately four and one-half miles northeast of Redfield, South Dakota.
13. **Application No. 8869-3** Jim or Colin Klebsch proposes to appropriate 2.57 cubic feet of water per second (cfs) from the James River located in the E ½ SE ¼ of Section 11 for the irrigation of 180 acres located in the E ½ NE ¼, NE ¼ SE ¼ of Section 14, the N ½ NW ¼ of Section 13, the SW ¼ SW ¼ of Section 12, the SE ¼ SE ¼ of Section 11, all in T117N-R64W. The site is located in Spink County, approximately five miles north of Redfield, South Dakota.
14. **Application No. 8870-3** Jim or Colin Klebsch proposes to appropriate 3.88 cubic feet of water per second (cfs) from the James River located in the NE ¼ SE ¼ of Section 11 for the irrigation of 272 acres located in the W ½ of Section 2, all in T117N-R64W. The site is located in Spink County, approximately five and one-half miles northeast of Redfield, South Dakota.