
2023 ANNUAL INTEGRATED
MANAGEMENT PLAN REPORT:

NEBRASKA DEPARTMENT OF NATURAL
RESOURCES

&

UPPER NIOBRARA WHITE NATURAL
RESOURCES DISTRICT

REPORTING ON 2022 DATA

ANNUAL MEETING HELD ON NOVEMBER 16, 2023

Purpose

This report fulfills the Department of Natural Resources' (Department or NeDNR) responsibilities as outlined in the Upper Niobrara White Natural Resources District (District or UNWNRD) integrated management plan (IMP) and provides updates on current projects and studies in the area.

Reporting and exchanging information gathered from monitoring projects, streamflow data, or other studies provides a basis for increased understanding of the hydrologically connected surface water and groundwater system. In areas where surface water and groundwater are hydrologically connected, estimates of water quantity of either surface water or groundwater cannot be evaluated separately. Data gathered through the IMP's monitoring plan and reported here are provided to assist in evaluating the success of the IMP's objectives. This exchange of information also helps to test the validity of conclusions and information upon which the IMP is based.

Department Reporting

The IMP requires that the Department annually report on the following surface water data within the district:

1. Surface water permitting

- a. Any order of cancellation issued pursuant to Neb. Rev. Stat. § 46-229.04(5) or any assignment of the right to use that portion of an appropriation which was relinquished.
- b. Variances granted by the Department, facts offered as justification for the variance to be granted and the reasons for the action taken. See **Appendix D** for full text of the Department of Natural Resources Rules of Surface Water, Title 457, Neb. Admin. Code, Chapter 23, concerning variances.

2. Diversions

- a. Records of surface water diversions collected by the Department upstream of the Box Butte Reservoir.
- b. Surface water pump site inspections conducted in 2022.

3. Streamflow

- a. Records of streamflow measurements taken from non-gaged streams within the District.

1. Surface Water Permitting

- a. Any order of cancellation issued pursuant to Neb. Rev. Stat. § 46-229.04(5) or any assignment of the right to use that portion of an appropriation which was relinquished.

In 2022, the Department did not issue any orders of cancellation pursuant Neb. Rev. Stat. § 46-229.04(50). However, there were three temporary manufacturing (MF) permits for road construction that expired in 2022. Because these permits were located within the surface water control area, and therefore subject to a moratorium, they were issued under variances, which were reported in the Department’s 2021 report. **Figure 1** shows the surface water control area and the location of all surface water permitting actions in 2022. **Table 1** provides a summary of the expired MF permits and their associated variances.

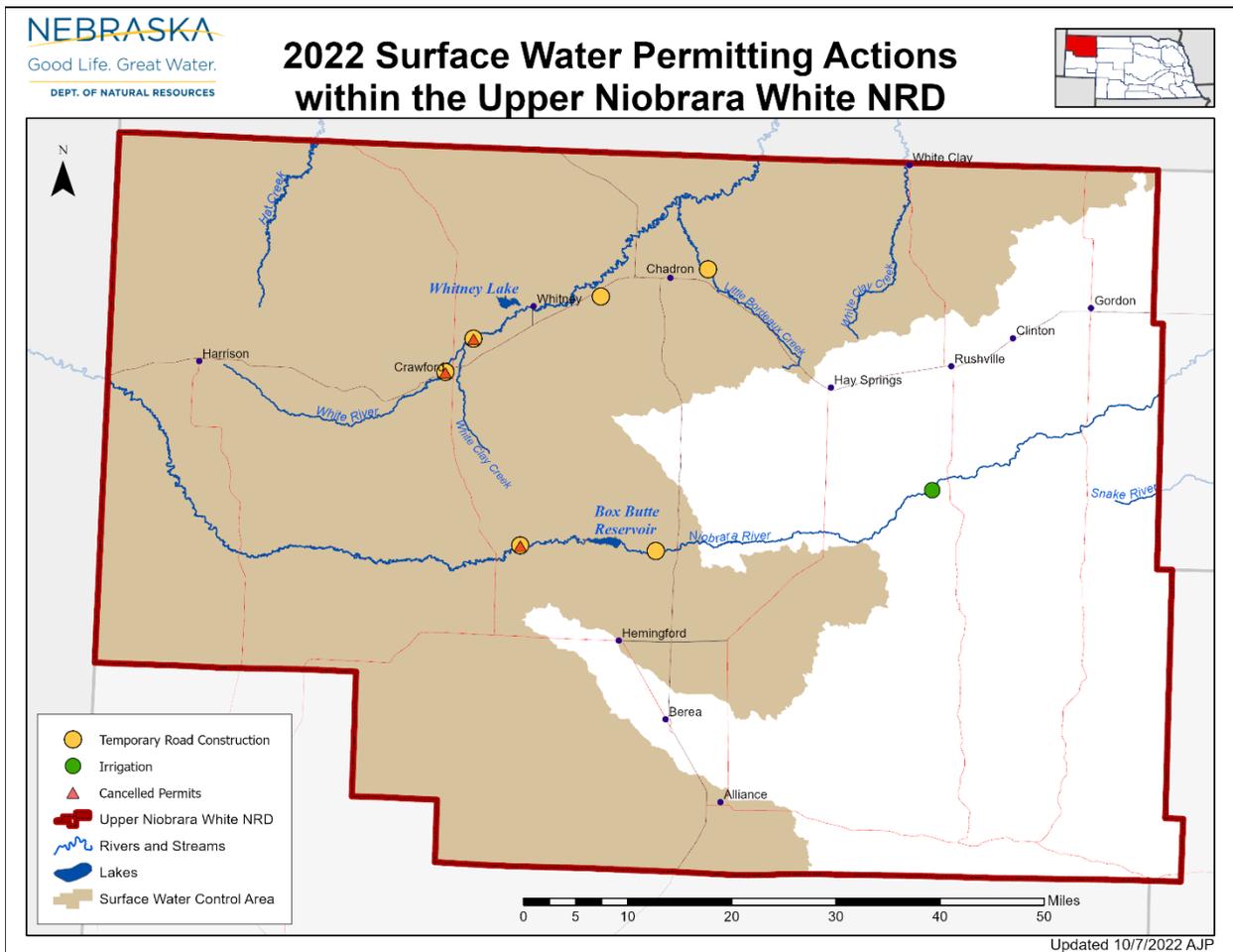


Figure 1: 2022 surface water permitting actions within Upper Niobrara White NRD

b. Variances granted by the Department, facts offered as justification for the variance to be granted and the reasons for the action taken.

In 2022, the Department granted variances for surface water permits within the surface water control area. This process has two steps, first a petitioner must file a request for leave, if a variance is granted, the petitioner then has one year from NeDNR's order to file an application for a permit to appropriate water.

There were six variances granted (VAR-9592 through VAR-9597), that allowed for temporary MF permits to be issued for road construction. These temporary permits automatically expire one year from the date they are issued. **Table 2** summarizes all new permitting actions and the associated the variances granted in 2022 within the Upper Niobrara White NRD.

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Table 1: Summary of surface water permits that expired or were cancelled in 2022.

Appropriation Number	Approval Date	Expiration Date	Point of Diversion Location				Use	Source	Name of Reservoir	Grant in CFS	Grant in AF	Variance Petition Basis	Associated Variance
			Sec	Twn	Rng	Dir							
A-19784	7/30/2021	8/4/2022	35	29	51	W	Temporary Road Construction	Niobrara River	N/A	N/A	10	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.06	VAR-9393
A-19785	7/30/2021	8/4/2022	3	31	52	W	Temporary Road Construction	White River	N/A	N/A	10	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.06	VAR-9394
A-19786	7/30/2021	8/4/2022	24	32	52	W	Temporary Road Construction	White River	N/A	N/A	10	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.06	VAR-9395

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Table 2: New surface water permitting actions and associated variances granted in 2022 within the Upper Niobrara- White NRD.

Appropriation Number	Approval Date	Point of Diversion Location				Use	Source	Name of Reservoir	Grant	Variance Petition Basis	Associated Variance
		Sec	Twn	Rng	Dir						
A-19467	7/1/2022	28	30	44	W	IR - Irrigation from Natural Stream	Niobrara River	N/A	0.32 CFS	Outside of IMP area. No variance required.	N/A
A-19833	4/25/2022	36	29	49	W	Temporary Road Construction	Niobrara River	N/A	10 AF	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.04	VAR-9592
A-19834	4/25/2022	24	32	52	W	Temporary Road Construction	White River	N/A	10 AF	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.04	VAR-9593
A-19835	4/25/2022	3	31	52	W	Temporary Road Construction	White River	N/A	10 AF	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.04	VAR-9594
A-19836	4/25/2022	30	33	49	W	Temporary Road Construction	Dead Horse Creek	N/A	10 AF	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.04	VAR-9595
A-19837	4/25/2022	35	29	51	W	Temporary Road Construction	Niobrara River	N/A	10 AF	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.04	VAR-9596
A-19838	4/25/2022	13	33	48	W	Temporary Road Construction	Bordeaux Creek, Little	N/A	10 AF	Variance granted pursuant to 457 Neb. Admin. Code Ch. 23 § 001.04	VAR-9597

2. Diversions

a. Records of surface water diversions collected by the Department upstream of the Box Butte Reservoir

Surface water diversion records for the 2022 are included in **Appendix A**, and their locations are shown in **Figure 2**. The canals measured include the following: Johnson Canal, Lakotah Canal, Earnest Canal (North), Earnest Canal (South), McGinley-Stover Canal, Cook Canal No. 1, Harris-Neece Canal, Labelle Canal, Mettlen Canal, Bennett-Kay Canal, Moore-Kay Canal, Geo. Hitshew Canal, McLaughlin Canal, Excelsior Canal, Hughes Canal, Pioneer Canal and the Lichte Canal.

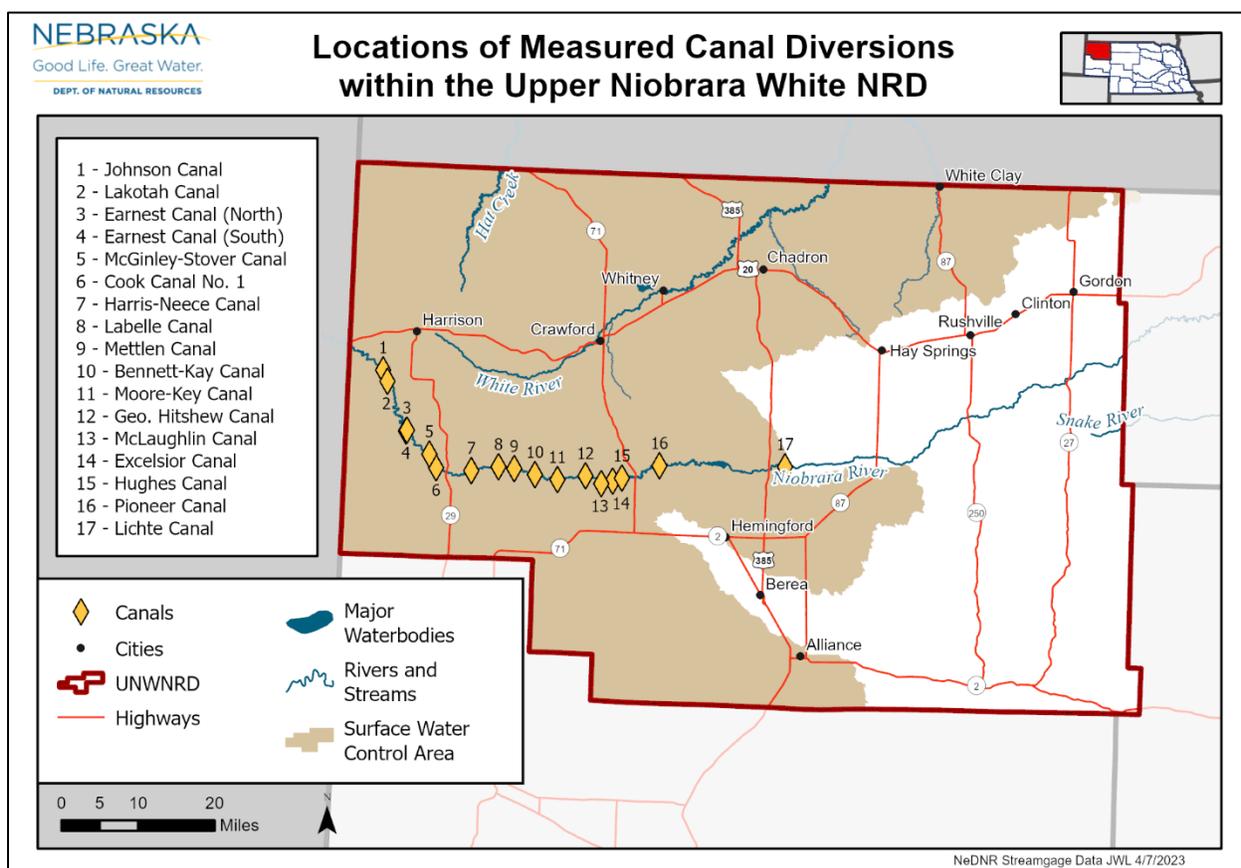


Figure 2: Locations of canal diversions in the Upper Niobrara White NRD.

b. Surface water pump site inspections conducted in 2022.

The NeDNR field office staff regularly inspects pump sites of surface water diversion points as conditions allow. Not all pump sites are inspected every irrigation season, and some pump sites may be visited more than once per season. In 2022, field office staff made 49 pump site inspections (**Figure 3**), this is in addition to the field measurements of diversions into canals (**Appendix B**), in the UNWNRD. As a part of inspections, field staff collect the following data:

- Evidence of pump site
- Pumps that are running
- Crops in field
- Irrigation method

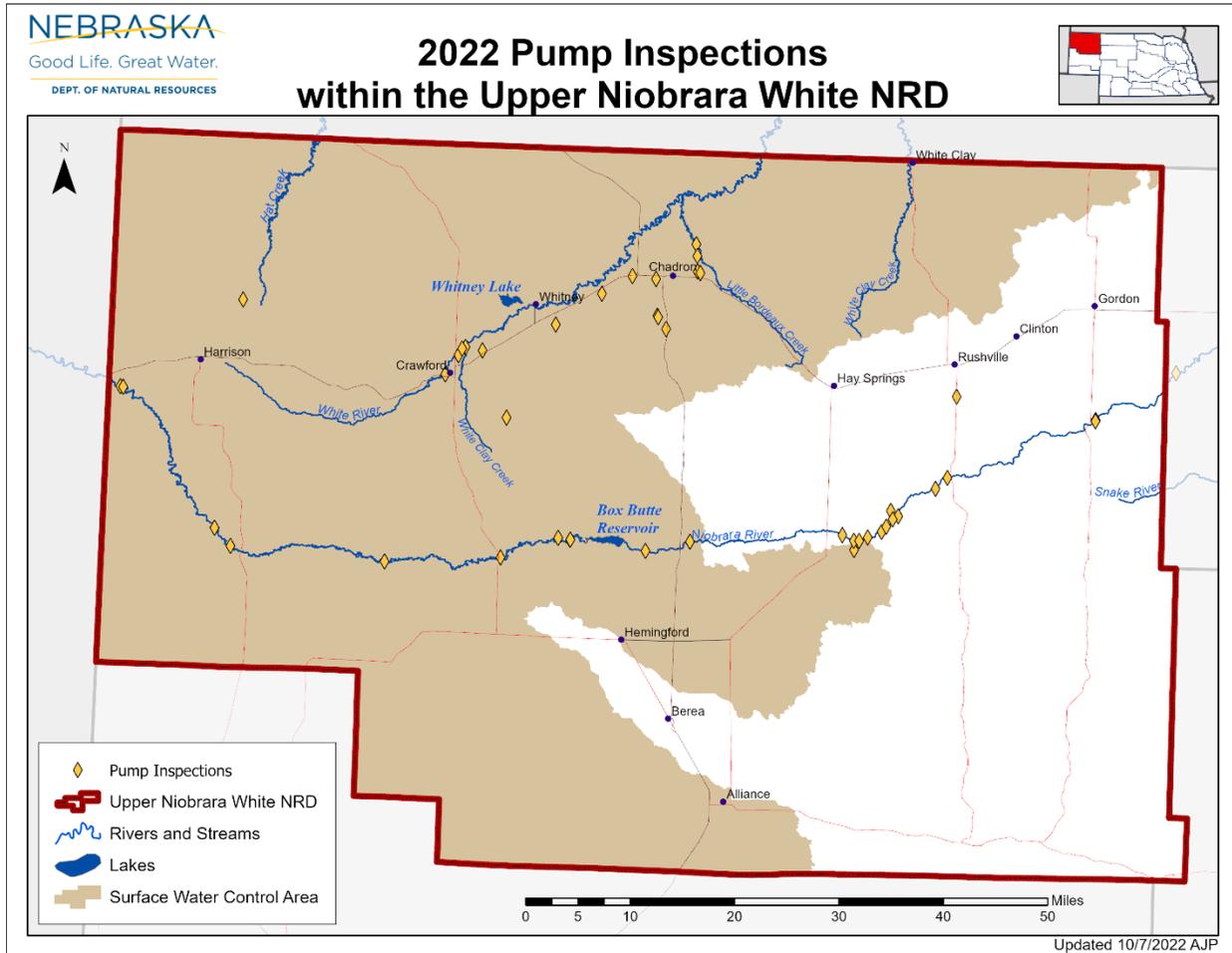


Figure 3: Pump site inspections conducted in 2022.

3. Streamflow

Non-gaged stream locations, pump site, and reservoir measurements for calendar year 2022 are included in **Appendix B**. Streamflow measurements for gaged streams can be found in **Appendix C** or at: <https://nednr.aquaticinformatics.net/> . Locations of streamgages that are operated by the Department are shown in **Figure 4** below.

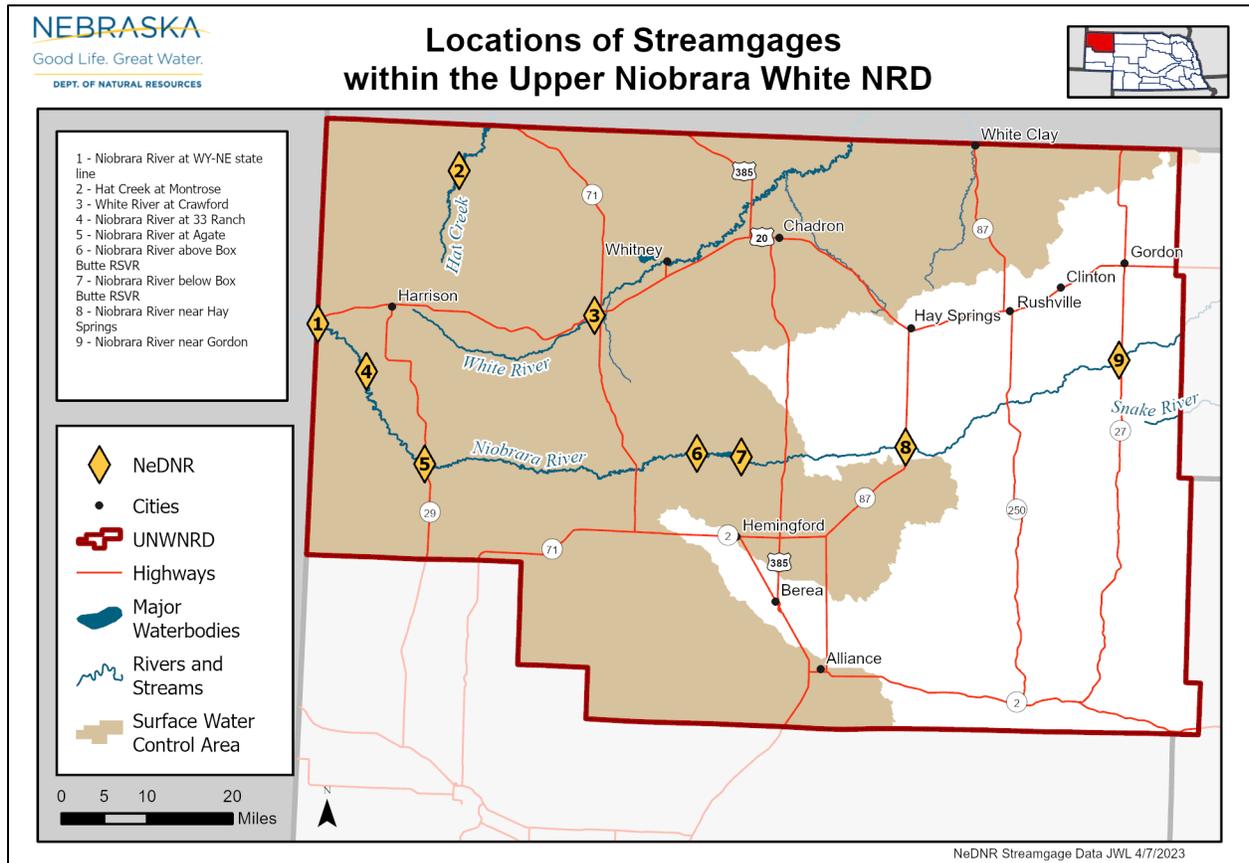


Figure 4: Locations of streamgages in the Upper Niobrara White NRD.

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Current Studies

USGS Niobrara Basin Model

The Department began working with the National Park Service and U.S. Geological Survey in 2020 to develop and calibrate a numerical groundwater model for most of the Niobrara basin in Nebraska, including a portion of the District. Model calibration has been completed and USGS is currently working on final documentation. The modeling project and final report are expected to be complete in 2024.

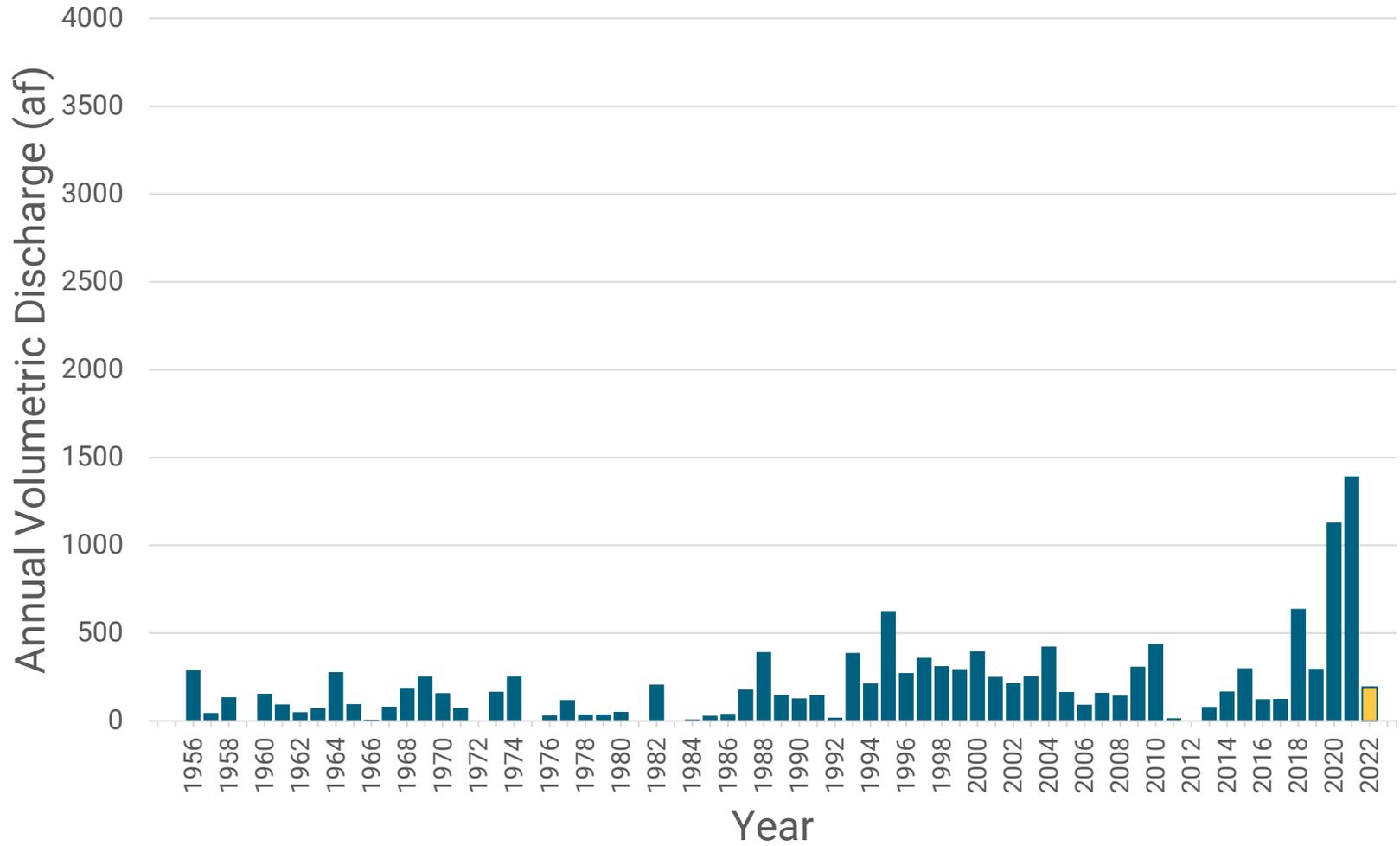
UNWNRD Groundwater Modeling (Upper Niobrara White Groundwater Model)

At the 2022 Nebraska Association of Resources Districts (NARD) Annual Conference, NeDNR and UNWNRD staff met to discuss progress on a study to better understand surface water and groundwater interaction in the District. At the meeting, the Department shared preliminary findings of the study, which used the Upper Niobrara White groundwater model and INSIGHT data, to answer the following questions.

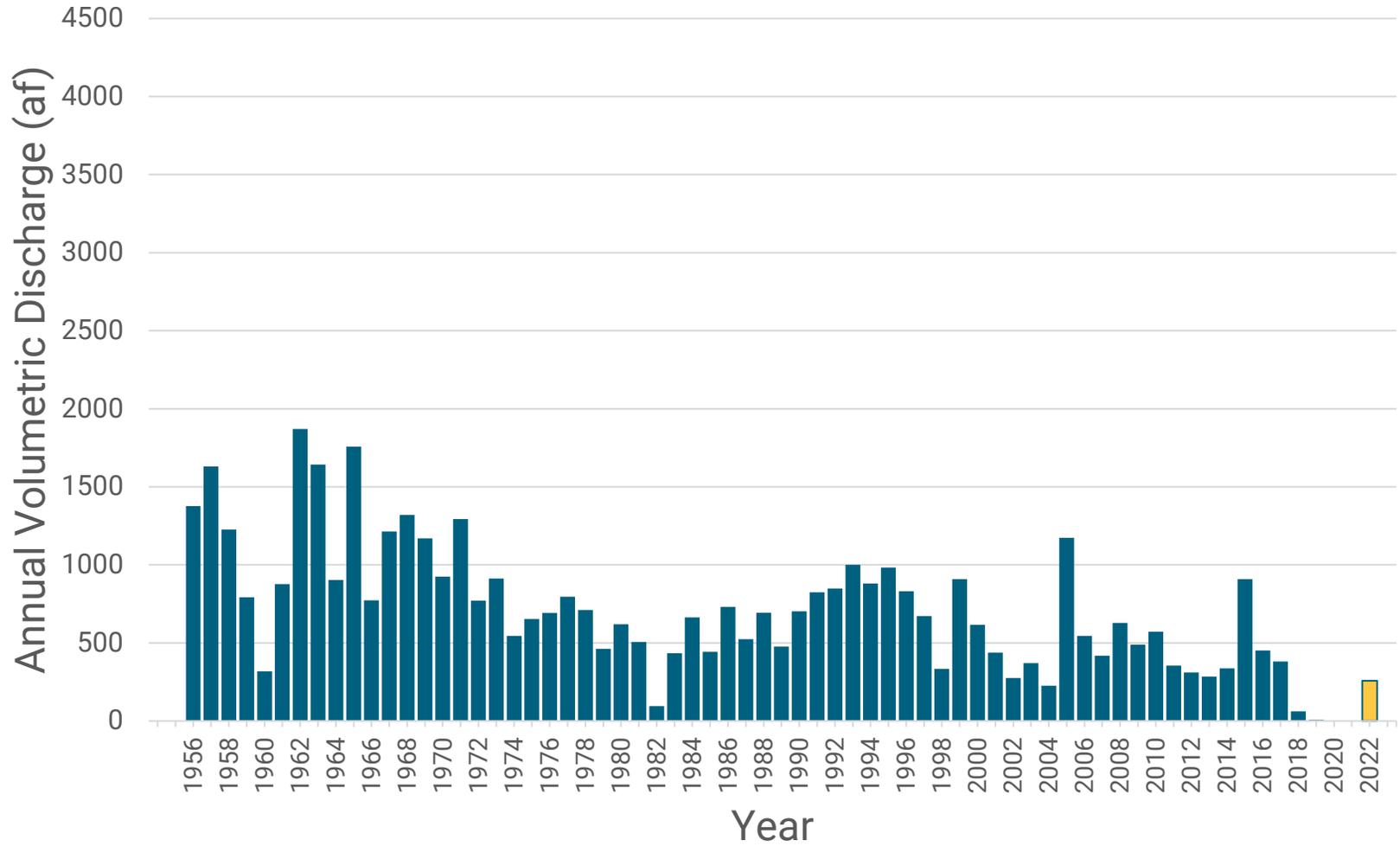
- How has surface and groundwater irrigation impacted streamflow in the Niobrara River?
- What portion of that impact is attributed to groundwater irrigation?
- What is the long term flow trend for the Niobrara River based on the current level of surface and groundwater irrigation? Specifically, based on 2021 (under 2011, 2012, and 2015 climate conditions) developed acres and average water use.
- Would an allocation result in increased stream flow in the Niobrara River and if so, what would the impact be?
- Would surface water adjudication result in an increase in stream baseflow and if so, what would the impact be? (This could not be modeled)
- What would it take to cause a 6-foot drawdown in Subarea 5?

The department recognized that there are limitations to the study due to the age of the model, which was last updated in 2018. These questions could be answered more completely by updating the model to use MODFLOW 6 and input data through 2021. In order to address this issue, UNWNRD applied for and was awarded a Water Sustainability Fund grant to help fund these updates. Work on this project is expected to begin in late 2023.

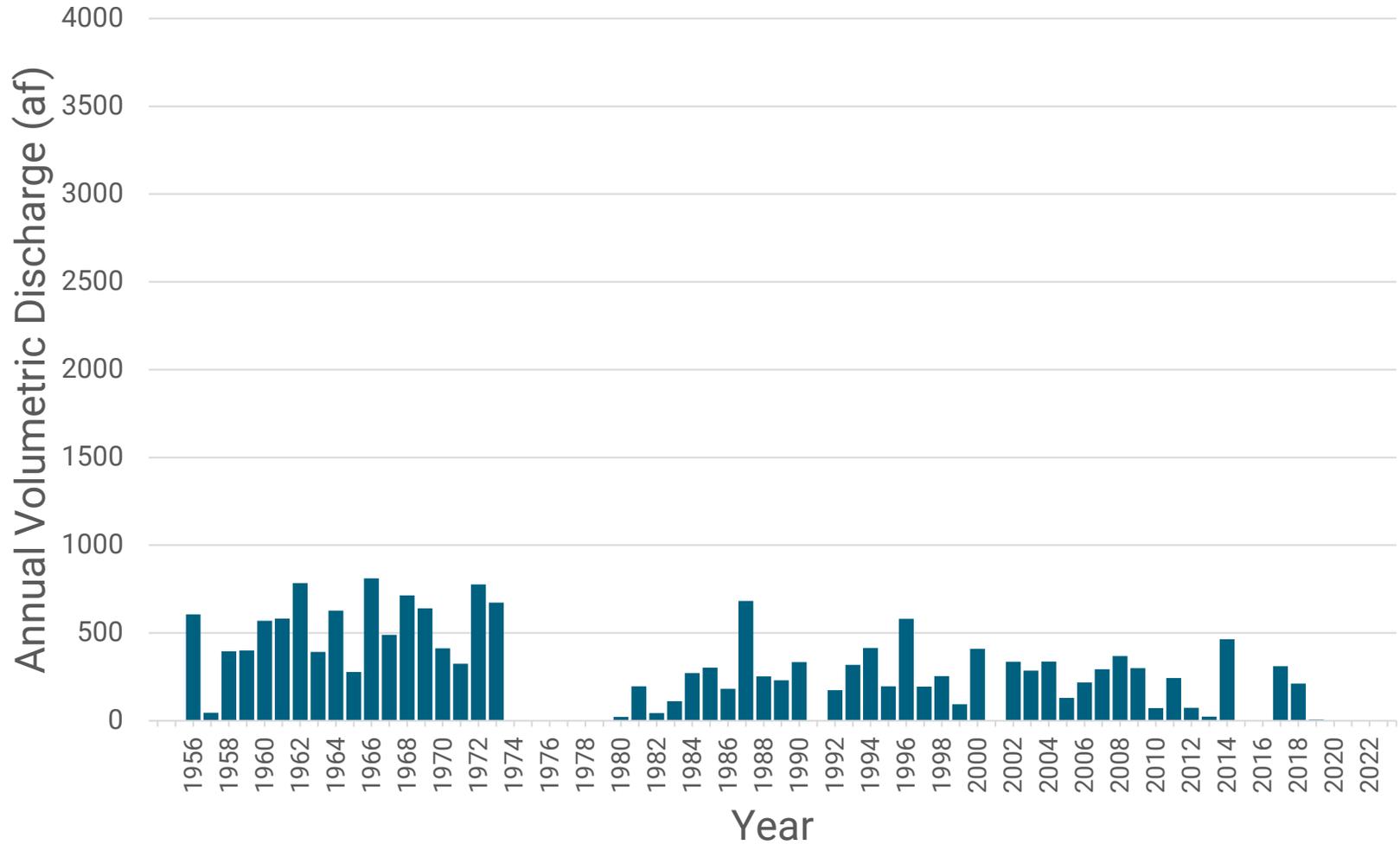
Annual Volumetric Discharge Recorded at Johnson Canal from Niobrara River Gage #72000



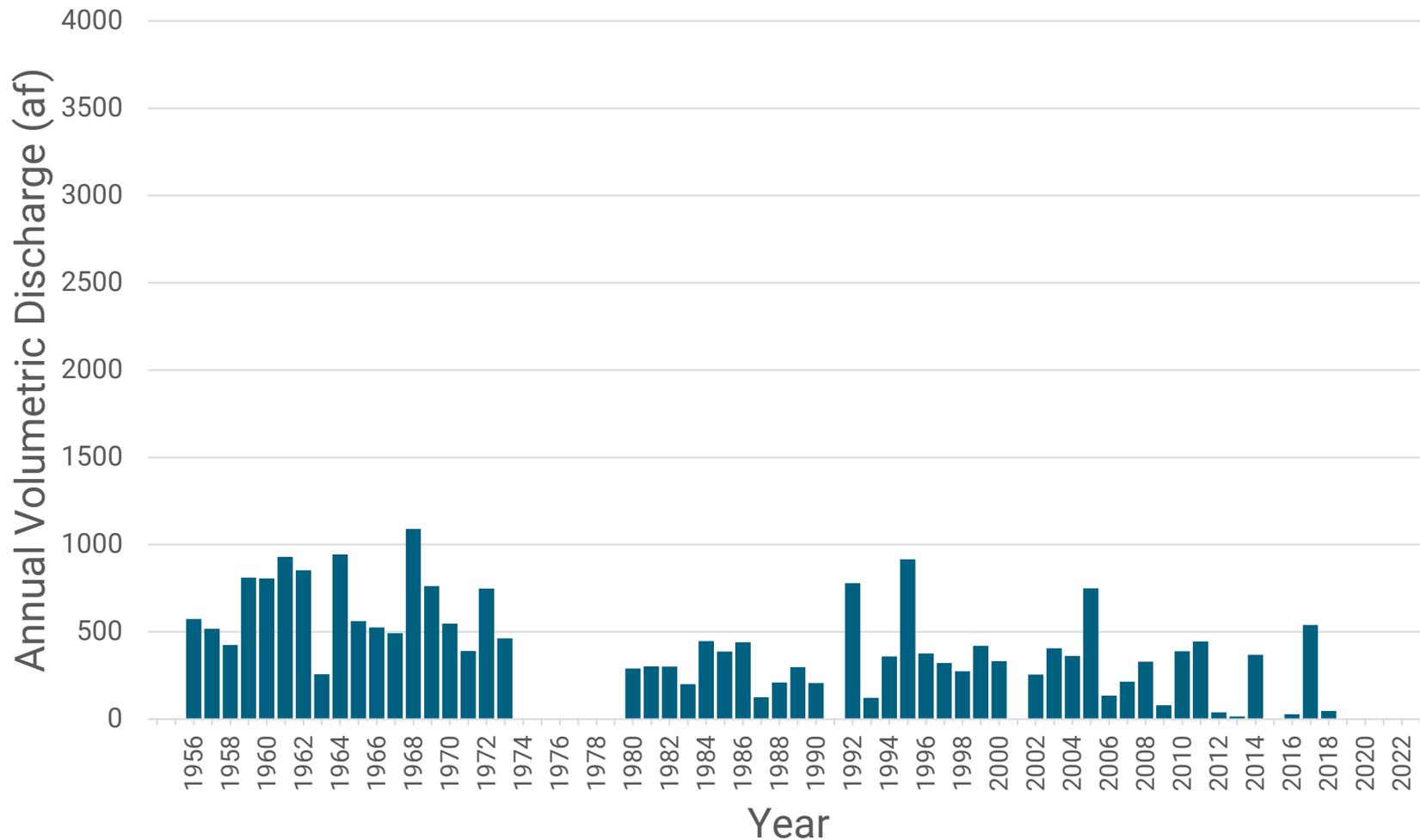
Annual Volumetric Discharge Recorded at Lakotah Canal from Niobrara River Gage #79000



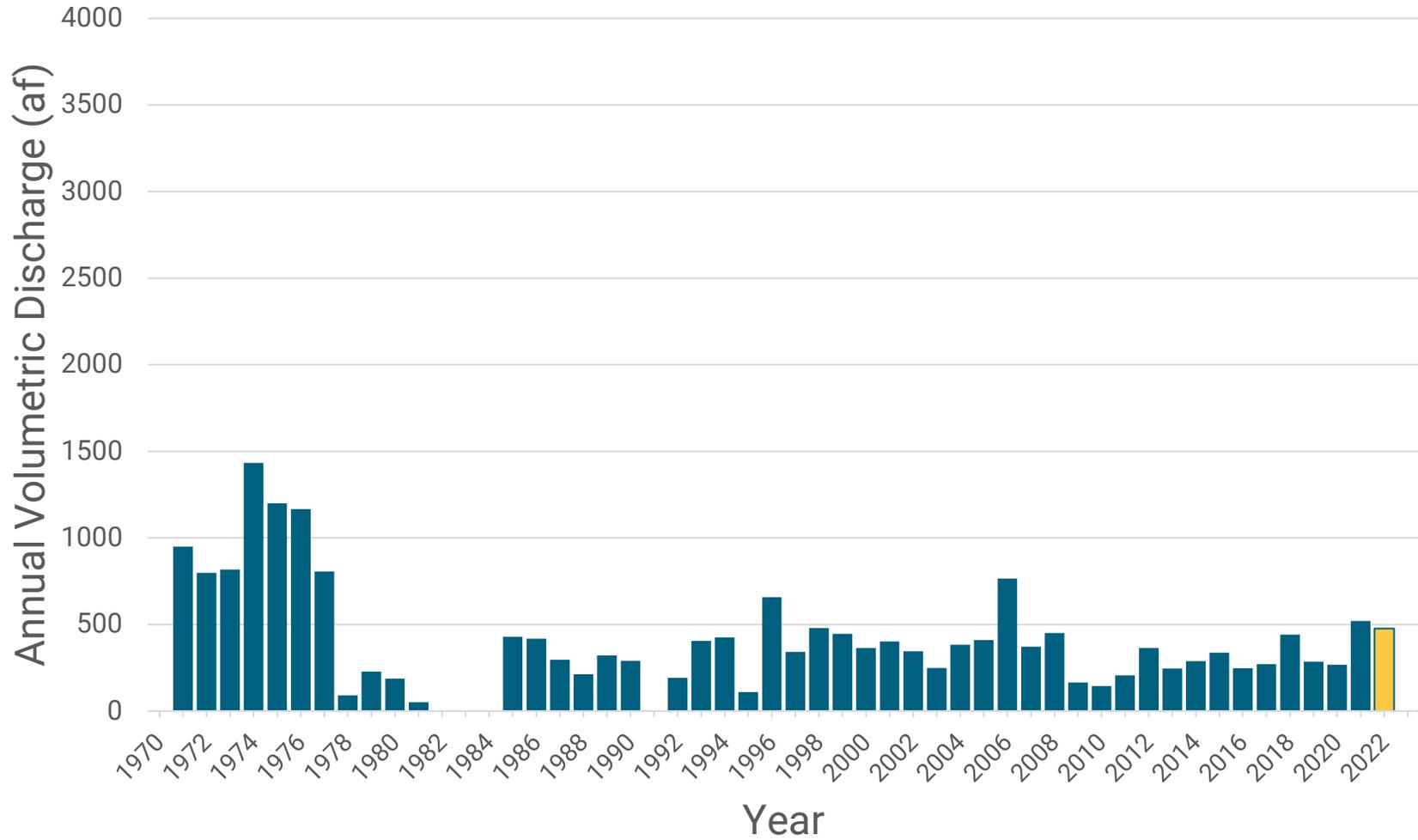
Annual Volumetric Discharge Recorded at Earnest Canal (North) from Niobrara River Gage #382000



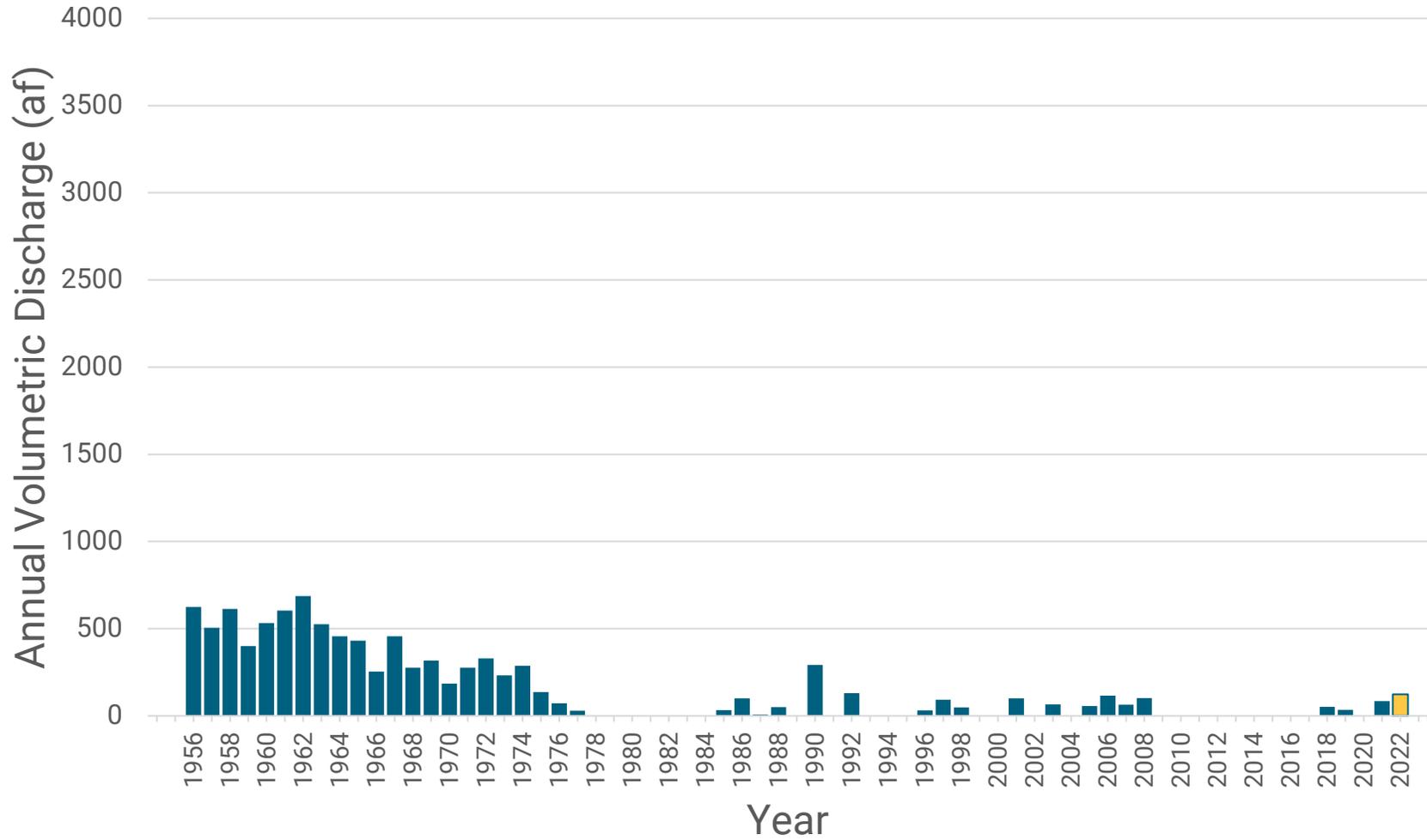
Annual Volumetric Discharge Recorded at Earnest Canal (South) from Niobrara River Gage #381000



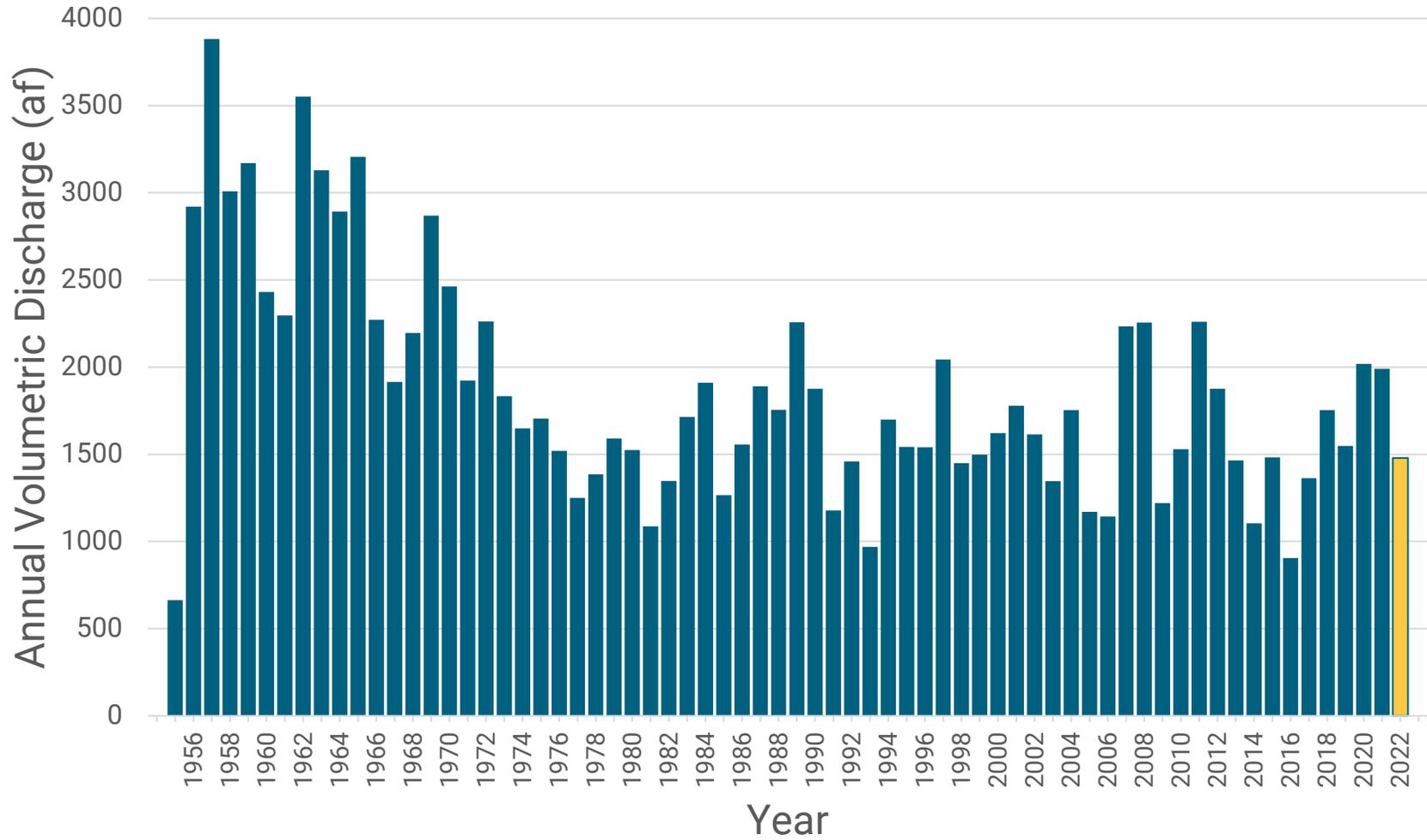
Annual Volumetric Discharge Recorded at McGinley-Stover Canal from Niobrara River Gage #84000



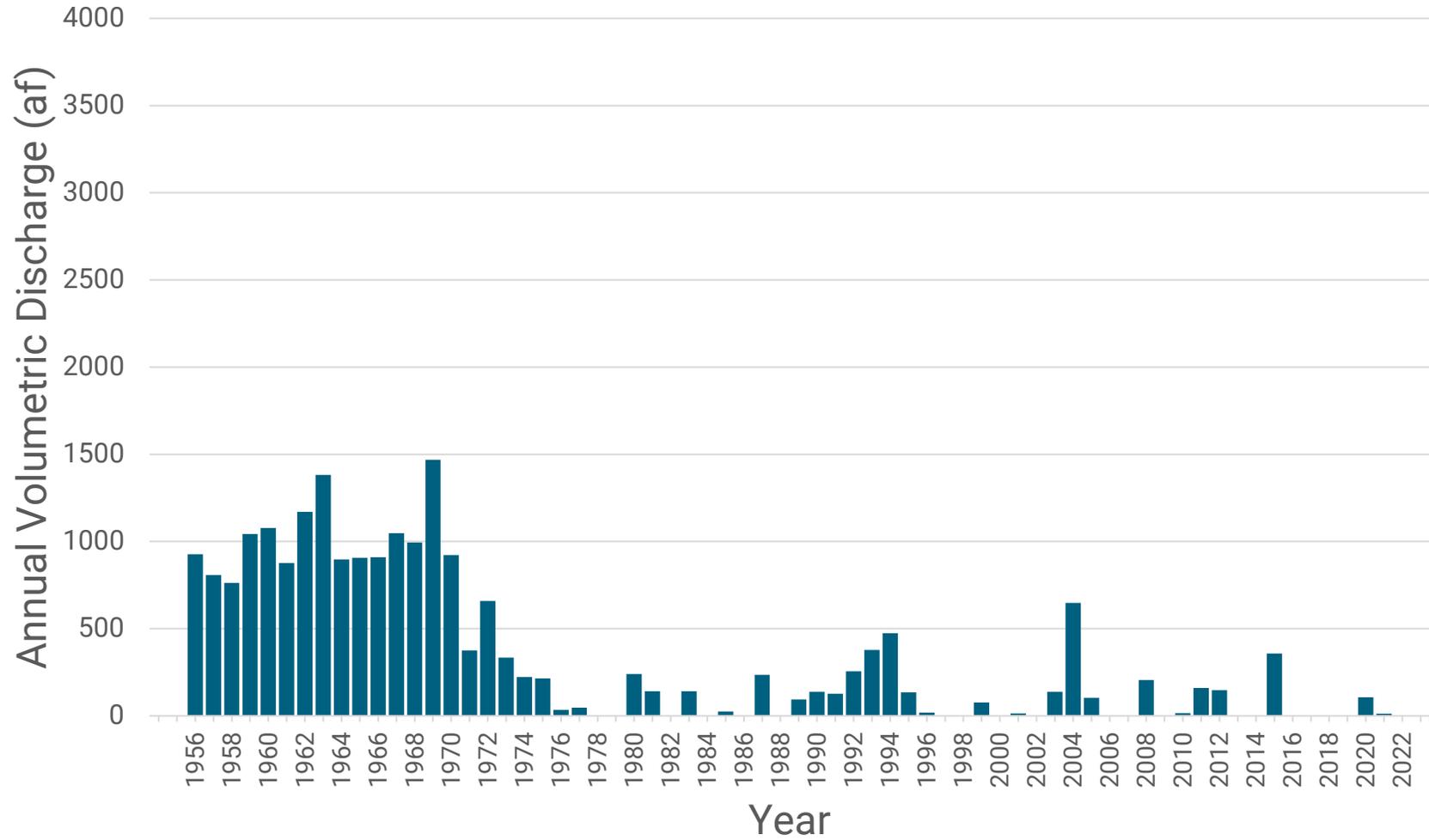
Annual Volumetric Discharge Recorded at Cook Canal No. 1 from Niobrara River Gage #29000



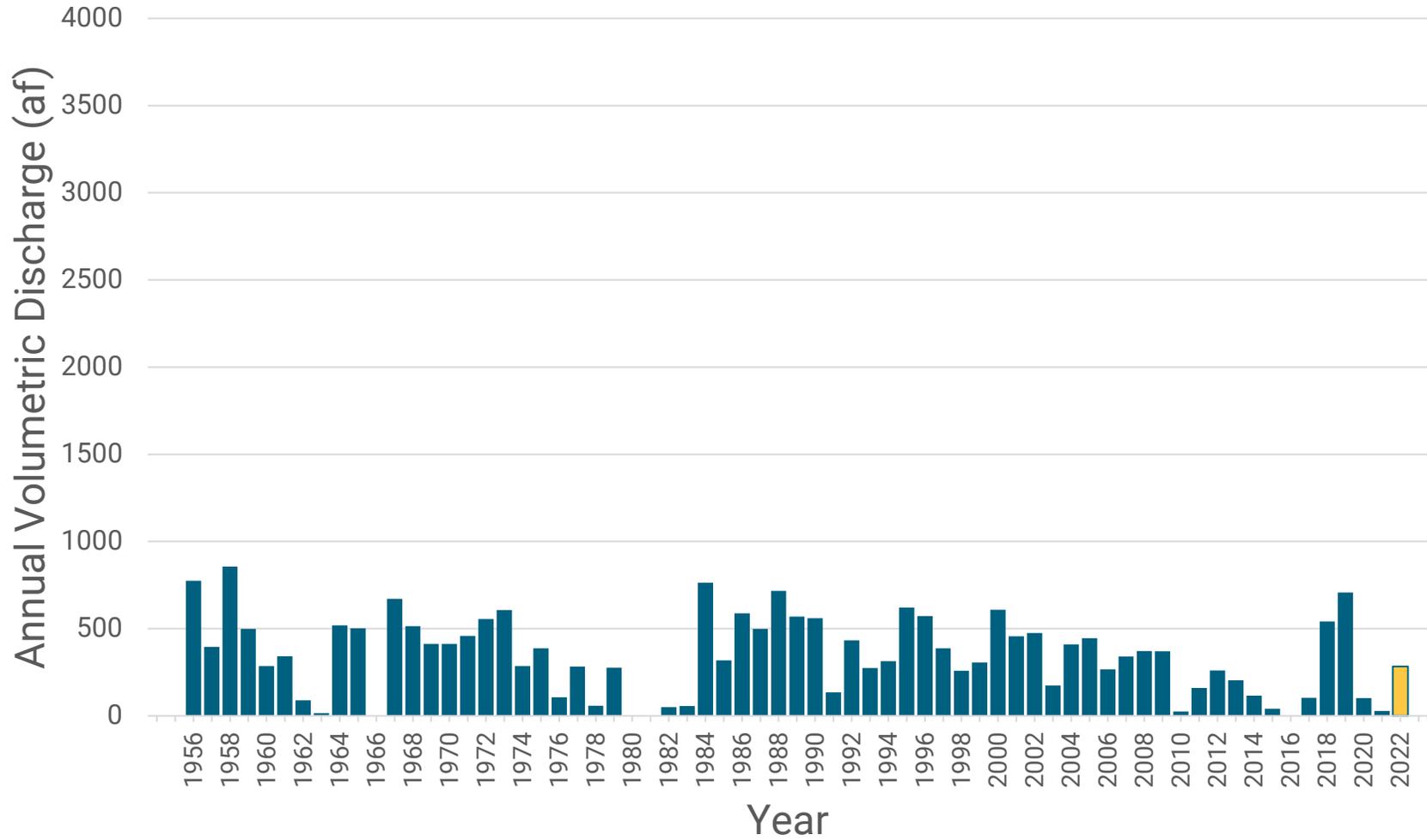
Annual Volumetric Discharge Recorded at Harris-Neece Canal from Niobrara River Gage #62000



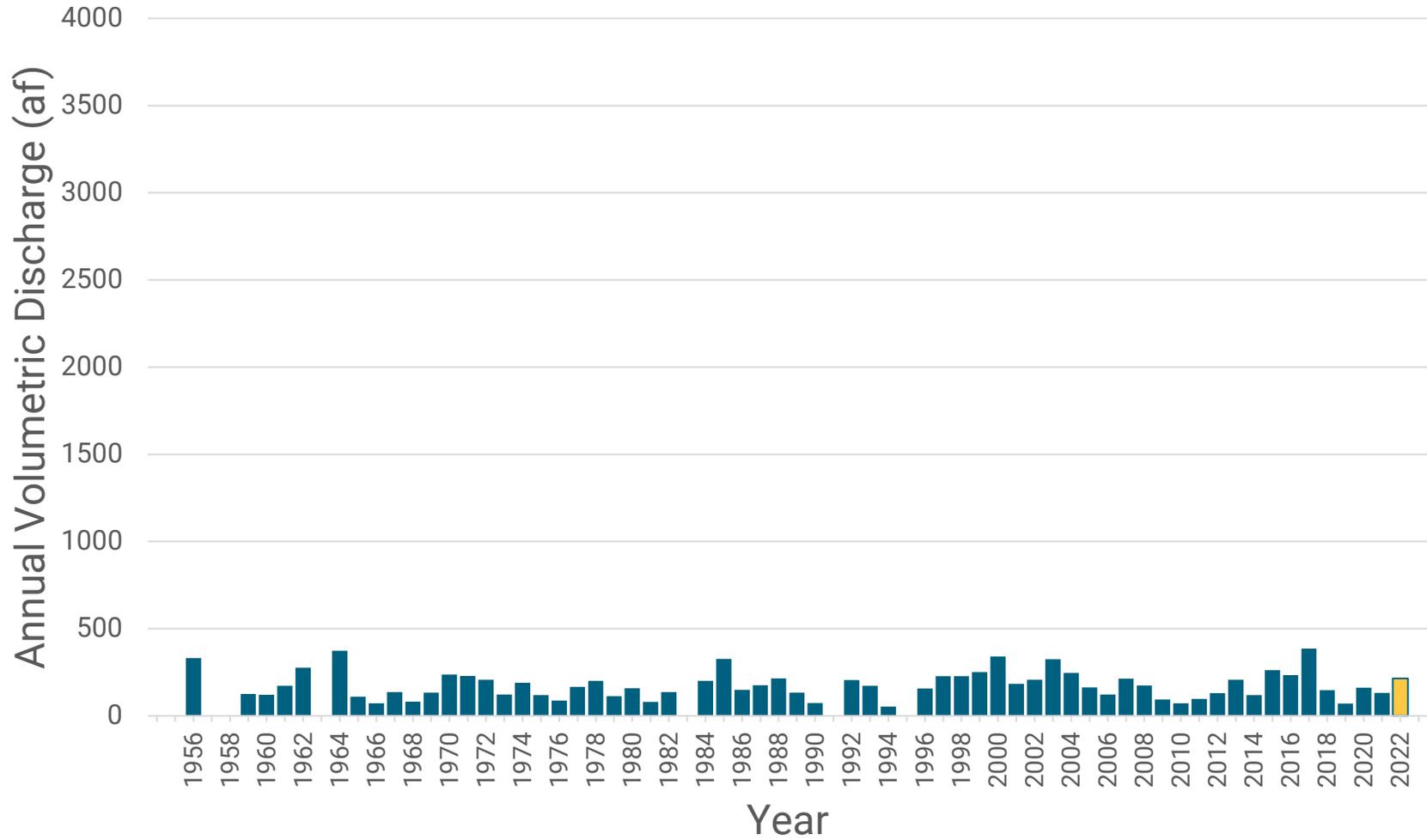
Annual Volumetric Discharge Recorded at Labelle Canal from Niobrara River Gage #78000



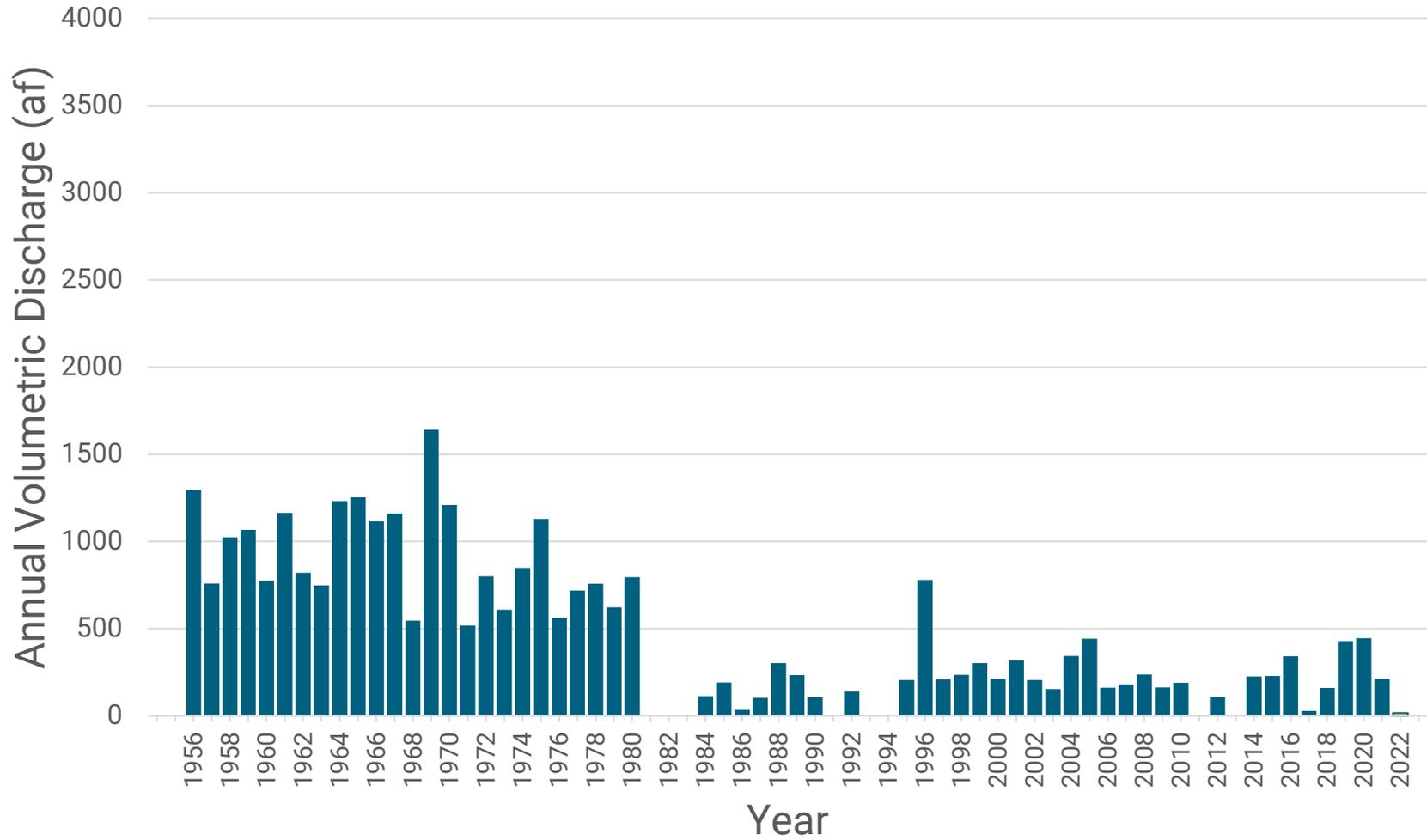
Annual Volumetric Discharge Recorded at Mettlen Canal from Niobrara River Gage #89000



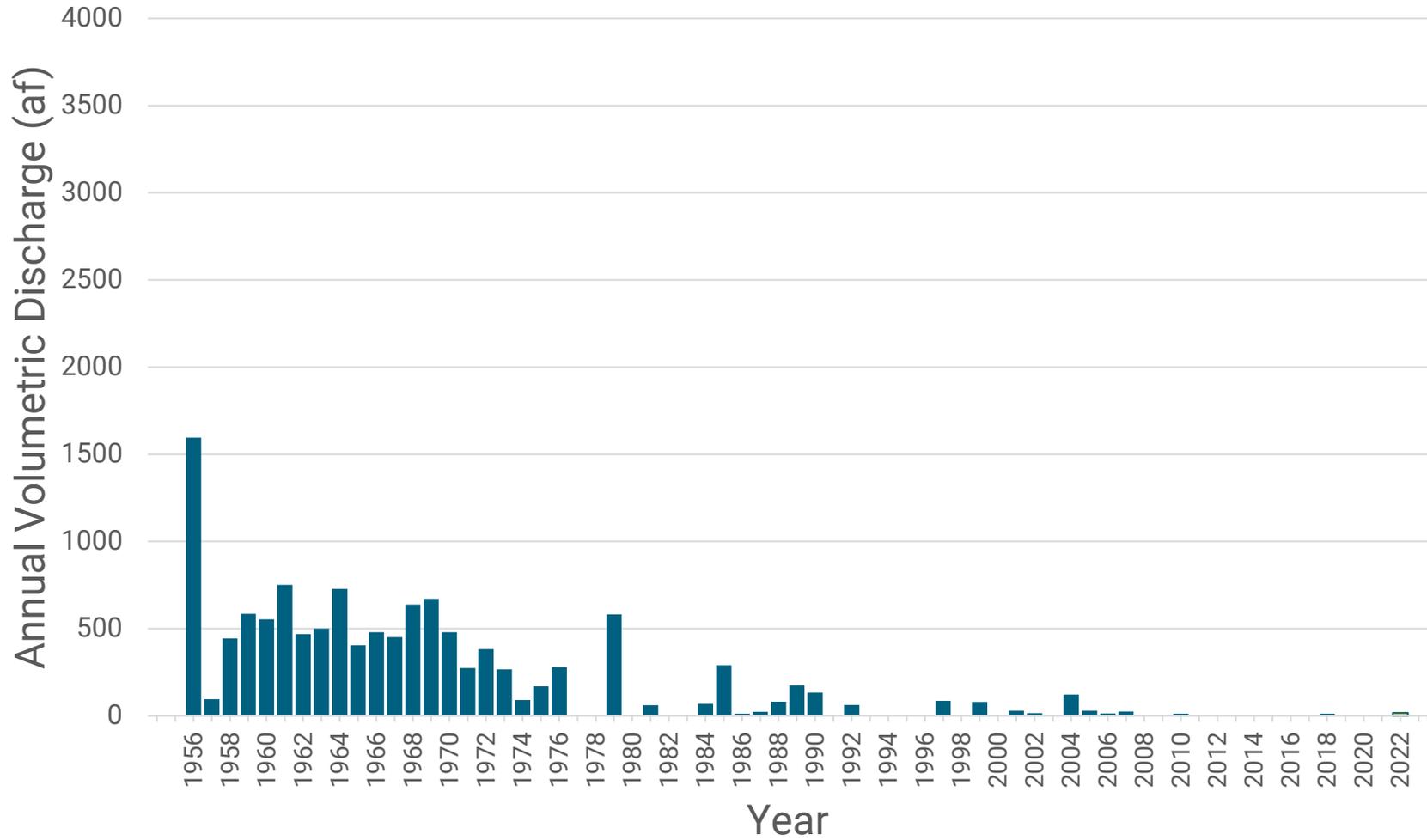
Annual Volumetric Discharge Recorded at Bennett-Kay Canal from Niobrara River Gage #13000



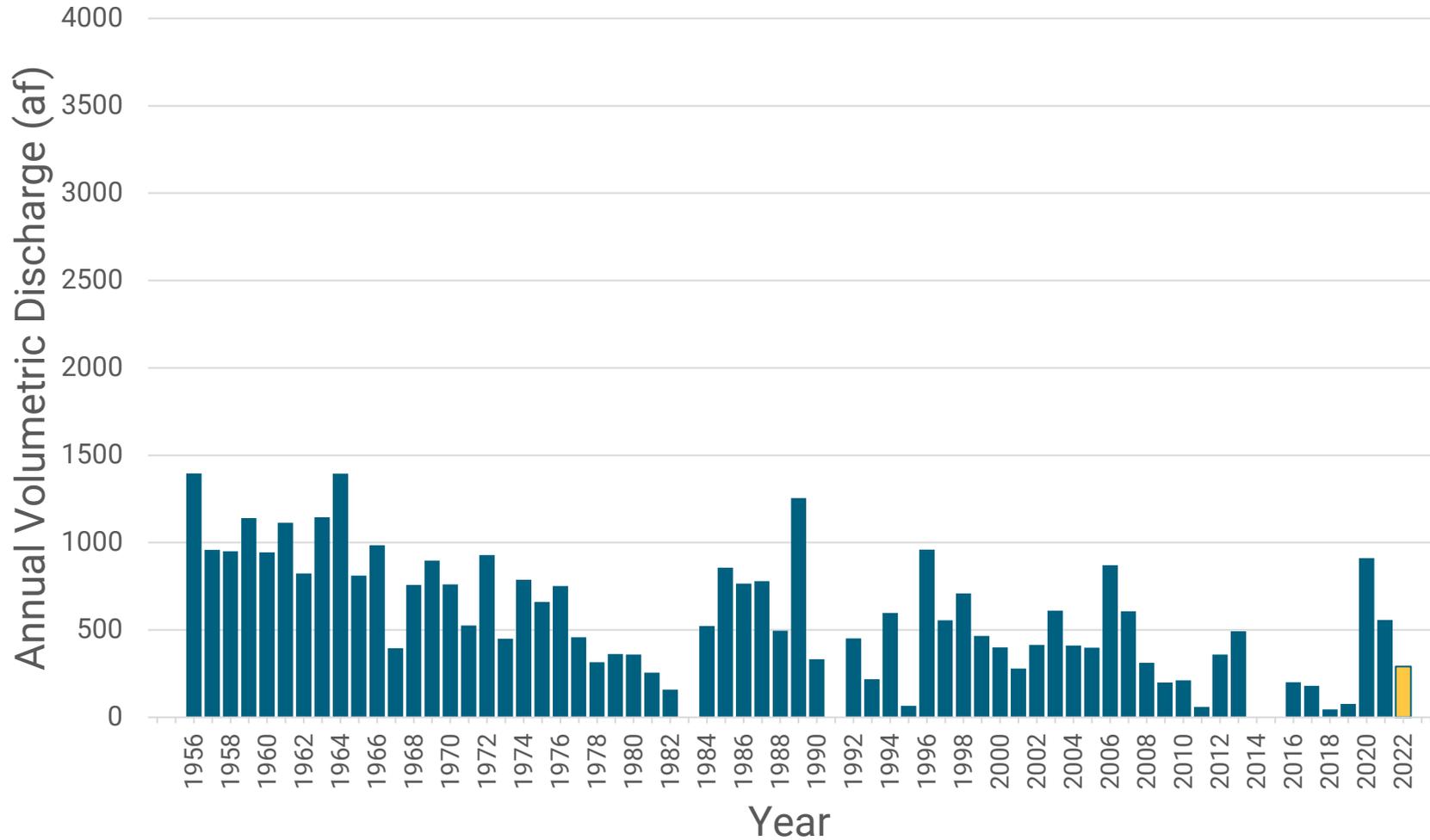
Annual Volumetric Discharge Recorded at Moore-Kay Canal from Niobrara River Gage #104000



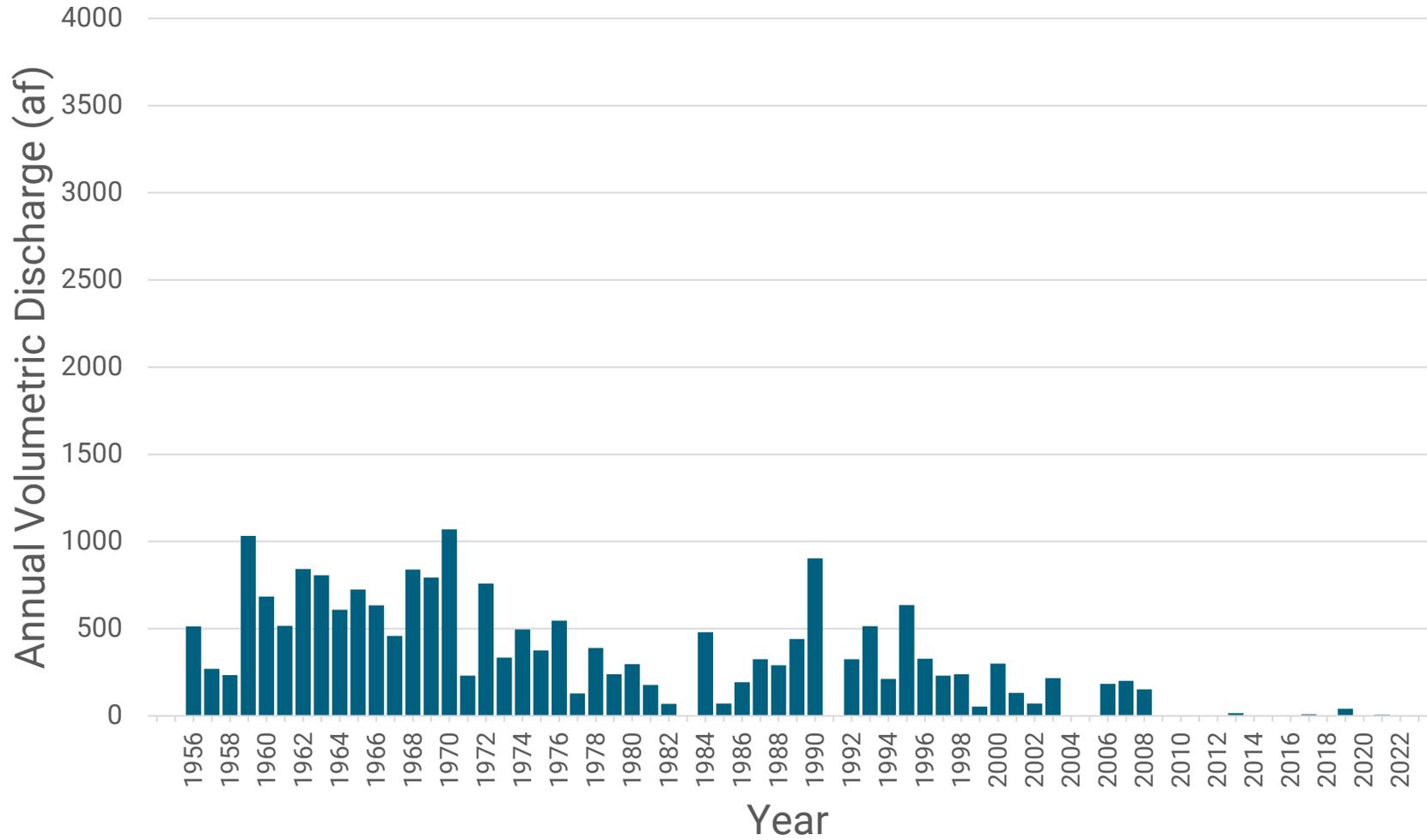
Annual Volumetric Discharge Recorded at Geo. Hitshew Canal from Niobrara River Gage #63000



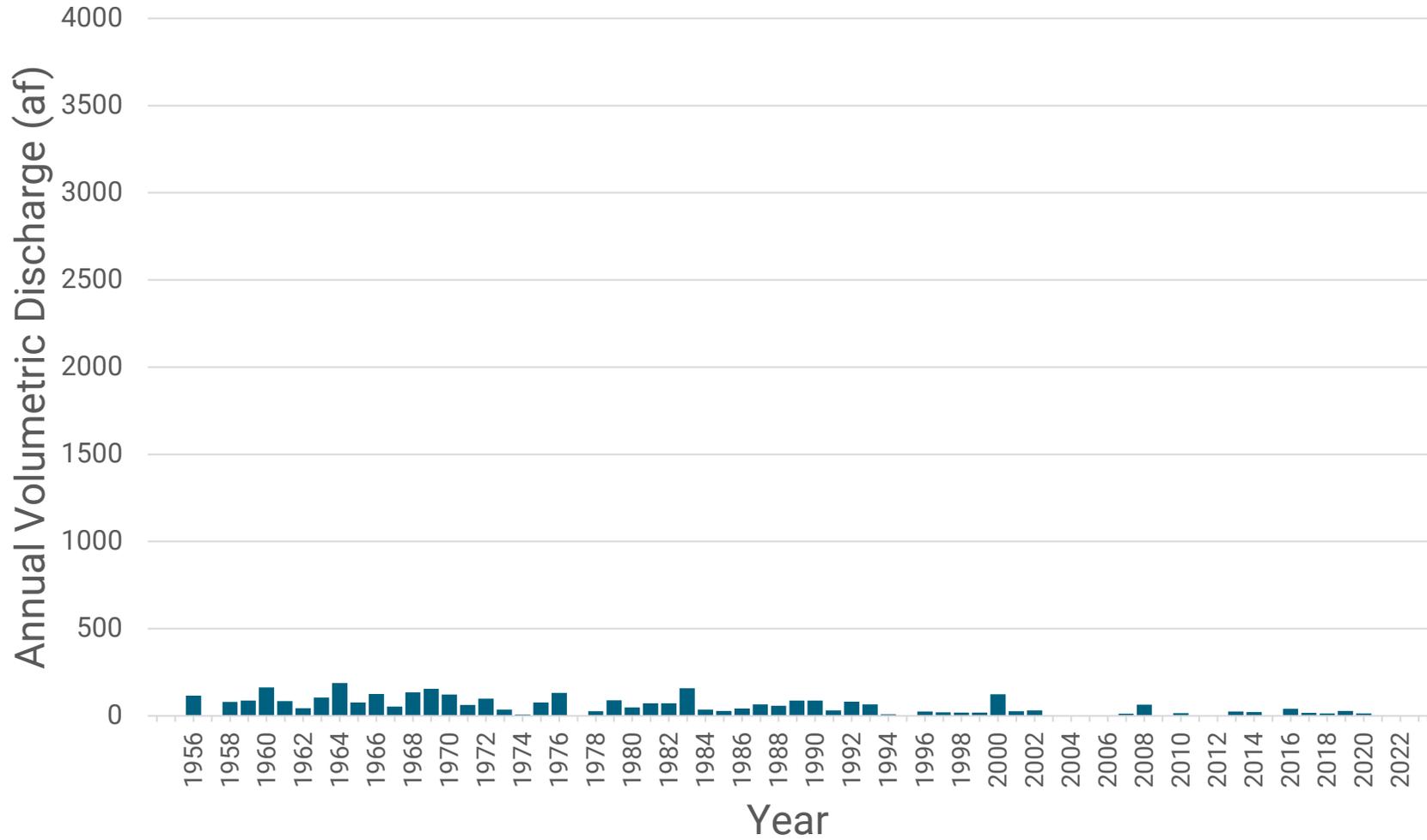
Annual Volumetric Discharge Recorded at McLaughlin Canal from Niobrara River Gage #86000



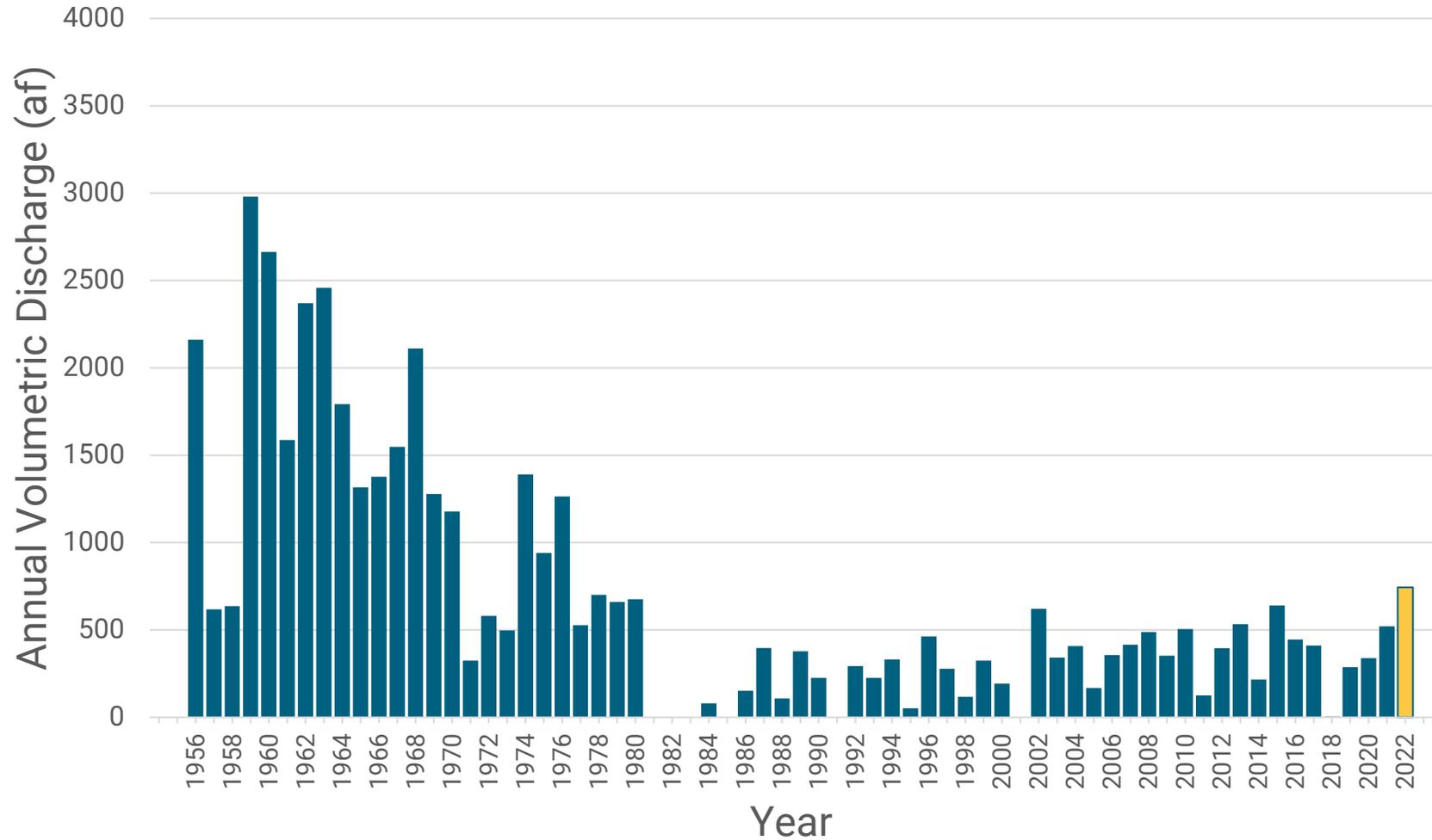
Annual Volumetric Discharge Recorded at Excelsior Canal from Niobrara River Gage #46000



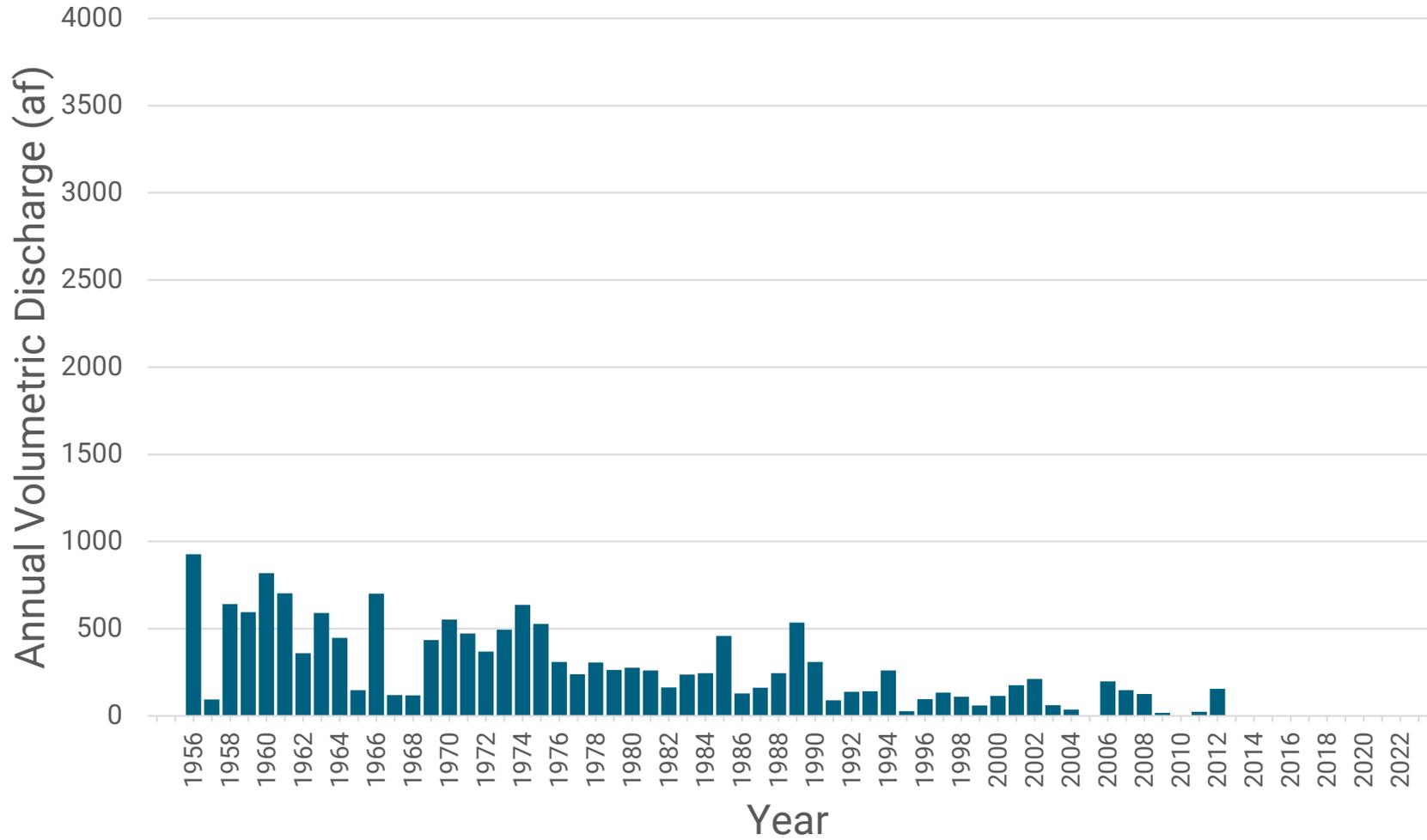
Annual Volumetric Discharge Recorded at Hughes Canal from Niobrara River Gage #69000



Annual Volumetric Discharge Recorded at Pioneer Canal from Niobrara River Gage #12300



Annual Volumetric Discharge Recorded at Lichte Canal from Niobrara River Gage #81000



APPENDIX B 2022 FIELD MEASUREMENTS

Date	Site Name	Discharge/Volume	Unit
1/21/2022	Armstrong Pump fr Niobrara River	0	CFS
2/25/2022	Armstrong Pump fr Niobrara River	0	CFS
3/22/2022	Armstrong Pump fr Niobrara River	0	CFS
5/17/2022	Armstrong Pump fr Niobrara River	0	CFS
6/17/2022	Armstrong Pump fr Niobrara River	0	CFS
5/31/2022	Beaver Pump fr White River	0	CFS
6/29/2022	Beguín Pump A-9017 fr Niobrara River	0	CFS
6/28/2022	Carlson Pump A-9999A	0	CFS
6/30/2022	Chadron Creek at Hwy 20	0	CFS
5/31/2022	Circle Pump - Hollibaugh fr Niobrara River	0	CFS
1/17/2022	Cook Pump fr Niobrara River	0	CFS
2/17/2022	Cook Pump fr Niobrara River	0	CFS
3/8/2022	Cook Pump fr Niobrara River	0	CFS
3/14/2022	Cook Pump fr Niobrara River	0	CFS
5/13/2022	Cook Pump fr Niobrara River	0	CFS
6/13/2022	Cook Pump fr Niobrara River		CFS
7/26/2022	Crawford City Park Pump fr White River		CFS
5/26/2022	Delsing Pump fr Niobrara River		CFS
6/22/2022	Delsing Pump fr Niobrara River		CFS
6/30/2022	Elwess Pump fr Chadron Creek	0	CFS
2/24/2022	Enterprise Pump fr Niobrara River	0	CFS
3/29/2022	Enterprise Pump fr Niobrara River	0	CFS
5/24/2022	Enterprise Pump fr Niobrara River	0	CFS
6/22/2022	Enterprise Pump fr Niobrara River	0	CFS
7/12/2022	Fisher Pump fr Rush Creek	0	CFS
8/9/2022	Harris-Cooper Canal fr White River	5.34	CFS
8/17/2022	Harris-Cooper Canal fr White River	14	CFS
8/29/2022	Harris-Cooper Canal fr White River	8.45	CFS
1/24/2022	Hat Creek above Coffee Canal	3.27	CFS
1/21/2022	Armstrong Pump fr Niobrara River	0	CFS
2/25/2022	Armstrong Pump fr Niobrara River	0	CFS
3/22/2022	Armstrong Pump fr Niobrara River	0	CFS
5/17/2022	Armstrong Pump fr Niobrara River	0	CFS
6/17/2022	Armstrong Pump fr Niobrara River	0	CFS
5/31/2022	Beaver Pump fr White River	0	CFS
6/29/2022	Beguín Pump A-9017 fr Niobrara River	0	CFS
6/28/2022	Carlson Pump A-9999A	0	CFS
6/30/2022	Chadron Creek at Hwy 20	0	CFS
5/31/2022	Circle Pump - Hollibaugh fr Niobrara River	0	CFS
1/17/2022	Cook Pump fr Niobrara River	0	CFS

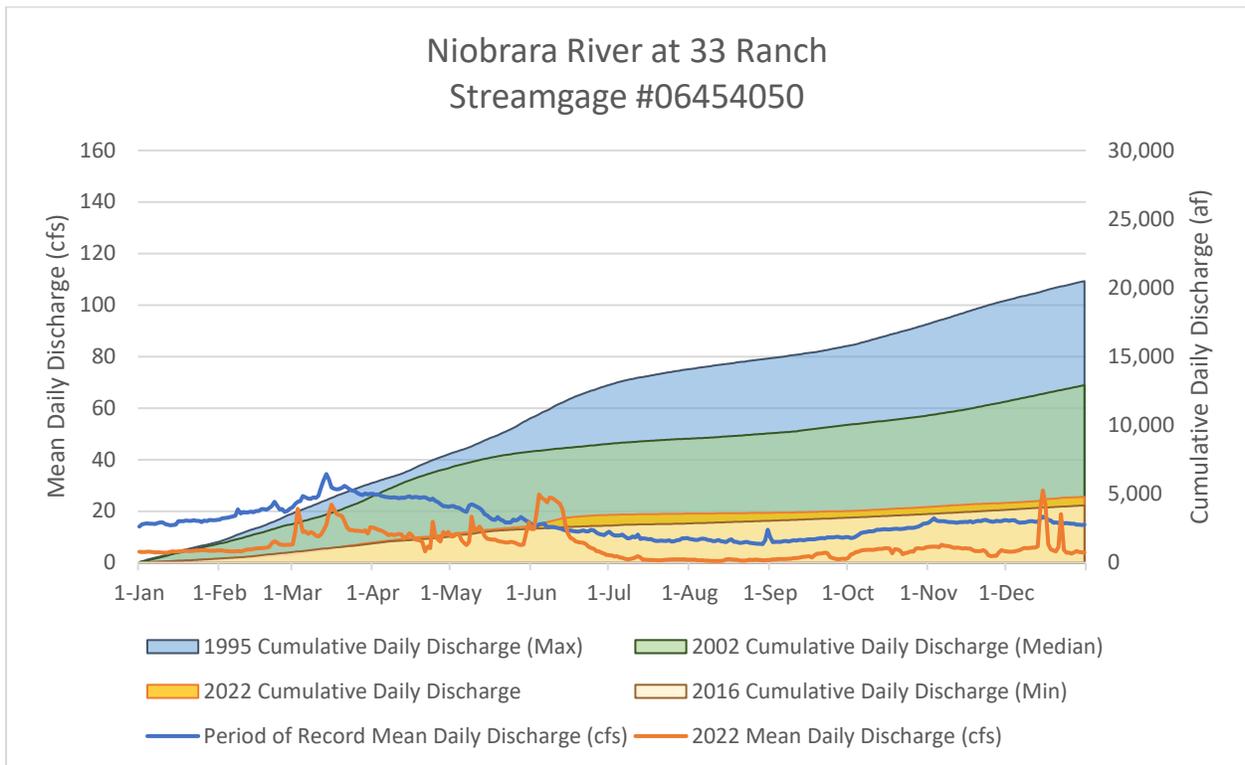
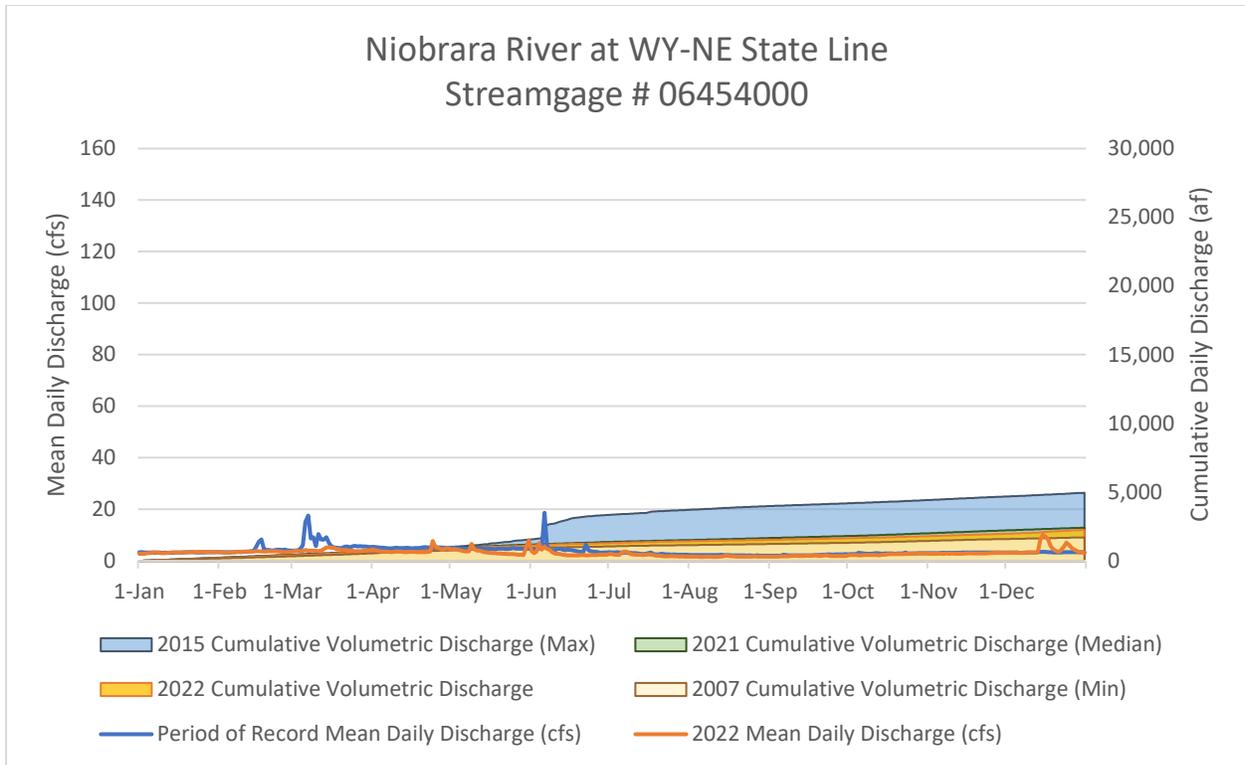
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Date	Site Name	Discharge/Volume	Unit
1/24/2022	Hat Creek near Geisers Bridge		CFS
11/9/2022	Hat Creek near Geisers Bridge	1.38	CFS
6/30/2022	Hawthorne Pump fr Dead Horse Creek	0	CFS
6/30/2022	Hebbert Pump fr Big Bordeaux Creek	0	CFS
6/1/2022	Hoover Pump fr Niobrara River	0	CFS
7/8/2022	Hoover Pump fr Niobrara River	0	CFS
8/16/2022	Hoover Pump fr Niobrara River	0	CFS
6/28/2022	Housh Pump A-17398A	0	CFS
6/28/2022	Housh Pump A-17398B	0	CFS
6/8/2022	Johndreau Pump fr Niobrara River A-2555	0	CFS
6/8/2022	Johndreau Pump fr Niobrara River A-2654R	0	CFS
7/29/2022	Lakotah Canal Spill	0.28	CFS
5/26/2022	Lichte Canal from Niobrara River	0	CFS
6/23/2022	Lichte Canal from Niobrara River	0	CFS
6/30/2022	Meister Pump fr Bordeaux Creek		CFS
6/28/2022	Meyers Land & Cattle Company fr Box Butte Creek	0	CFS
5/26/2022	Montague Canal from Niobrara River	0	CFS
6/23/2022	Montague Canal from Niobrara River	0	CFS
5/26/2022	Montague Canal Pump fr Niobrara River	0	CFS
6/23/2022	Montague Canal Pump fr Niobrara River		CFS
4/7/2022	Norman Pump from Norman Reservoir	0	CFS
6/30/2022	ORourke Pump fr Chadron Creek	0	CFS
6/28/2022	Peters Pump A-4727 fr Peters Reservoir (Niobrara)		CFS
6/30/2022	Pfister Pumps fr Chadron Creek	0	CFS
5/31/2022	Pickering Pump fr White Clay Creek	0	CFS
6/28/2022	Pieper Pump A-10432 fr Niobrara River	0	CFS
6/28/2022	Pieper Pump A-10490 fr Niobrara River	0	CFS
5/31/2022	Pine Ridge Pump No. 1 fr Squaw Creek		CFS
6/30/2022	Pinkerton Pump fr Bordeaux Creek		CFS
5/31/2022	Rasher-Forbes Canal fr White River	0	CFS
1/24/2022	Hat Creek near Geisers Bridge		CFS
11/9/2022	Hat Creek near Geisers Bridge	1.38	CFS
6/30/2022	Hawthorne Pump fr Dead Horse Creek	0	CFS
6/30/2022	Hebbert Pump fr Big Bordeaux Creek	0	CFS
6/1/2022	Hoover Pump fr Niobrara River	0	CFS
7/8/2022	Hoover Pump fr Niobrara River	0	CFS
8/16/2022	Hoover Pump fr Niobrara River	0	CFS
6/28/2022	Housh Pump A-17398A	0	CFS
6/28/2022	Housh Pump A-17398B	0	CFS

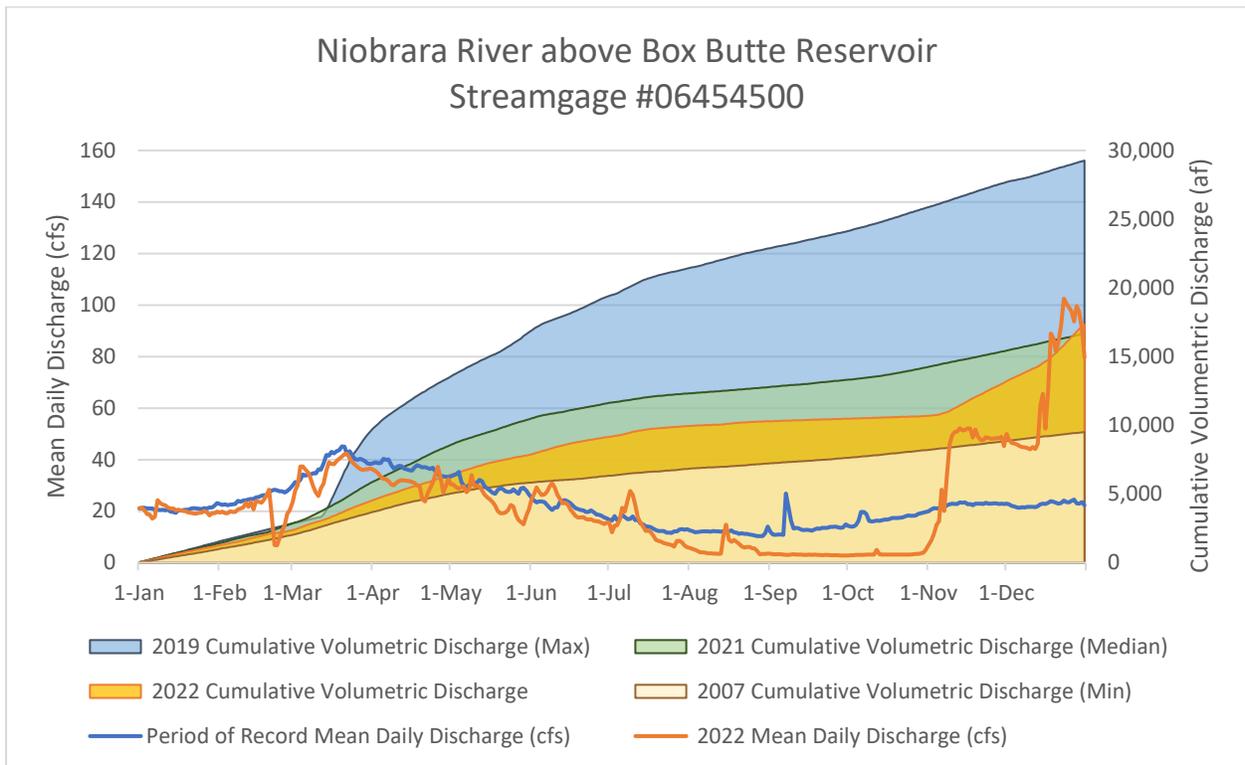
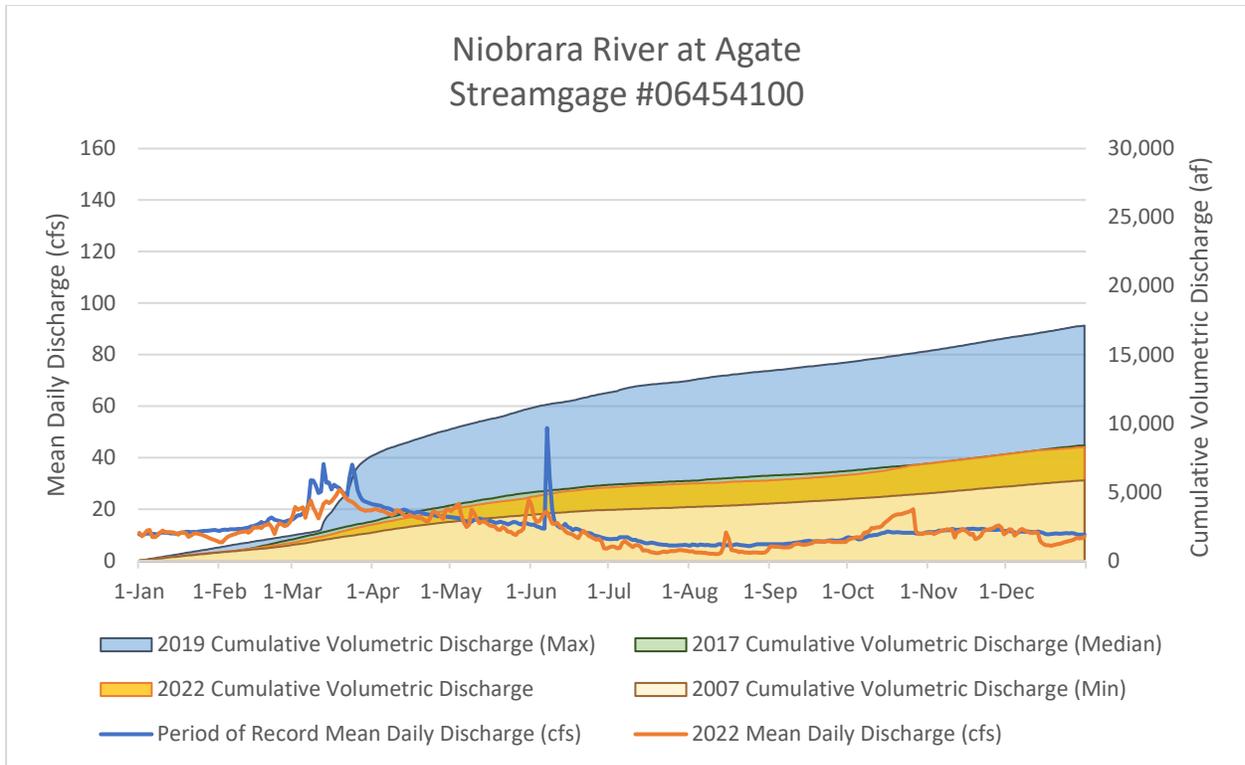
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Date	Site Name	Discharge/Volume	Unit
6/8/2022	Johndreau Pump fr Niobrara River A-2555	0	CFS
6/8/2022	Johndreau Pump fr Niobrara River A-2654R	0	CFS
7/29/2022	Lakotah Canal Spill	0.28	CFS
5/26/2022	Lichte Canal from Niobrara River	0	CFS
6/23/2022	Lichte Canal from Niobrara River	0	CFS
6/30/2022	Meister Pump fr Bordeaux Creek		CFS
6/30/2022	Schrack Pump fr Big Bordeaux Creek	0	CFS
6/9/2022	Smith Pump fr Schaefer Reservoir (Sow Belly Creek)	0	CFS
11/22/2022	South Antelope Creek at Eitel-Oldaker Line	0.15	CFS
11/22/2022	South Antelope Creek at Eitel-Oldaker Line	0.09	CFS
12/21/2022	South Antelope Creek at Eitel-Oldaker Line	0.12	CFS
11/14/2022	South Antelope Creek at Oldaker Culvert	0.04	CFS
10/19/2022	South Antelope Creek at Whitman Rd	0.15	CFS
11/14/2022	South Antelope Creek at Whitman Rd	0.32	CFS
11/22/2022	South Antelope Creek at Whitman Rd	0.15	CFS
12/21/2022	South Antelope Creek at Whitman Rd	0.17	CFS
3/25/2022	Sow Belly Creek above Zimmerman Canal		CFS
3/25/2022	Sow Belly Creek below Zimmerman Canal		CFS
3/25/2022	Spring Creek at Pants Butte Rd	0	CFS
1/28/2022	Squaw Creek near Montrose (Pants Butte Rd)	0	CFS
3/25/2022	Squaw Creek near Montrose (Pants Butte Rd)	0	CFS
6/28/2022	Terrell Pump A-5840A fr Niobrara River	0	CFS
6/28/2022	Terrell Pump A-5840B fr Niobrara River		CFS
6/28/2022	Terrell Pump A-9999B fr Niobrara River	0	CFS
7/12/2022	Vincent Pump A-9572 fr Niobrara River	0	CFS
3/25/2022	Warbonnet Creek at Pants Butte Rd		CFS

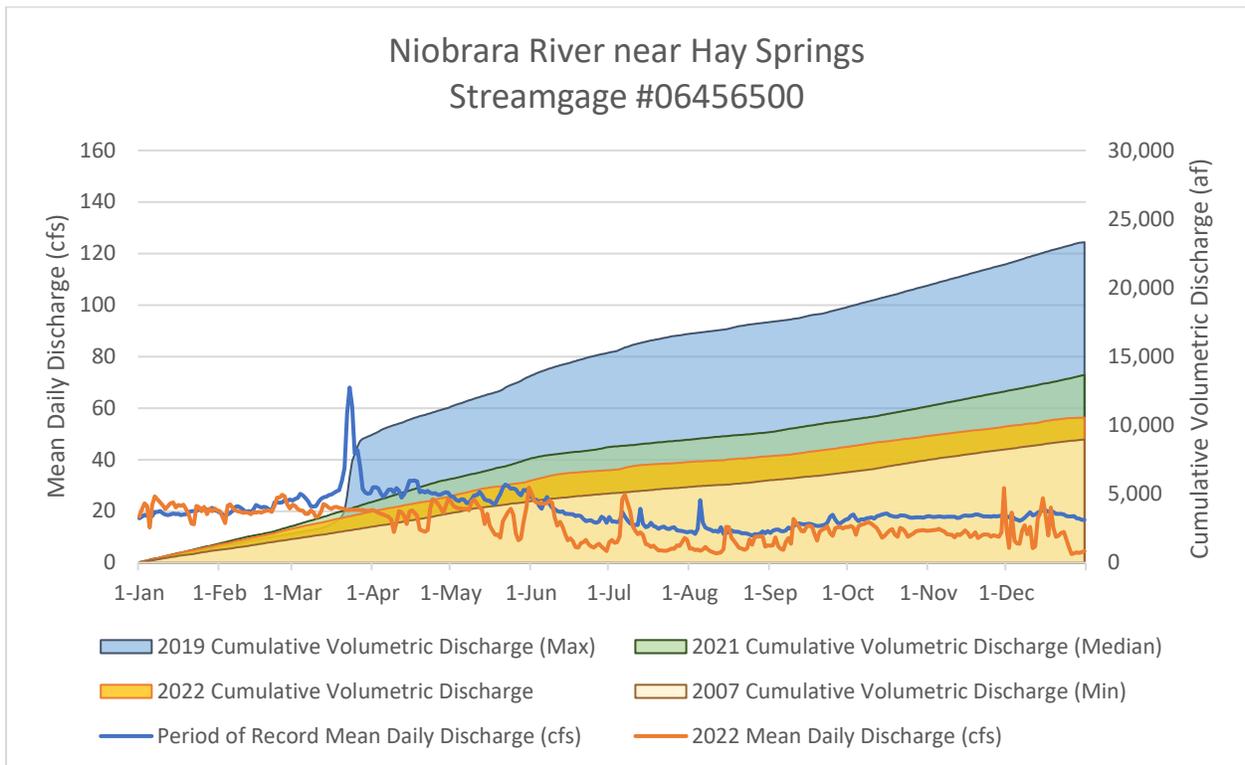
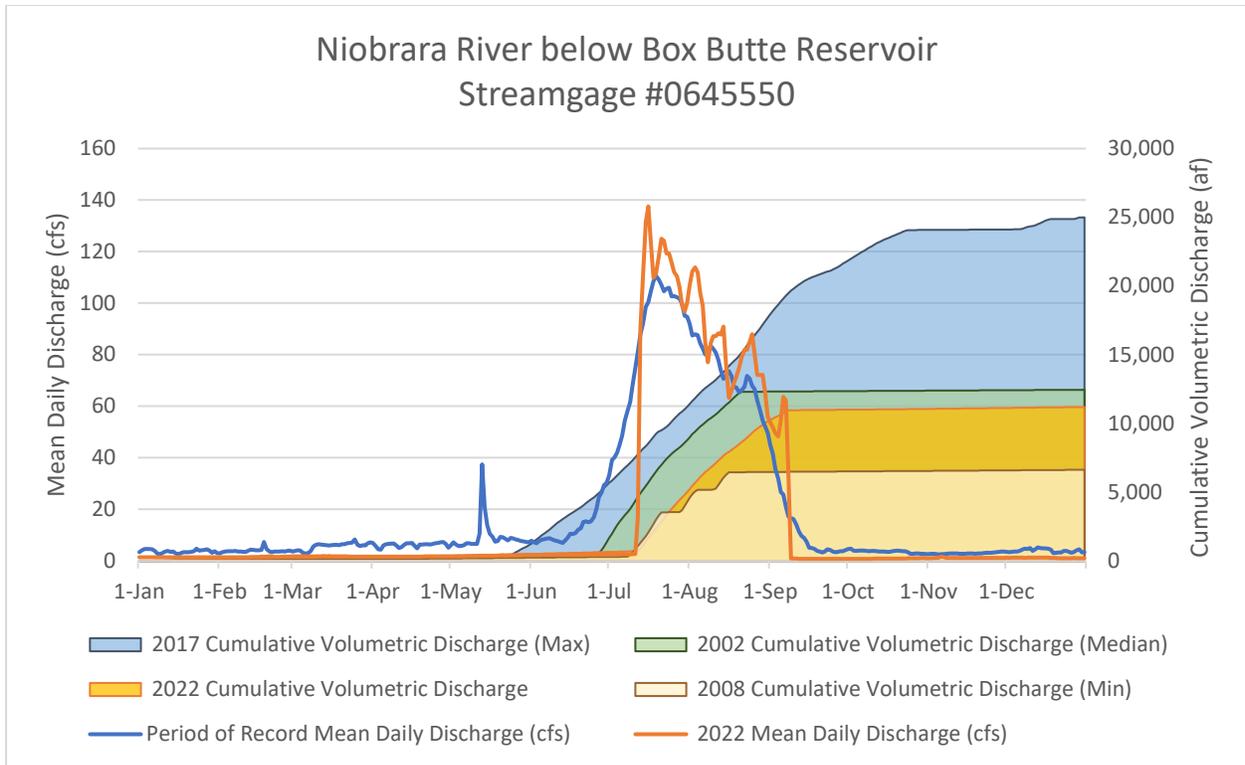
APPENDIX C 2022 Streamgage Measurements



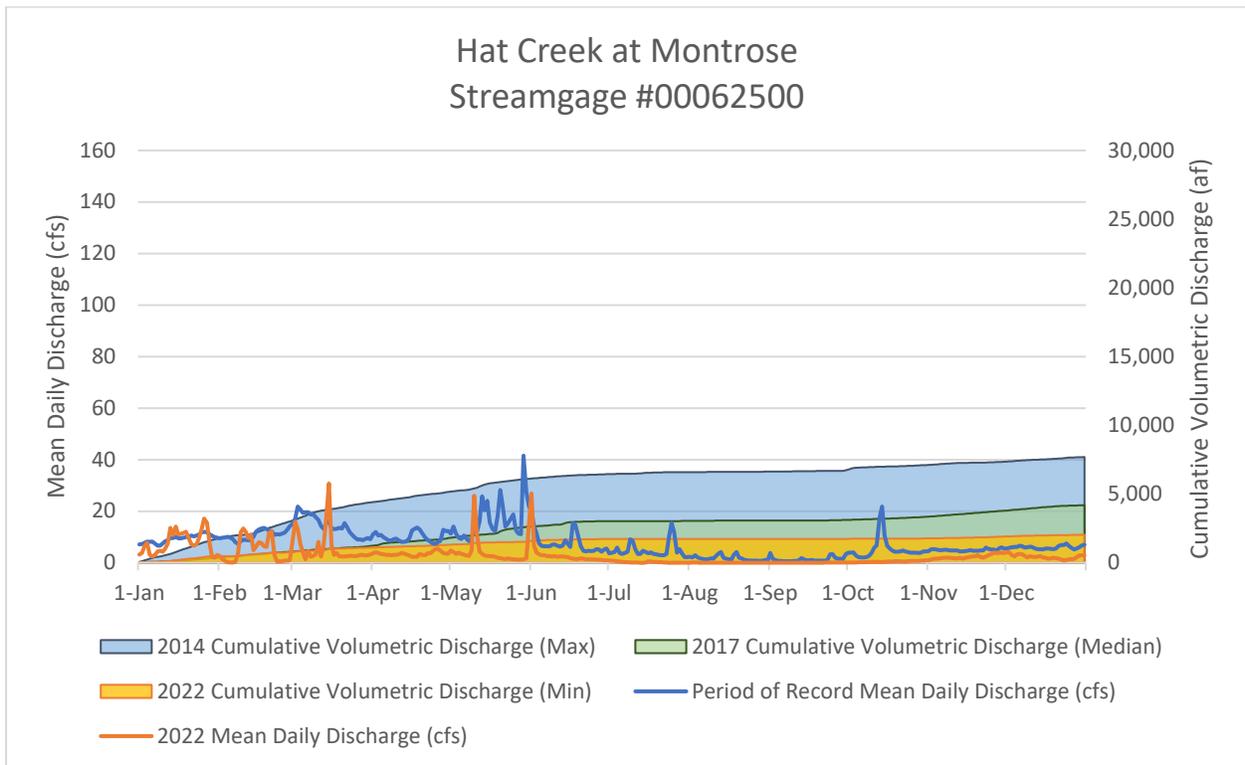
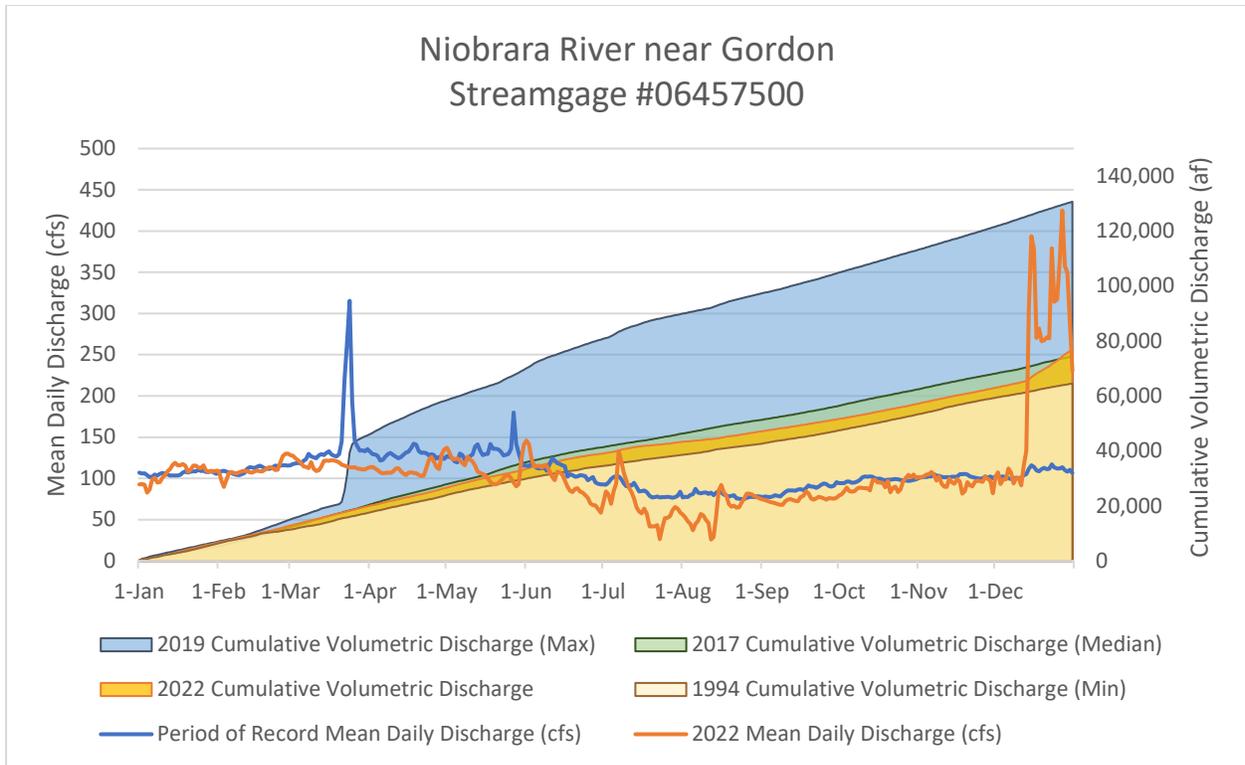
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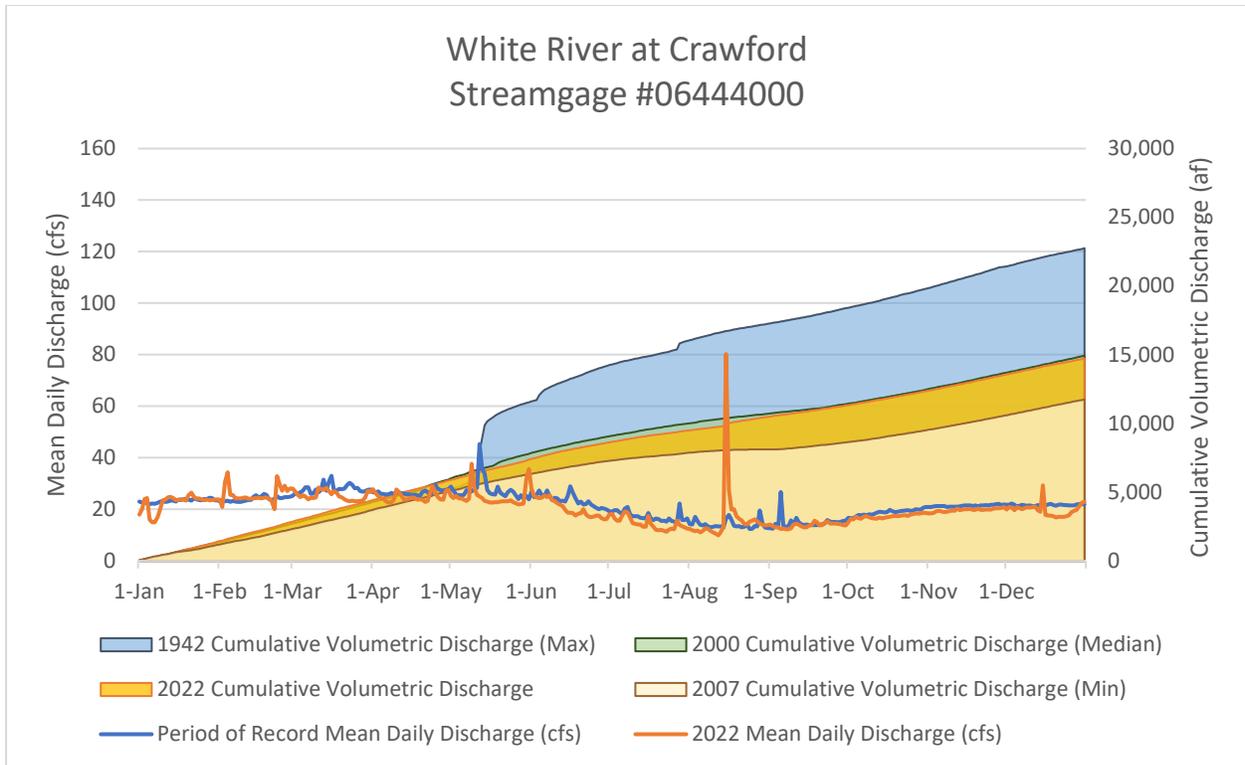
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APPENDIX C 2022 Streamgauge Measurements



NEBRASKA ADMINISTRATIVE CODE

Title 457 - DEPARTMENT OF NATURAL RESOURCES RULES FOR SURFACE WATER

Chapter 23 - MORATORIUM AREA VARIANCES FOR SURFACE WATER
APPROPRIATIONS

001 PETITION FOR LEAVE TO FILE OR CONSIDER AN APPLICATION. Any person wanting to apply for a new surface water appropriation within a moratorium or stay area must file a petition in the Department requesting leave to file an application. The petition must be accompanied by a copy of the completed proposed application. The application shall not be considered filed at the time it is submitted with the petition. Anyone who currently has an unapproved application on file in the Department for a new appropriation for a project that is within a moratorium or stay area must file a petition requesting a variance to the moratorium or stay. The fee for filing the petitions shall be that described in § 33-105(8) R.R.S. 1943, as amended.

The petition shall include sufficient information to indicate:

001.01 The proposed project is for a non-consumptive use; or

001.02 The applicant has a credible proposal for replacing any consumptive use that will occur in a manner such that the project will not harm other users; or

001.03 The applicant has credible information that indicates there **may be** unappropriated water available at the proposed location at the time the depletion is likely to occur; or

001.04 The project existed prior to any informal moratorium, formal moratorium or stay.

001.05 There is a public safety issue that must be addressed and the proposed project addresses such issue.

001.06 The proposed use is a temporary use for public construction and the total volume requested is less than ten (10) acre-feet.

002 REVIEW. The Department shall review the information provided with the petition and shall make a determination as to whether it is sufficient to indicate good cause for allowing further consideration of the application.

003 DECISION. A written decision shall be issued. The decision shall either deny the petition and state the reasons for such denial, or grant the petition and state either (a) the

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petitioner may file the application and supporting documentation, or (b) the Department will proceed to process the existing filed application. Any decision approving a petition shall not bind the Director to approve any application to which it relates, or in any way be used as evidence of prejudice for the Director's future decisions concerning the specific approval requirements of such application. Allowance of a leave to file does not negate the necessity to meet the specific approval requirements for an appropriation.

004 APPEAL. If the petitioner wishes to appeal the decision of the Department, he or she may request a hearing before the Department within 15 days of the date the decision is rendered in accordance with the Department's Rules of Practice and Procedure, Title 454.