



April 16, 2024

DEVILS LAKE OUTLETS MANAGEMENT ADVISORY COMMITTEE UPDATE



NORTH
Dakota
Be Legendary.

Water Resources

OUTLINE



Introduction & Membership Term Review

John Paczkowski, ND State Engineer

National Weather Service Situational Update

Amanda Lee, NWS Grand Forks Service Hydrologist

2023 Operational Summary / Devils Lake Basin Overview

Yaping Chi, Devils Lake Engineer, NDDWR

Outlook For 2024 Outlet Operations

Yaping Chi, Devils Lake Engineer, NDDWR

Devils Lake West End Capital Improvement Plan Update

Yaping Chi, Devils Lake Engineer, NDDWR

Devils Lake Engineering Service Contract

Yaping Chi, Devils Lake Engineer, NDDWR

2023 Water Quality Review

Peter Wax, NDDEQ

Status By Committee Members

Final Comments

DLOMAC MEMBERSHIP



Dr. Andrea Travnicek - Governor's designee (8/1/2021 - 7/31/2025)

Katrina Kessler - MN Representative

Joel Anderson - Towner County (6/30/2021 - 7/1/2023)

Bruce Grubb - City of Fargo (6/30/2021 - 7/1/2025)

Kenneth Vein - City of Grand Forks (6/30/2021 - 7/1/2025)

Tim Meyer - City of Lisbon (6/30/2021 - 7/1/2025)

Lonna Jackson-Street - Spirit Lake Nation (In progress)

Tammy Kuk - Benson County (In progress)

Bill Mertens - Ramsey County (7/02/2022 - 7/1/2026)

Ben Varnson - Nelson County (6/30/2021 - 7/1/2024)

Gwendolyn Crawford - City of Valley City (10/27/2022 - 7/1/2026)

Nicole Armstrong - Manitoba, Canada

Cindy Schwehr - Barnes County (6/30/2021 - 7/1/2024)

Jeff Frith - Devils Lake Basin Joint Water Resource Board (7/02/2023 - 7/1/2027)

Dick Johnson - City of Devils Lake (7/02/2022 - 7/1/2026)

Senator Terry Wanzek - ND State Senate (12/12/2022 - 7/1/2025)

Representative Dennis Johnson - ND House of Representative (12/12/2022 - 7/1/2025)

DLOMAC MEMBERSHIP TERMS

Home

All Boards

Upcoming Appointments

Apply

Nominations

My Data

Devils Lake Outlet Management Advisory Committee

< Return

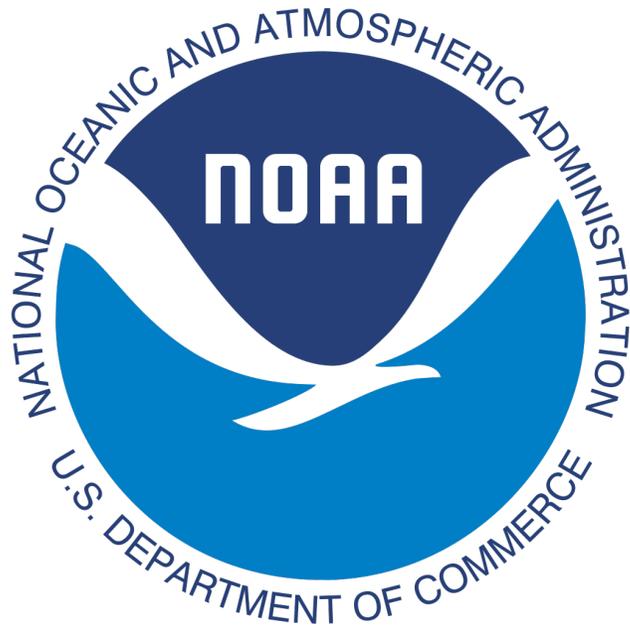
Board Summary

Type	Advisory
Governed By	NDCC — https://www.legis.nd.gov/cencode/t61c36.pdf?20150709172913
Board Summary	In response to rising water levels at Devils Lake, the State of North Dakota constructed outlets to direct water out of the basin as necessary. The Devils Lake Outlet Management Advisory Committee exists to advise the governor and State Water Commission on the operations of all Devils Lake outlets. The committee may recommend criteria for operation of each outlet based on outflow volumes, water quality considerations and the risk of an overflow of Devils Lake. Localities surrounding the lake and downstream outlets — including the counties of Benson, Ramsey, Towner, Nelson and Barnes and the cities of Devils Lake, Valley City, Lisbon/Fort Ransom, Fargo and Grand Forks — are represented on the committee, as well as representatives from the legislative assembly, the Devils Lake Joint Water Resource Board, Spirit Lake Nation, Minnesota and Manitoba. Any recommendations developed by the committee must receive support from ten of the seventeen members of the committee before submission to the governor or State Water Commission. Any recommendation not receiving majority support but receiving support from at least five members may be submitted as a minority recommendation.
Compensation	Voluntary
Term Length	4 years, no term limit
Meeting Frequency	

New Members and Members With Upcoming Term Expirations Are Encouraged To Apply For Appointment Or Reappointment Through The Board Application Portal

NATIONAL WEATHER SERVICE UPDATE

Amanda Lee
NWS Grand Forks
amanda.lee@noaa.gov



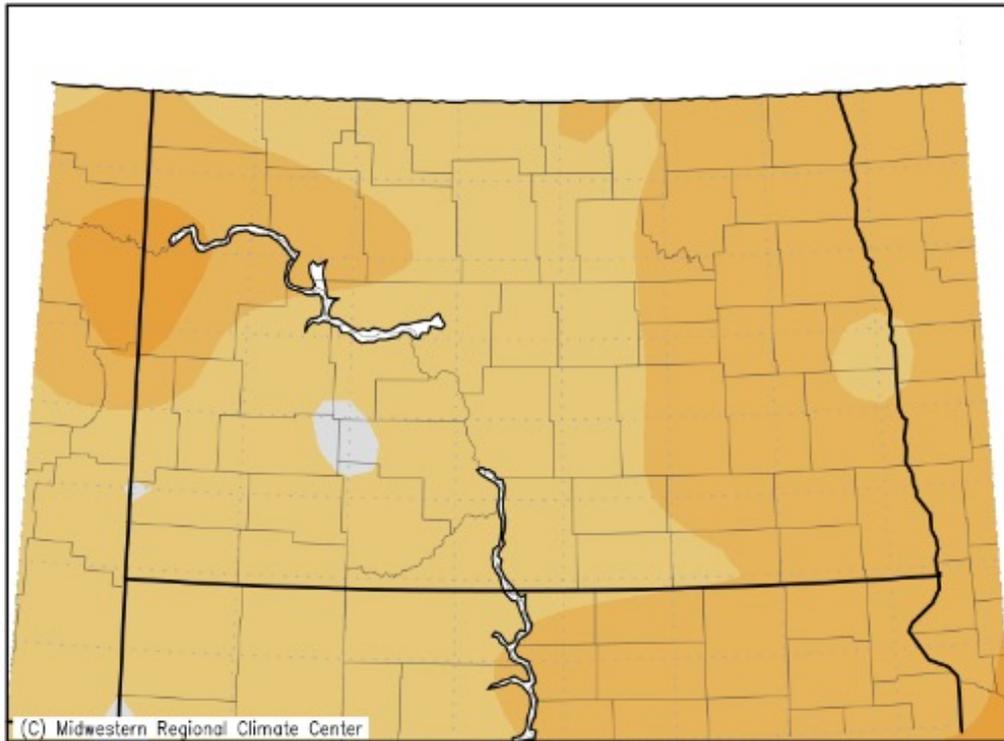
OVERVIEW

- Fall/Winter/Spring Review
- Upcoming Forecast/Climate Outlooks
- Lake Outlook

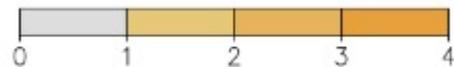


FALL TEMPERATURES AND PRECIPITATION (September - November 2023)

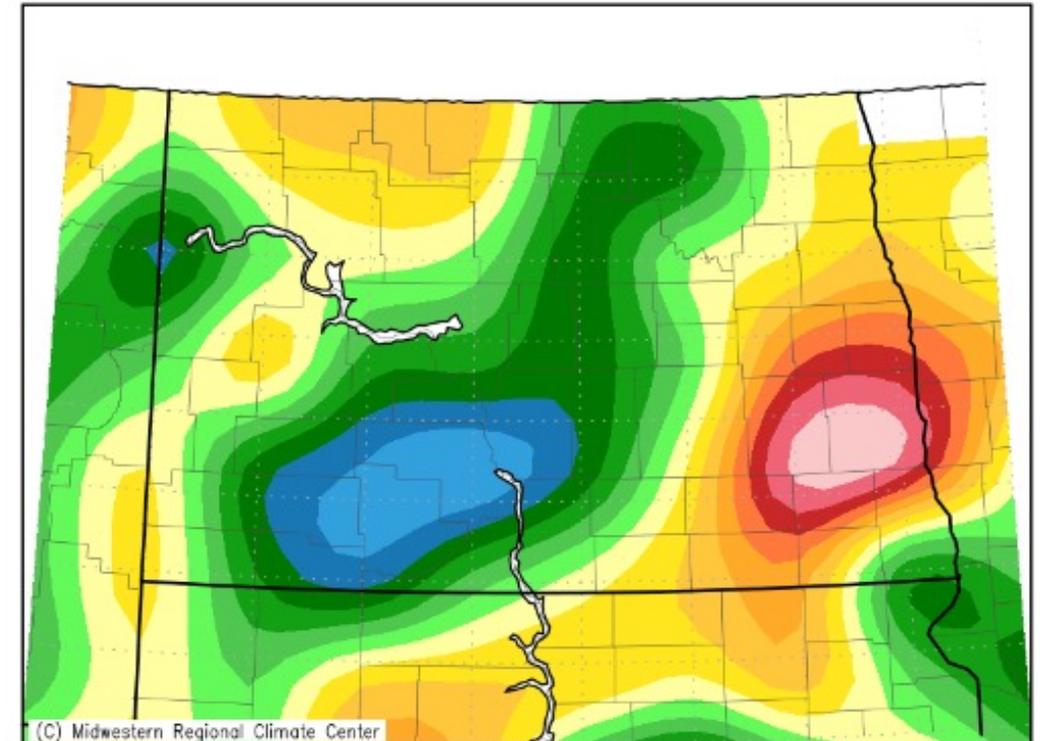
Average Temperature (°F): Departure from Mean
September 1, 2023 to November 30, 2023



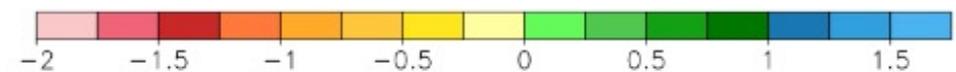
Mean period is 1991-2020.



Accumulated Precipitation (in): Departure from Mean
September 1, 2023 to November 30, 2023



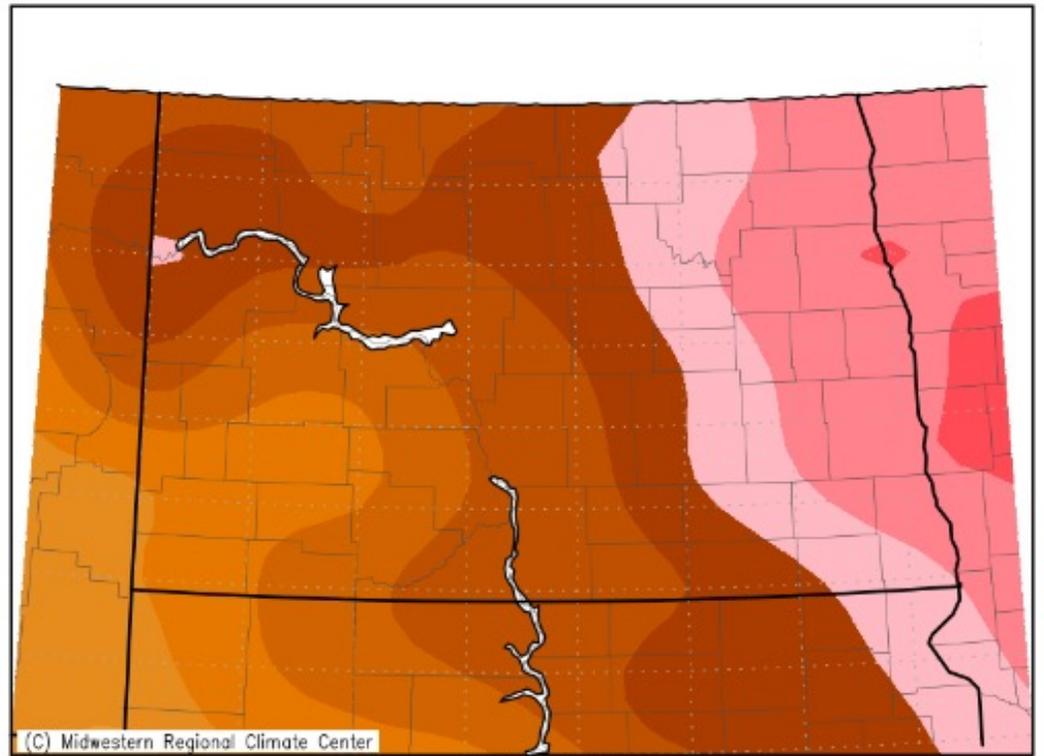
Mean period is 1991-2020.





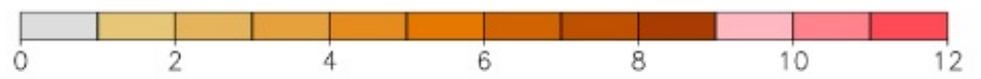
WINTER TEMPERATURES AND PRECIPITATION (December 2023 - February 2024)

Average Temperature (°F): Departure from Mean
December 1, 2023 to February 29, 2024

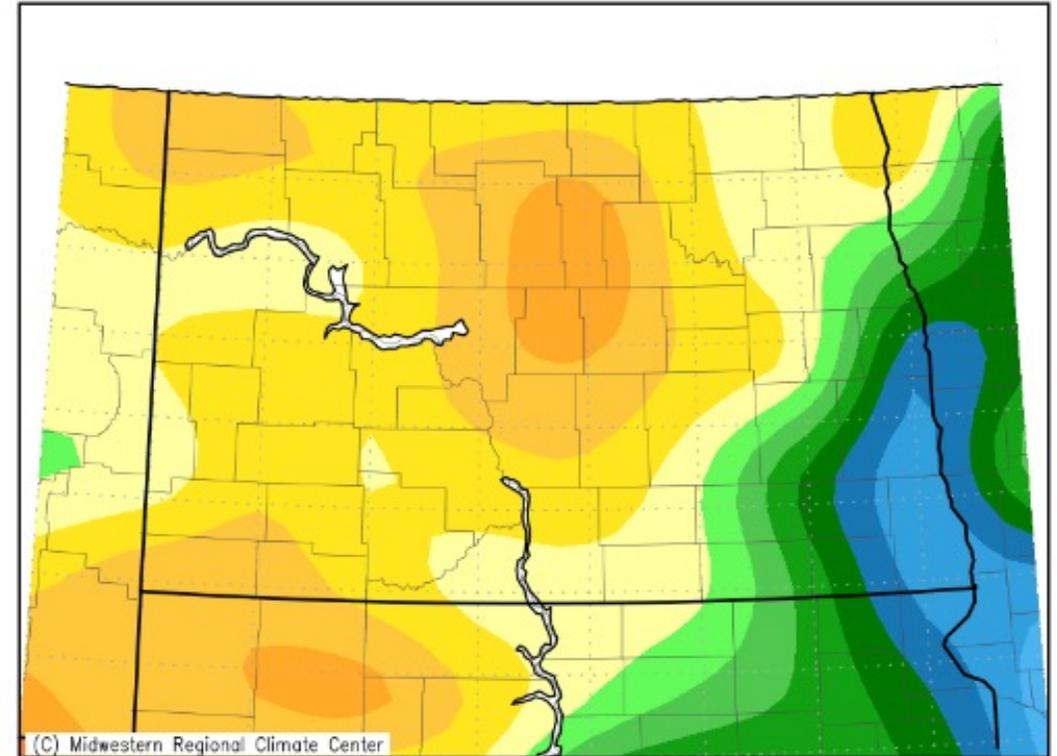


(C) Midwestern Regional Climate Center

Mean period is 1991-2020.



Accumulated Precipitation (in): Departure from Mean
December 1, 2023 to February 29, 2024



(C) Midwestern Regional Climate Center

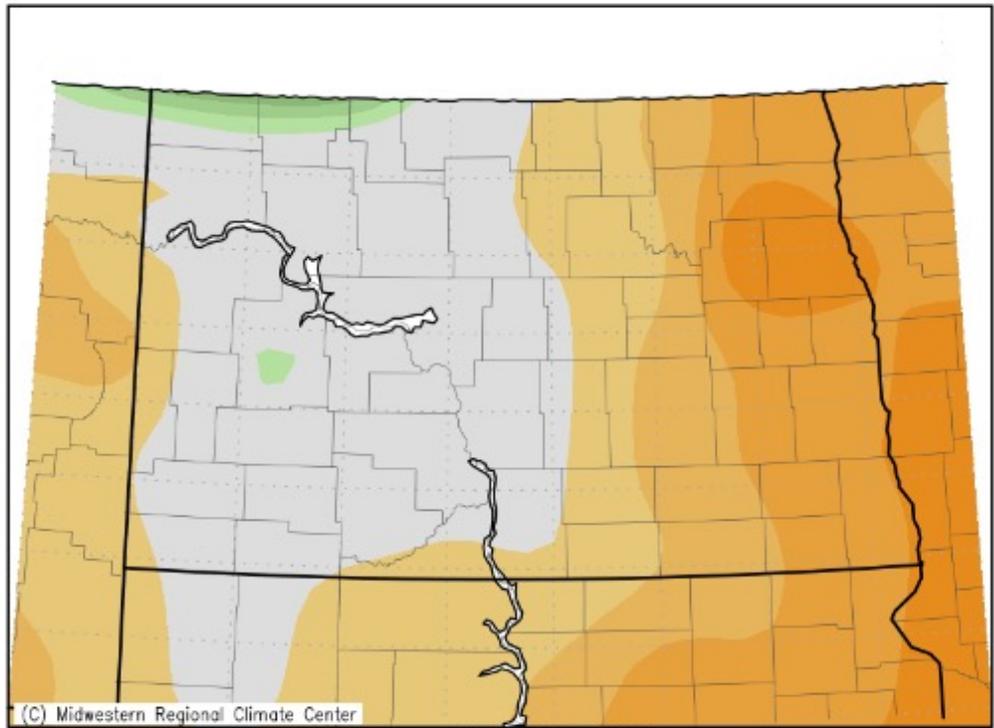
Mean period is 1991-2020.





SPRING TEMPERATURES AND PRECIPITATION (March 1, 2024 – April 14, 2024)

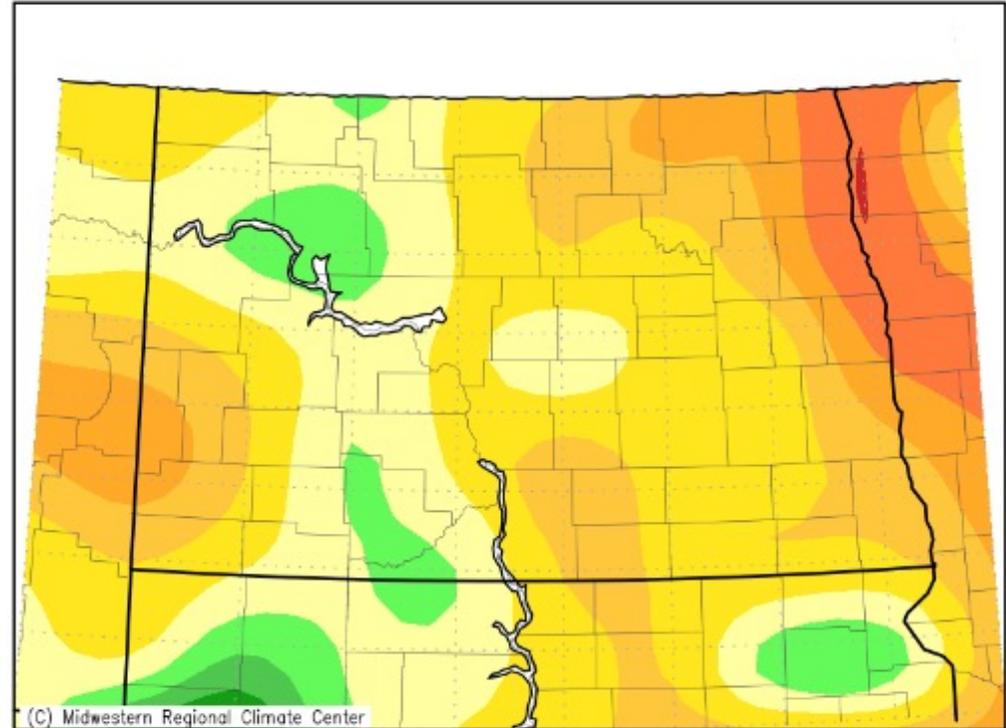
Average Temperature (°F): Departure from Mean
March 1, 2024 to April 14, 2024



Mean period is 1991–2020.



Accumulated Precipitation (in): Departure from Mean
March 1, 2024 to April 14, 2024



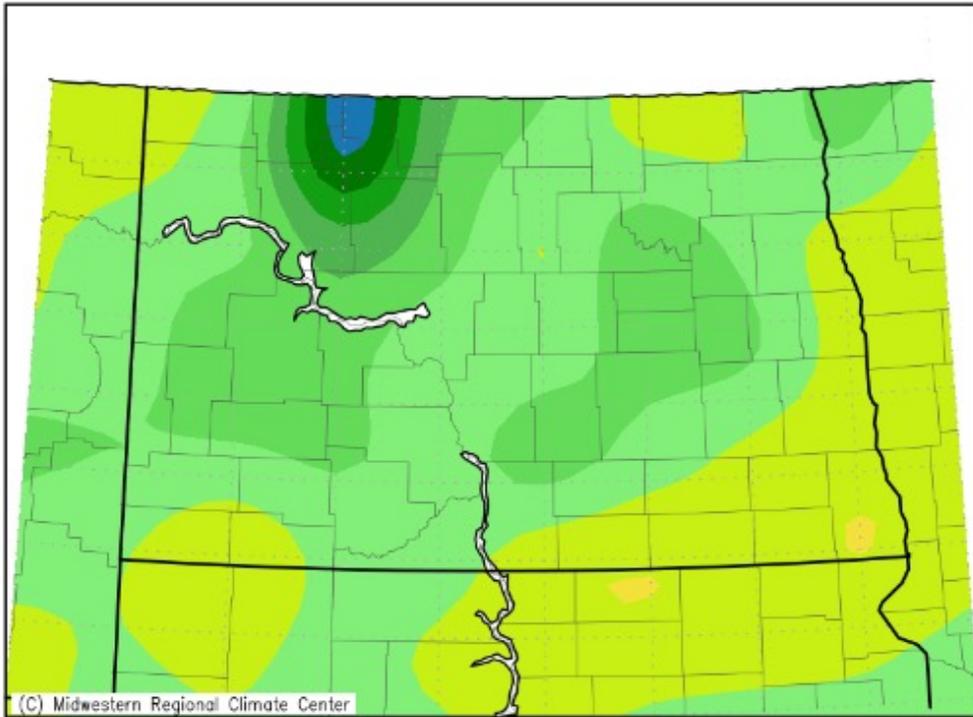
Mean period is 1991–2020.



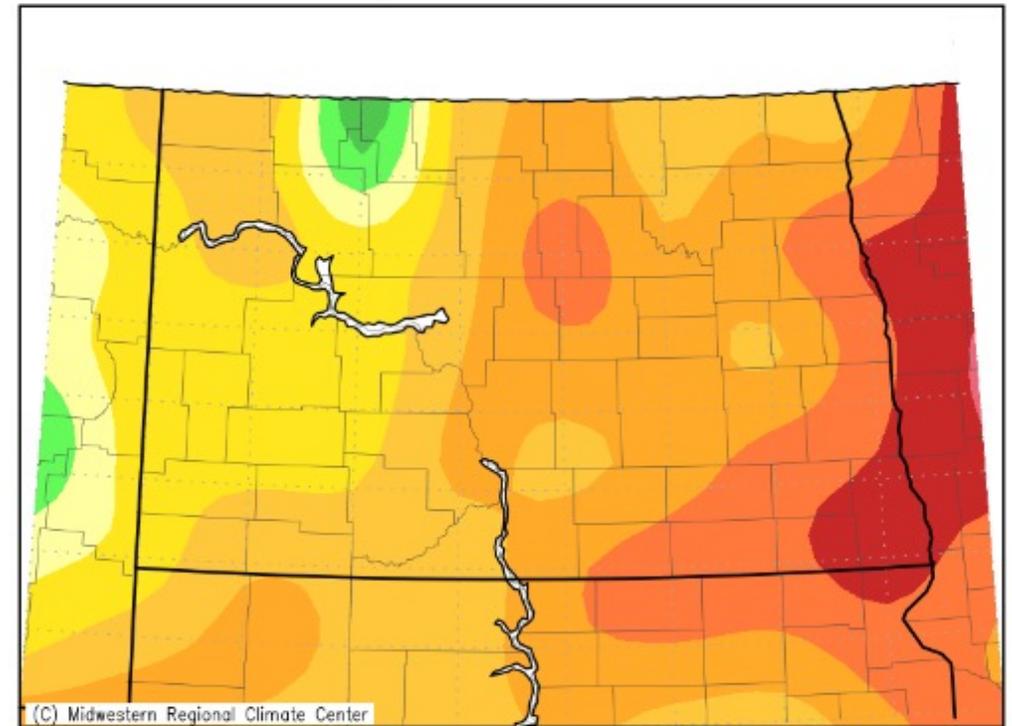


"COLD SEASON" SNOWFALL (November 2023 - March 2024)

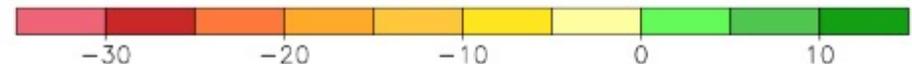
Accumulated Snowfall (in)
November 1, 2023 to March 31, 2024



Accumulated Snowfall (in): Departure from Mean
November 1, 2023 to March 31, 2024



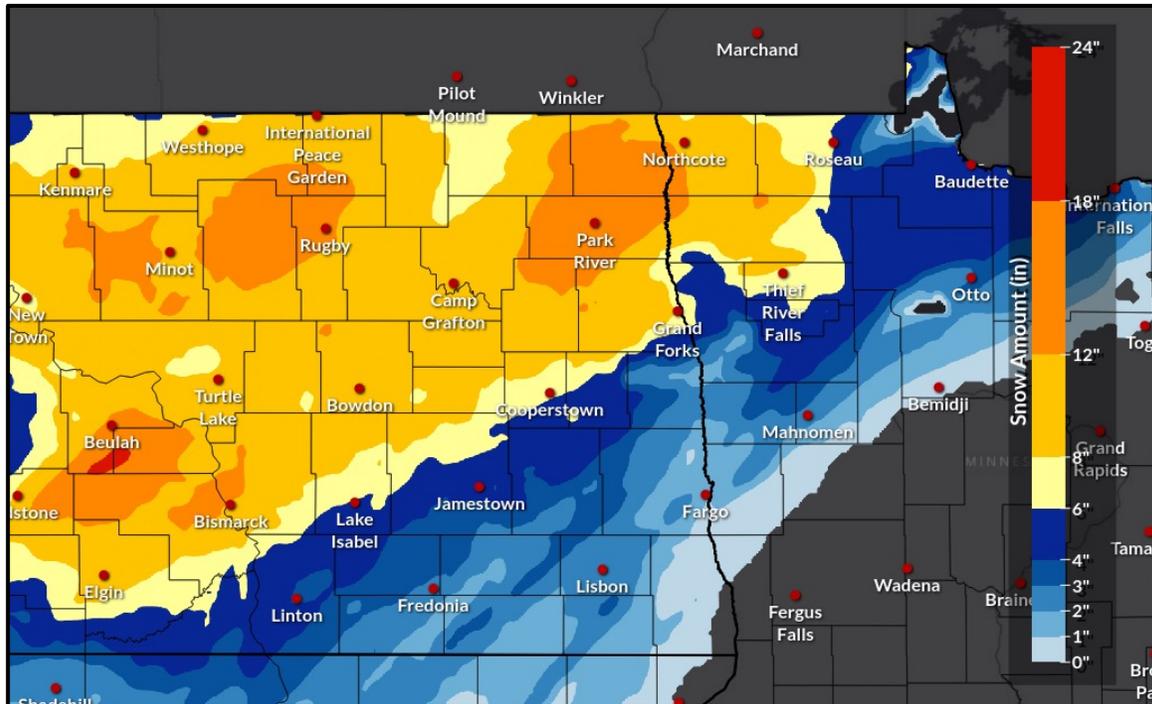
Mean period is 1991-2020.



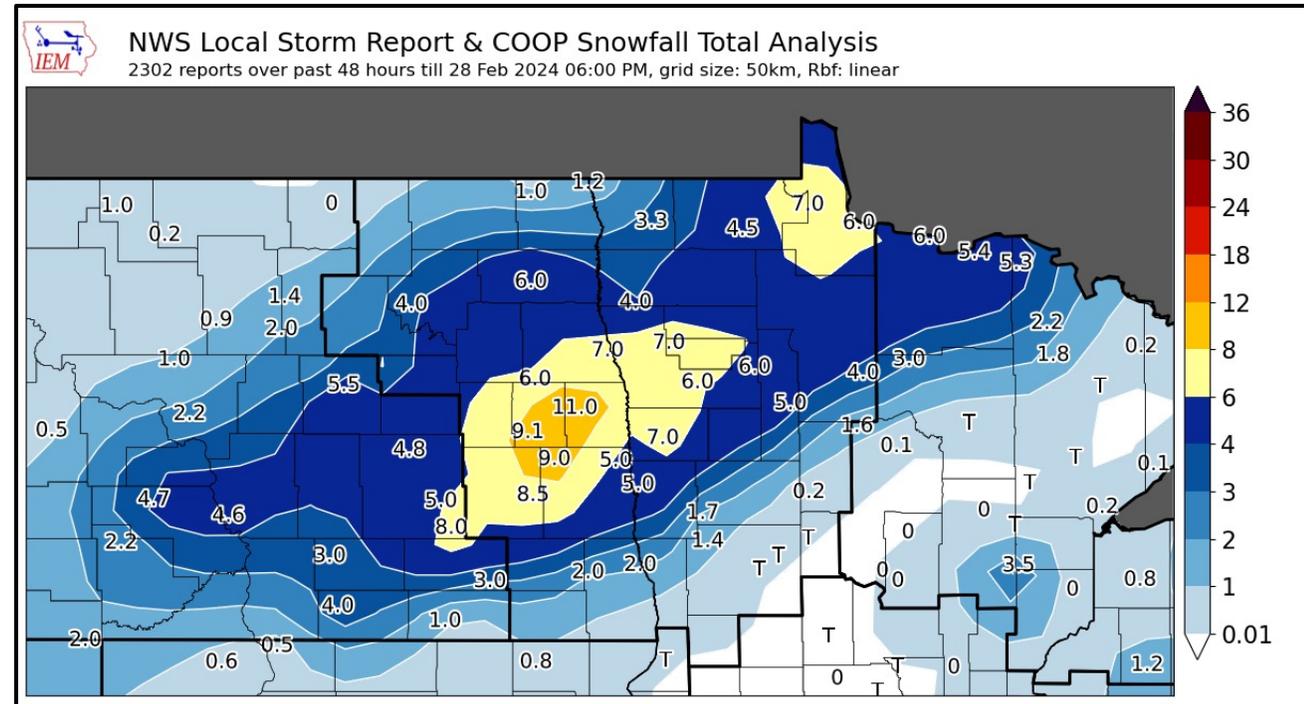


LARGEST 2023-2024 WINTER SNOWS IN THE DEVILS LAKE BASIN

- October snow all melted by mid-November
- Some snowpack mid to late January otherwise little to no snow across the landscape the rest of the winter



October 25-27, 2023



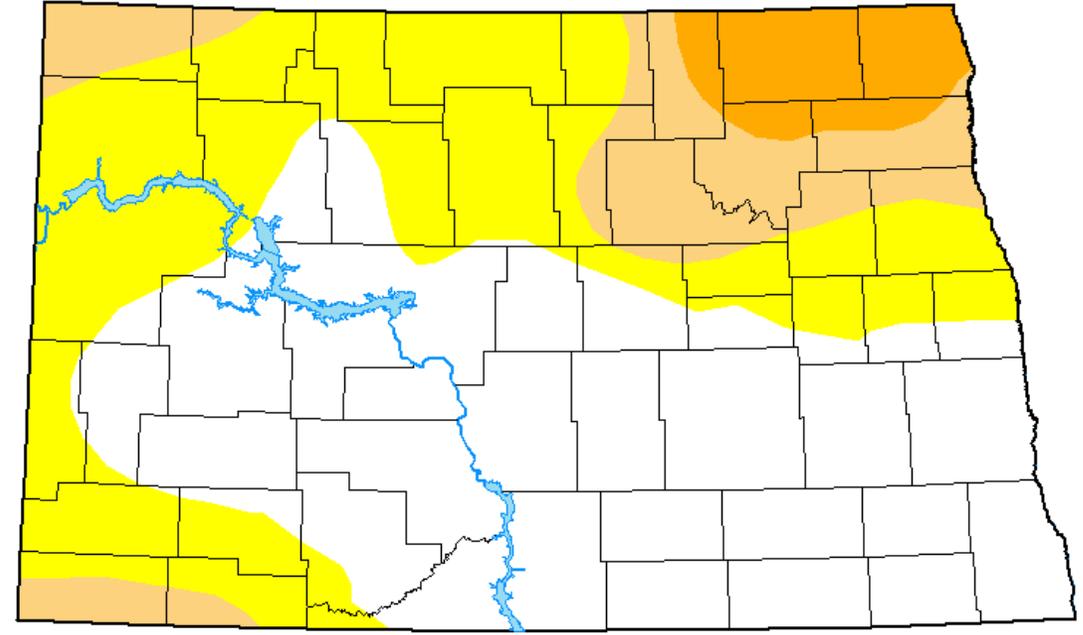
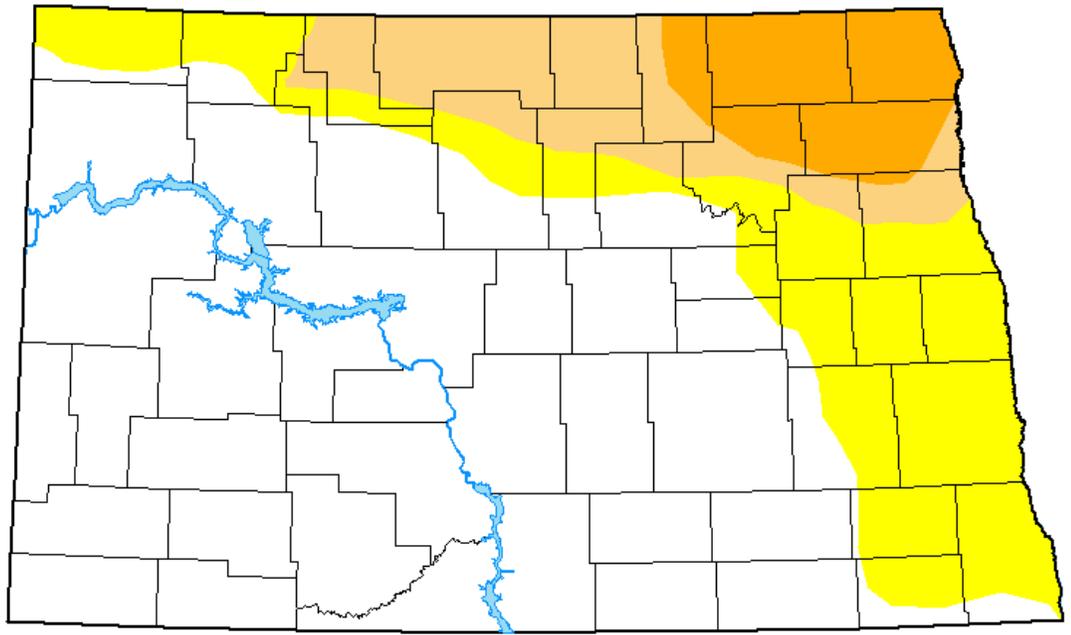
February 27, 2024



U.S. DROUGHT MONITOR

November 9, 2023

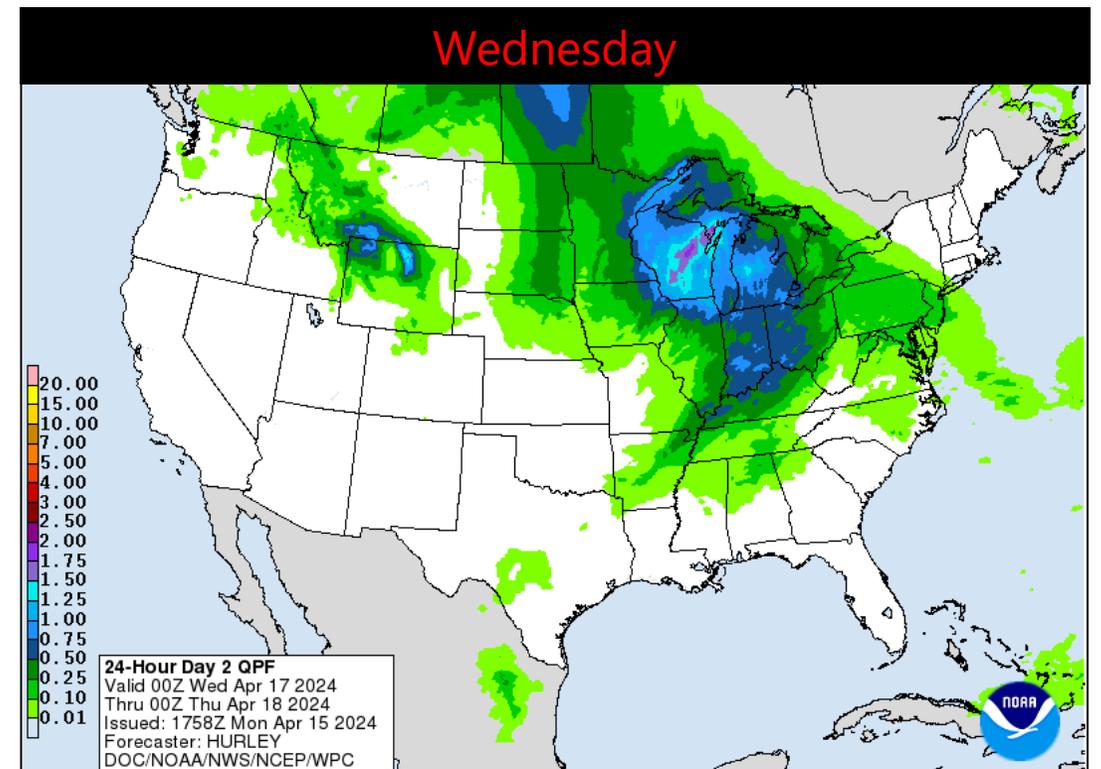
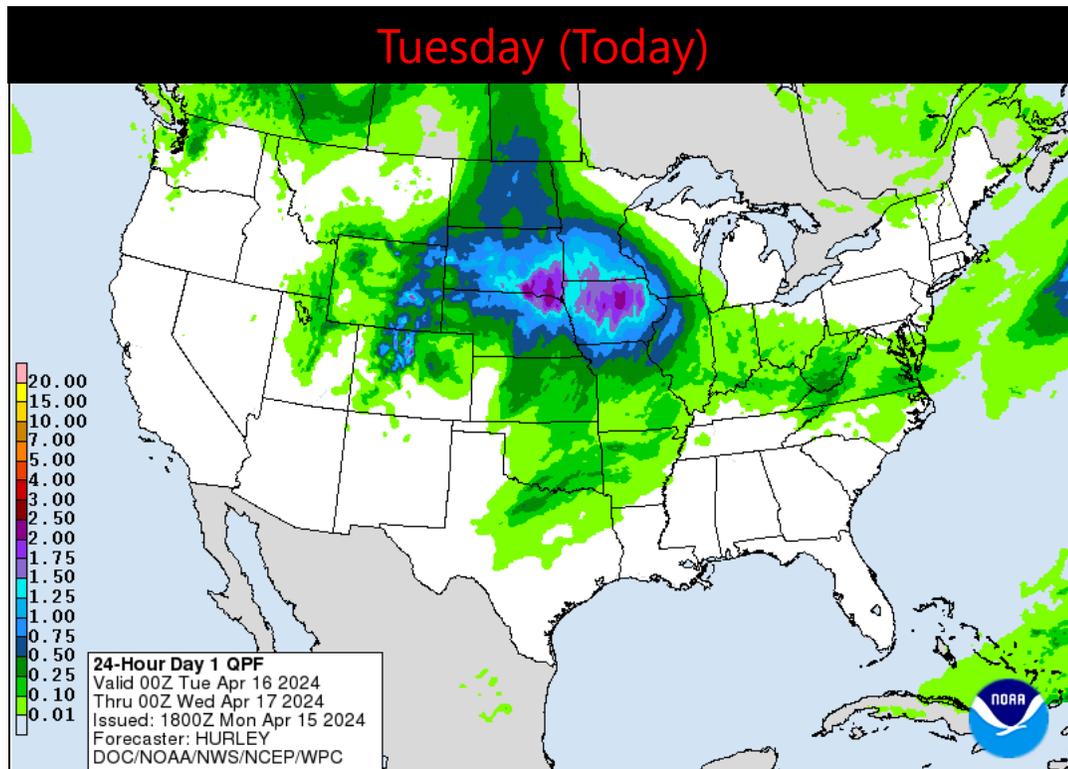
April 11, 2024





ONE WEEK FORECAST

- Rainy and windy through midweek with maybe a few snowflakes late week
- Still cool but drier for the weekend



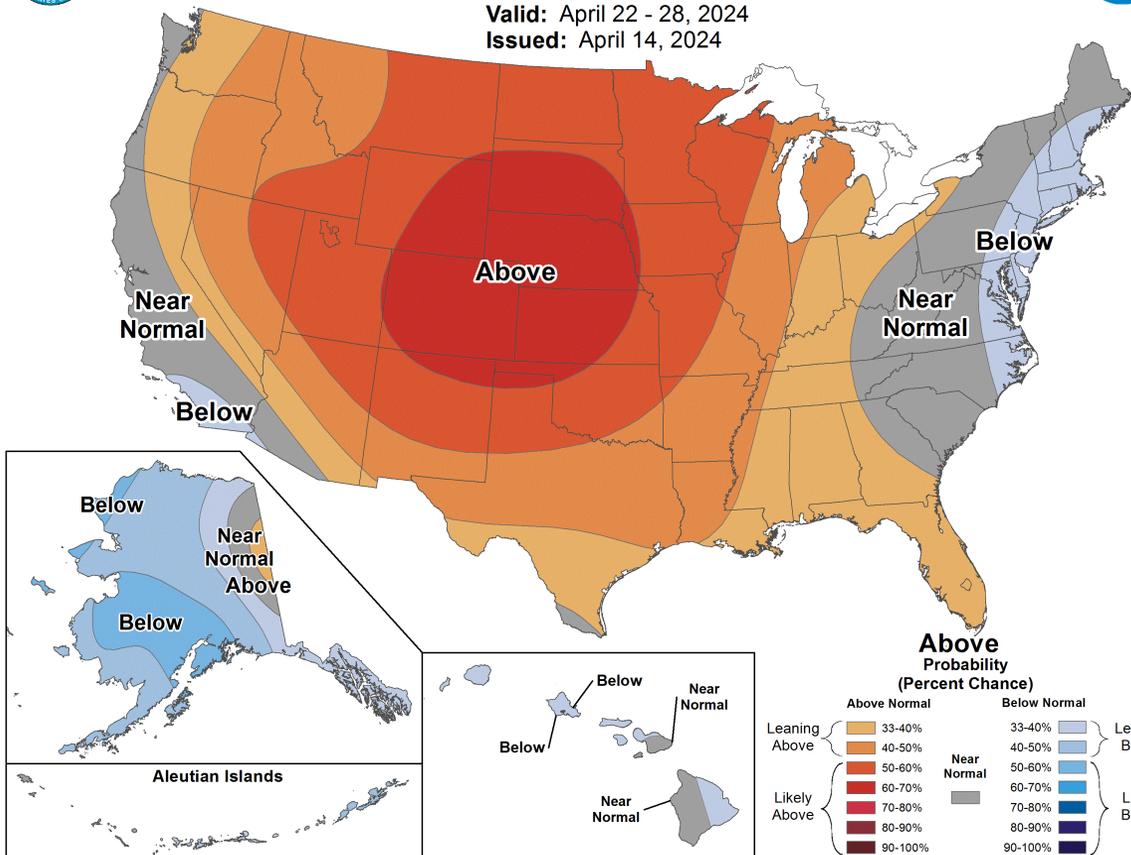


LAST WEEK OF APRIL

Temperature

8-14 Day Temperature Outlook

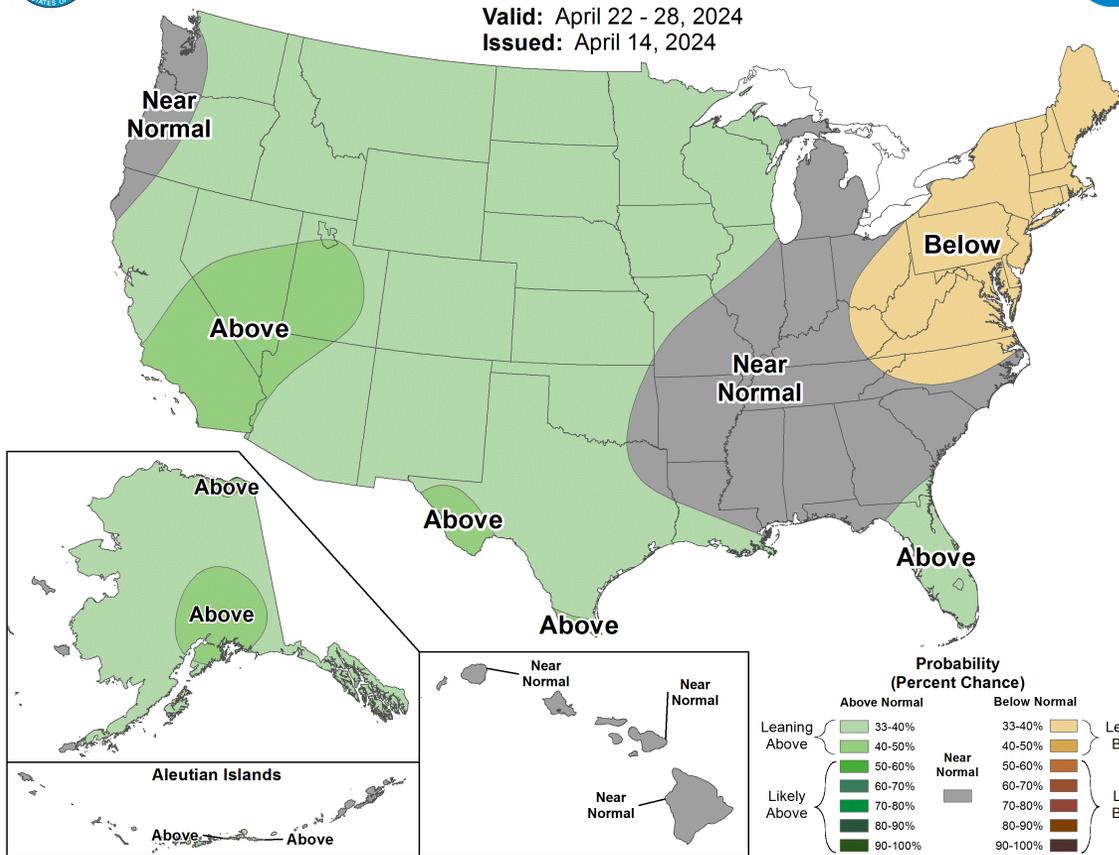
Valid: April 22 - 28, 2024
 Issued: April 14, 2024



Precipitation

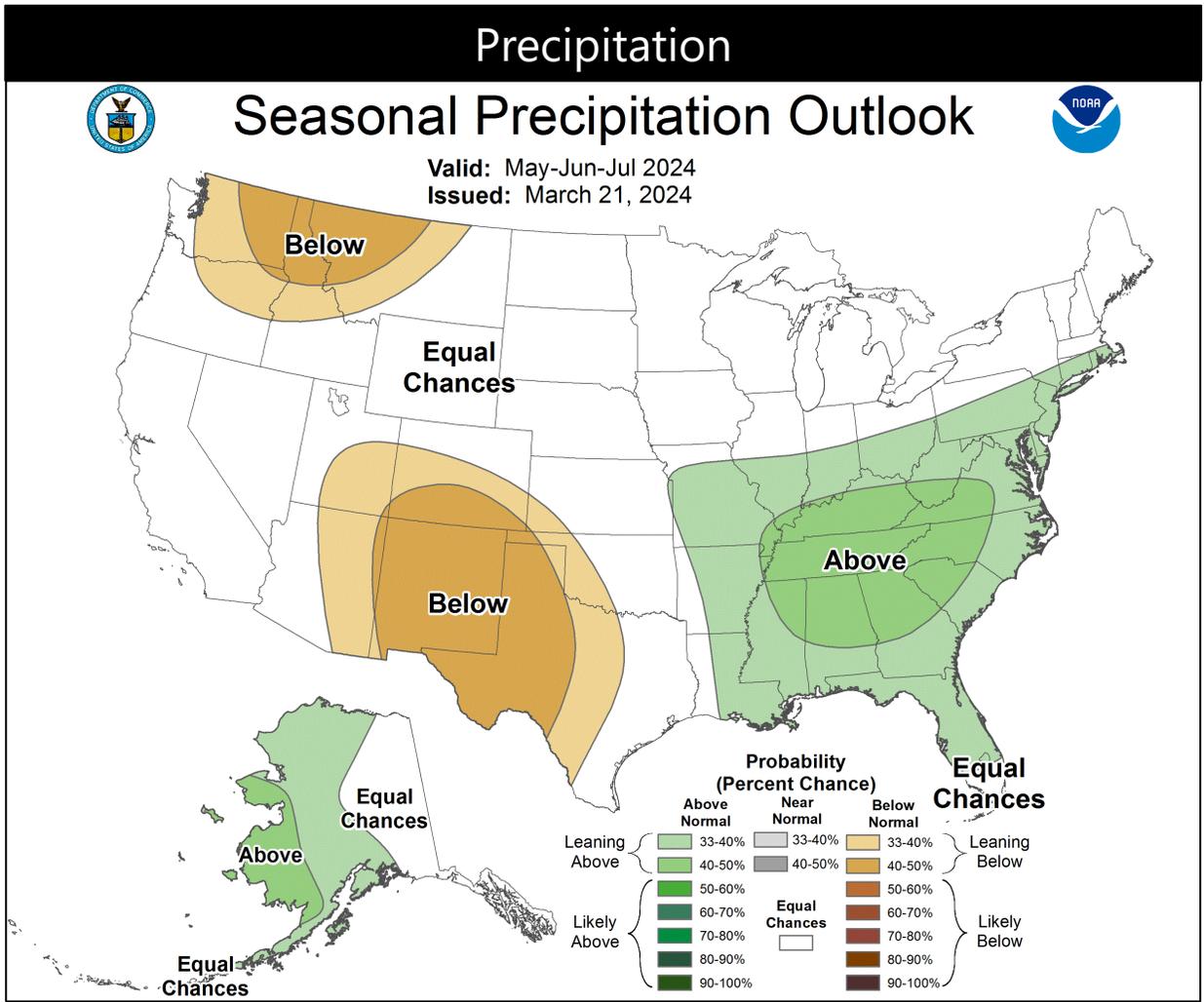
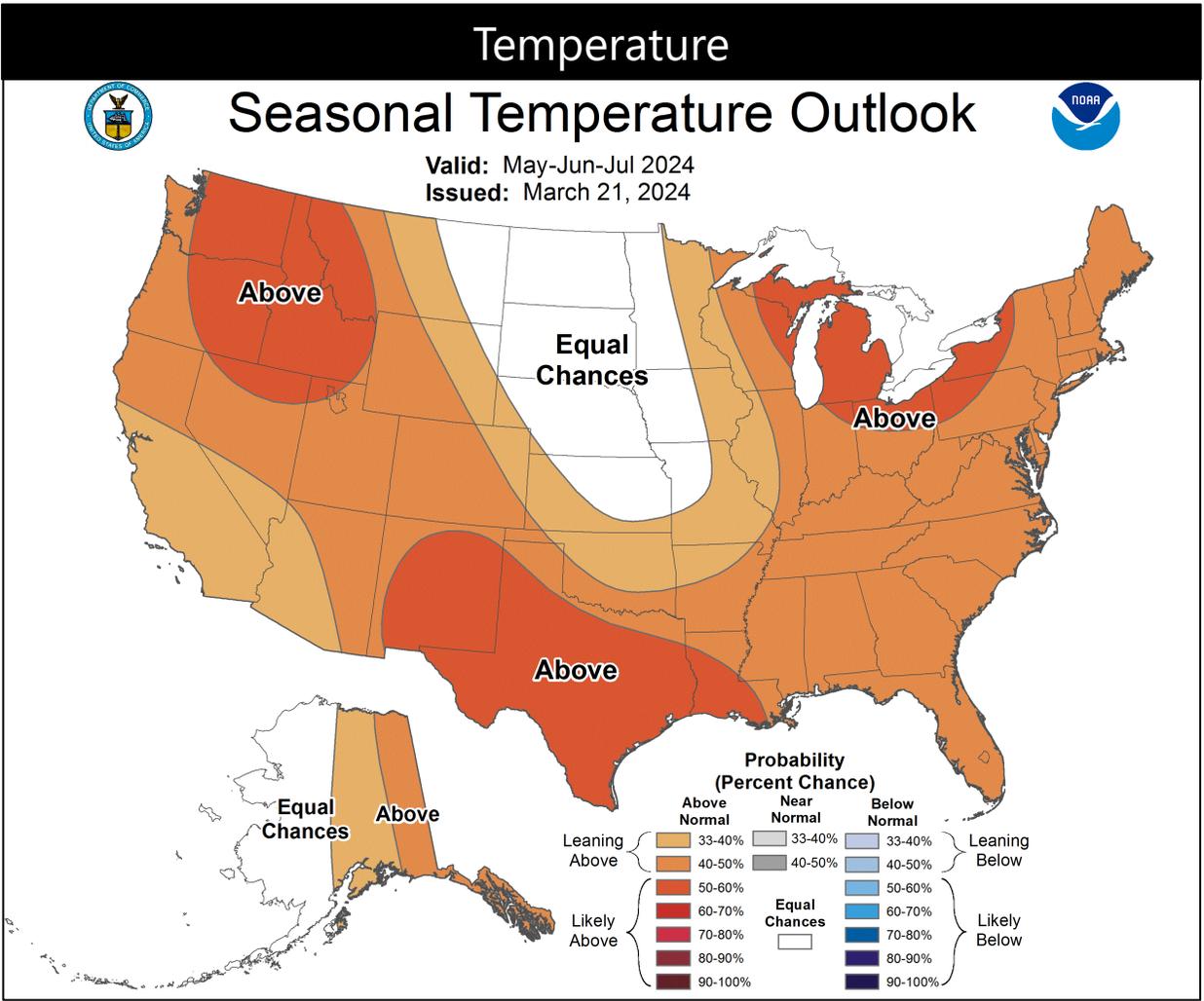
8-14 Day Precipitation Outlook

Valid: April 22 - 28, 2024
 Issued: April 14, 2024





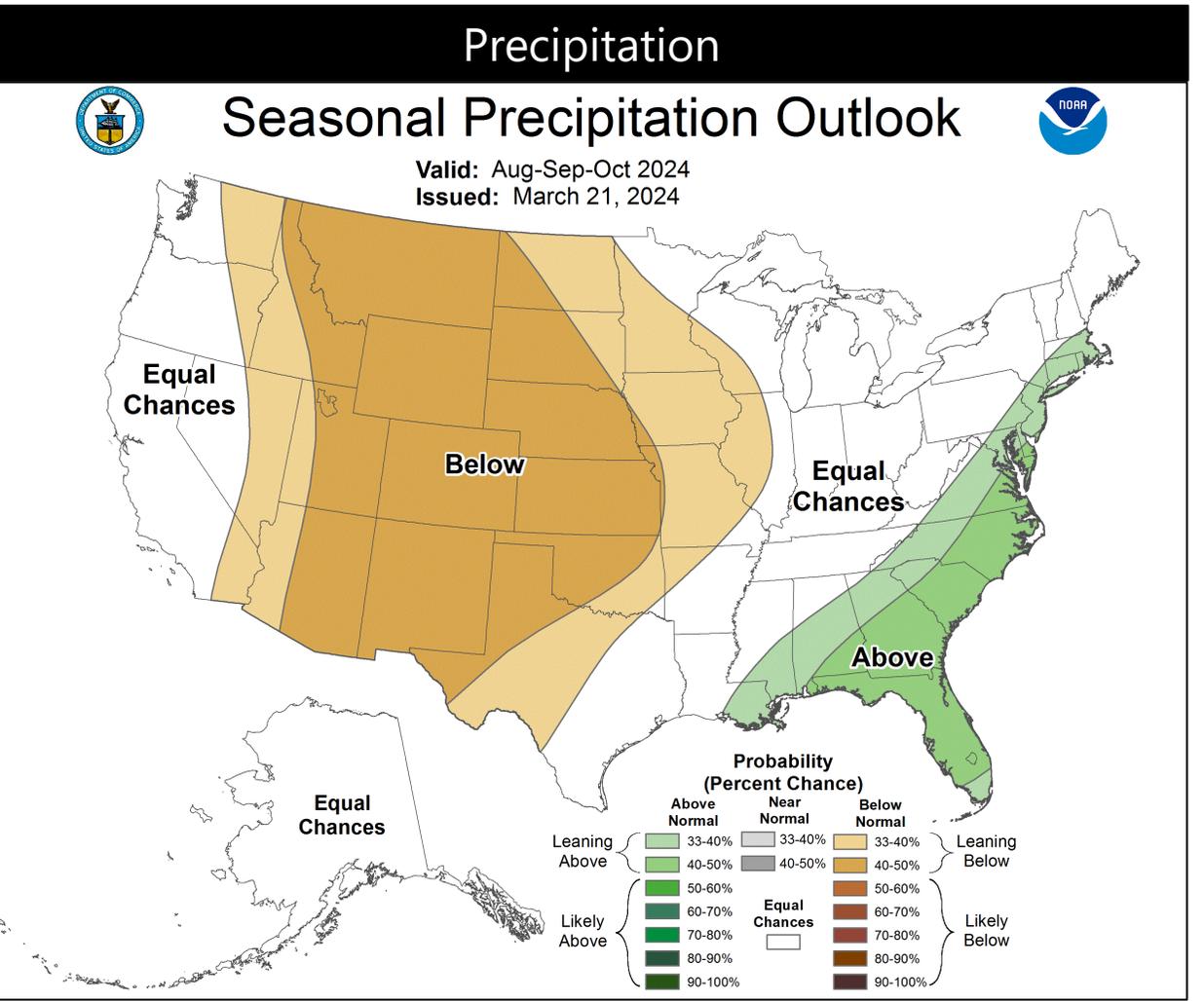
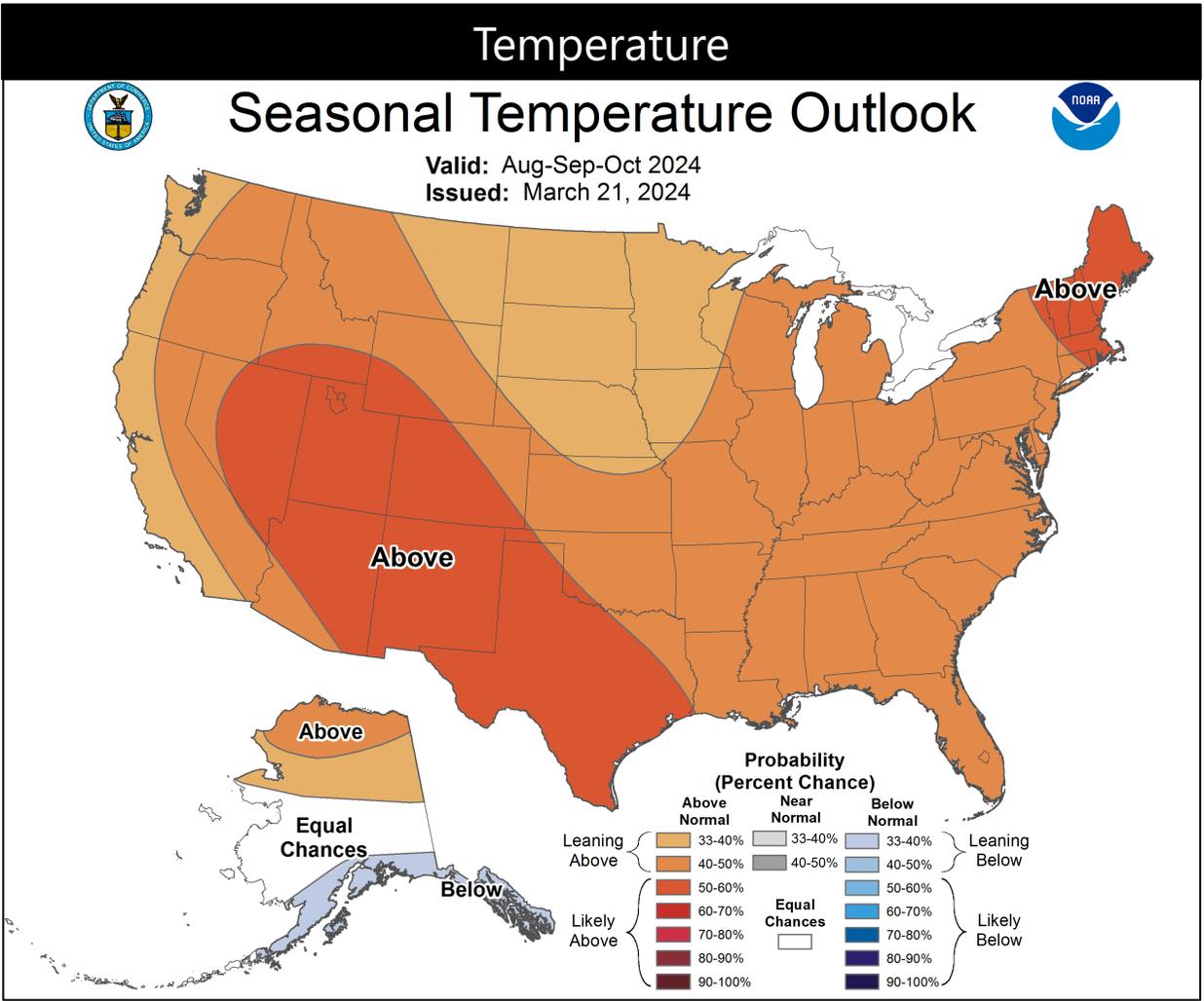
EARLY SUMMER (May, June, and July)





LATE SUMMER INTO FALL

(August, September, and October)

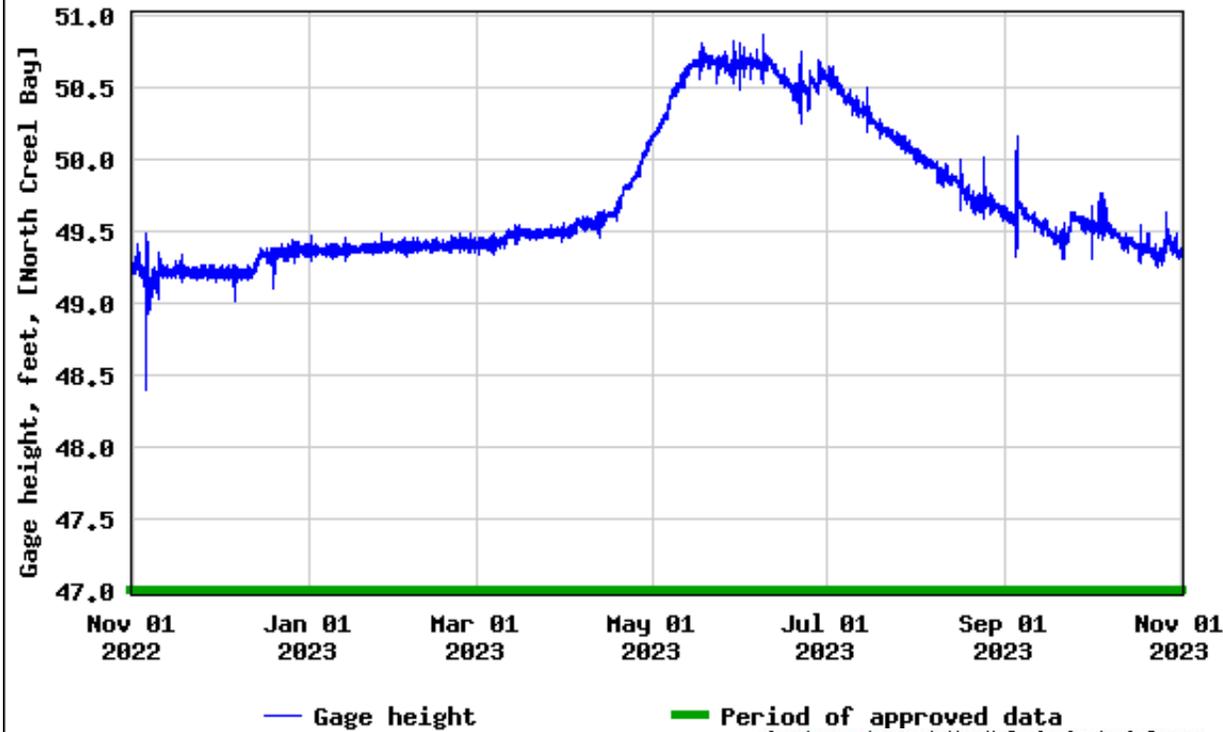




LAKE LEVELS

November 1, 2022 - November 1, 2023

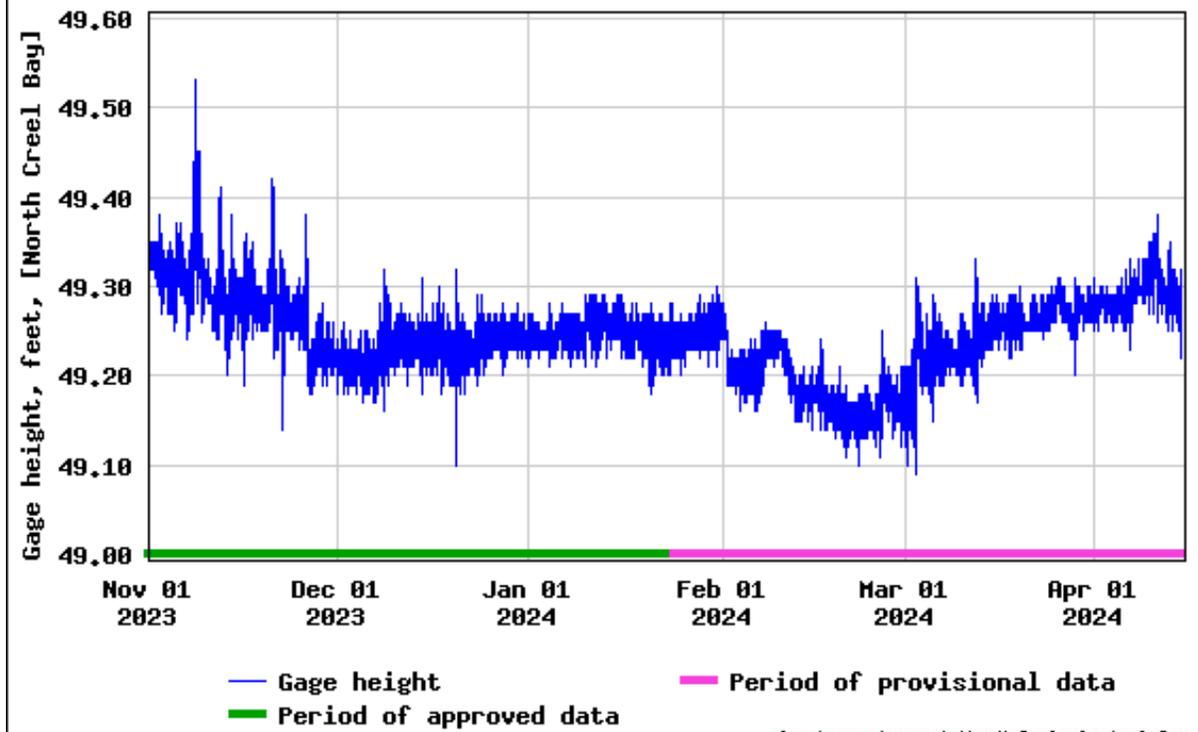
USGS 05056500 DEVILS LAKE NR DEVILS LAKE, ND



Graph courtesy of the U.S. Geological Survey

November 1, 2023 - Current

USGS 05056500 DEVILS LAKE NR DEVILS LAKE, ND



Graph courtesy of the U.S. Geological Survey



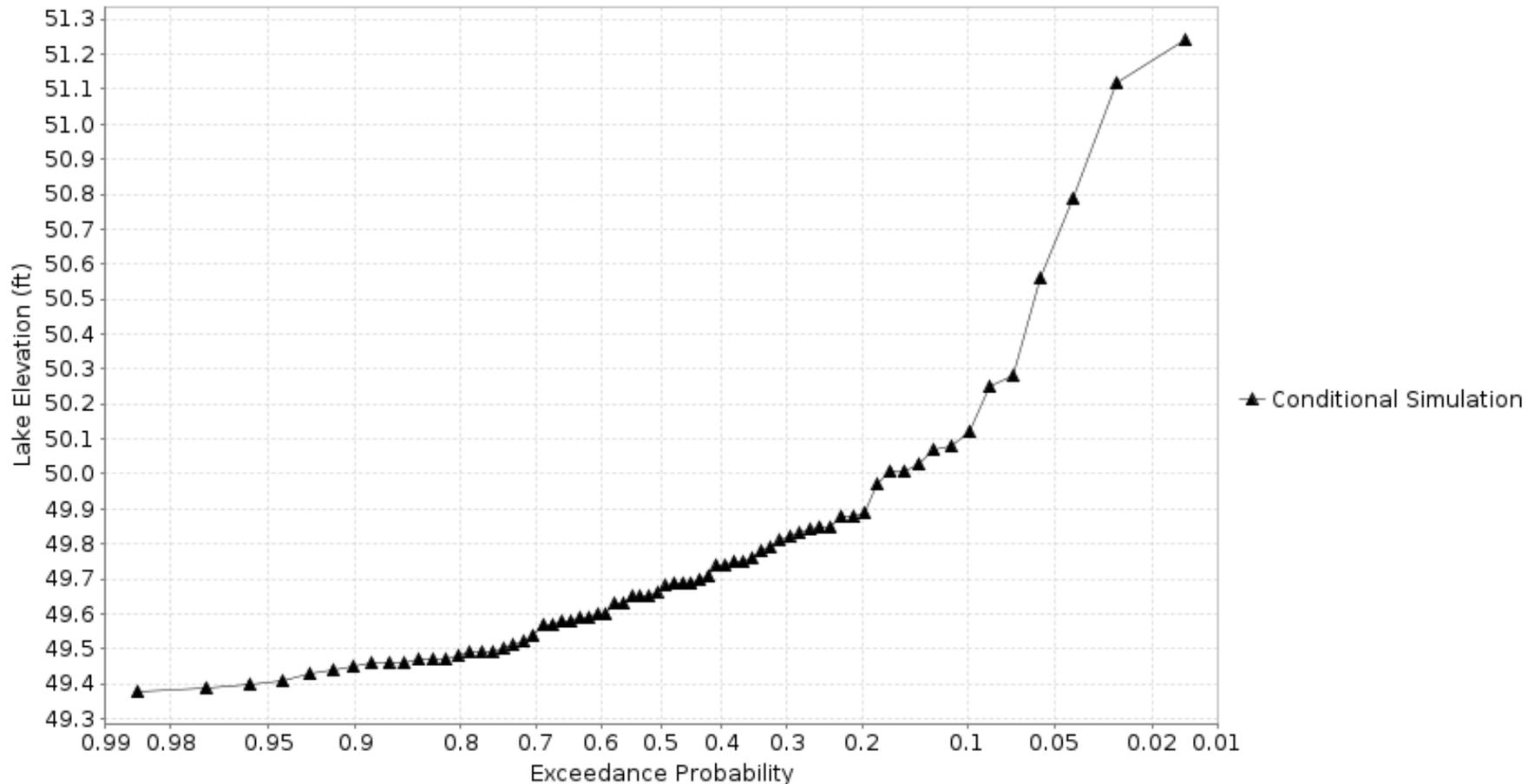
EXCEEDANCE PROBABILITIES

- Exceedance outlooks currently incorporate a daily average of 350 cfs pumping operations from May 15 to October 30
- Can be adjusted for future outlooks depending on what the committee recommends, pumping plans, etc.



EXCEEDANCE PROBABILITIES

Probability of Rising to High Lake Levels on the Devils Lake at Devils Lake 5SW-Creel Bay (DCBN8)
Forecast for the period 03/25/2024 - 09/30/2024
This is a conditional simulation based on the conditions as of 03/25/2024
Pumping schedule : 350cfs May 15 - Oct 30



Current Lake Level

Creel Bay
1449.27 ft (4/15)

Stump Lake
1449.21 ft (4/15)

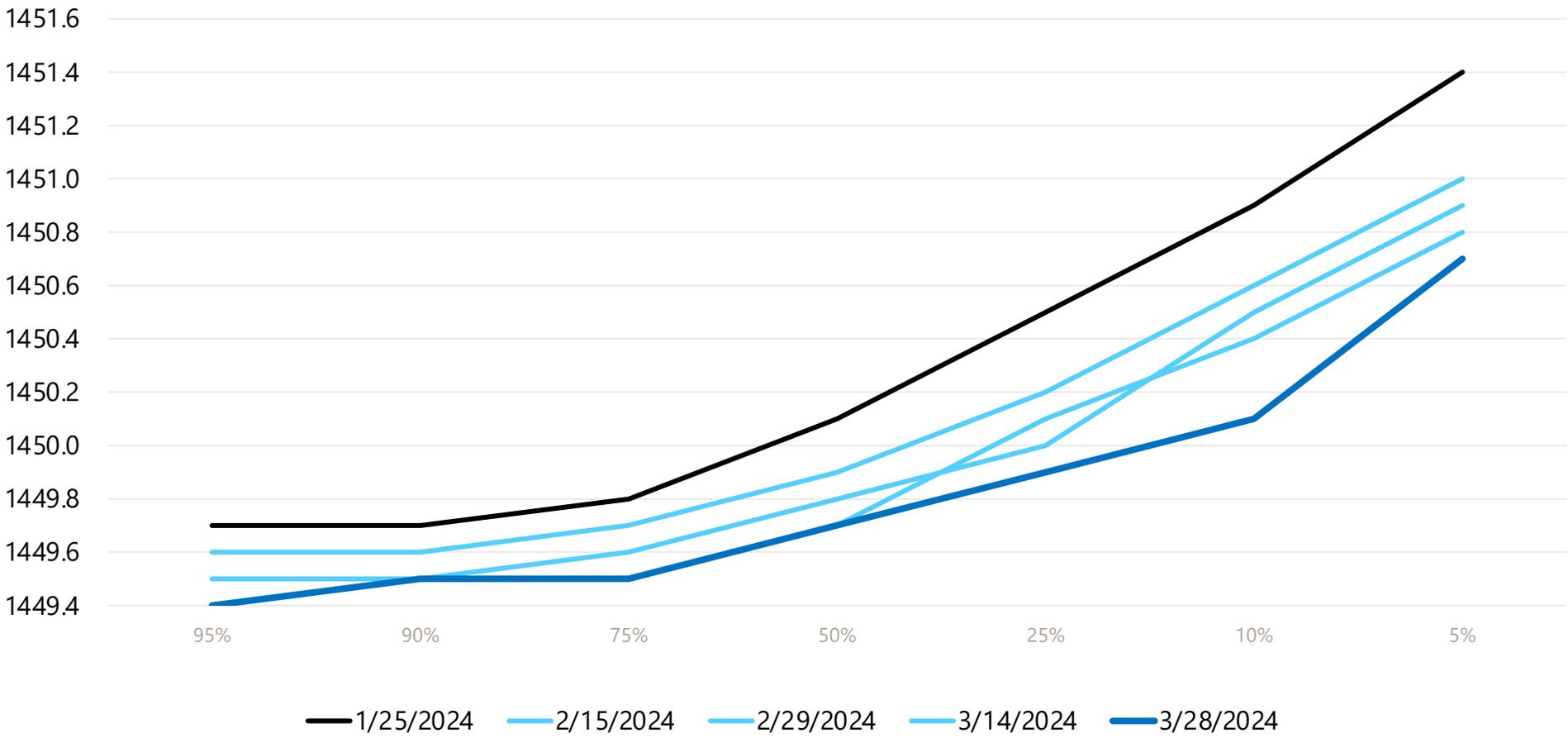
Next Exceedance Outlook

Thursday,
April 25, 2024



EXCEEDANCE PROBABILITIES

2024 Devils Lake Exceedance Probabilities



Current Lake Level

Creel Bay
1449.27 ft (4/15)

Stump Lake
1449.21 ft (4/15)

Next Exceedance Outlook

Thursday,
April 25, 2024



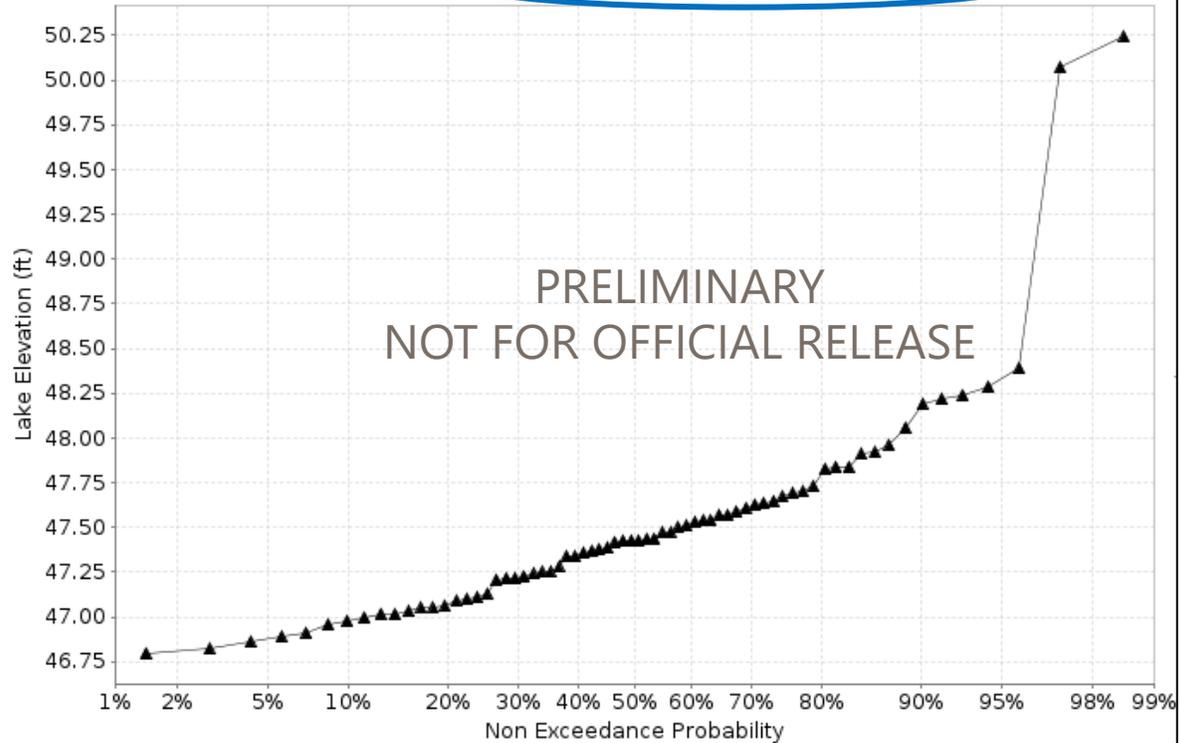
NON-EXCEEDANCE PROBABILITIES

Probability of Falling to Low Lake Levels on the Devils Lake at Devils Lake 5SW-Creel Bay (DCBN8)

Forecast for the period 09/01/2024 - 11/30/2024

This is a conditional simulation based on the conditions as of 04/08/2024

Pumping schedule : 350cfs May 15 - Oct 30

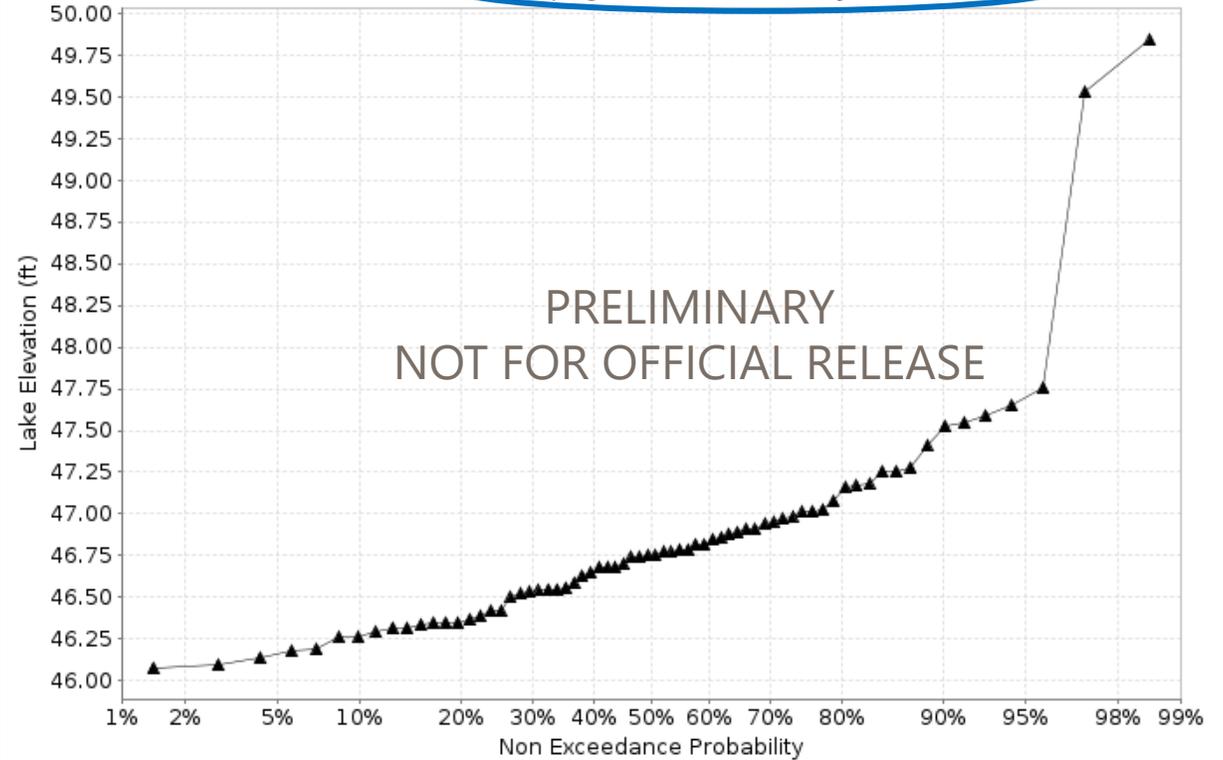


Probability of Falling to Low Lake Levels on the Devils Lake at Devils Lake 5SW-Creel Bay (DCBN8)

Forecast for the period 09/01/2024 - 11/30/2024

This is a conditional simulation based on the conditions as of 04/08/2024

Pumping schedule : 600cfs May 15 - Oct 30



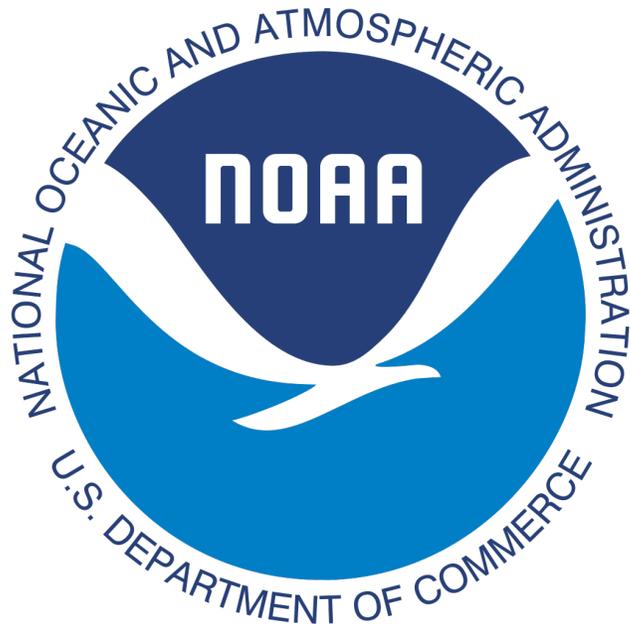
First non-exceedance outlook to be issued
Thursday, June 27, 2024

Current Lake Level

Creel Bay
1449.27 ft (4/15)

NATIONAL WEATHER SERVICE UPDATE

Amanda Lee
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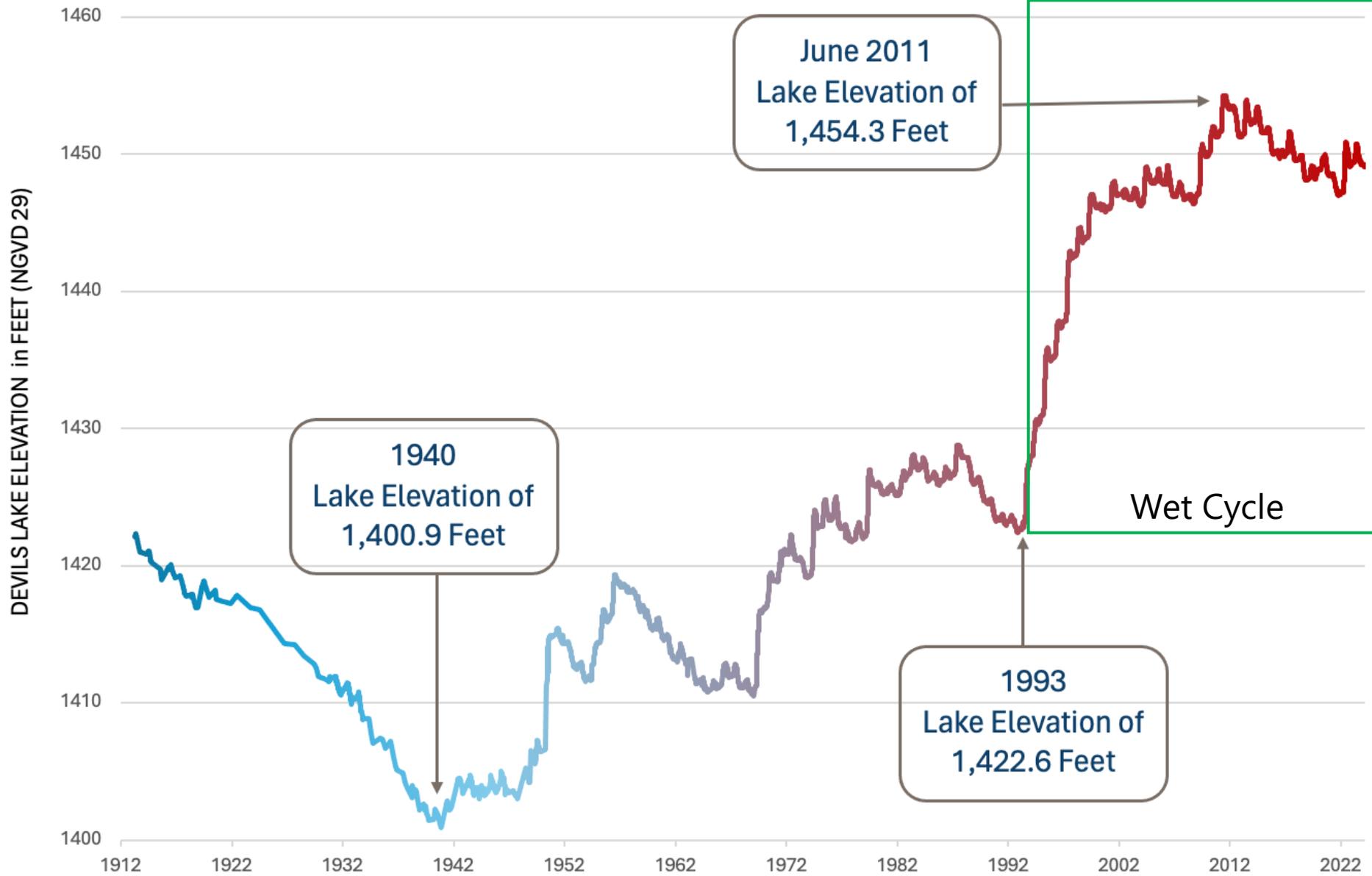


2023 DEVILS LAKE BASIN OVERVIEW

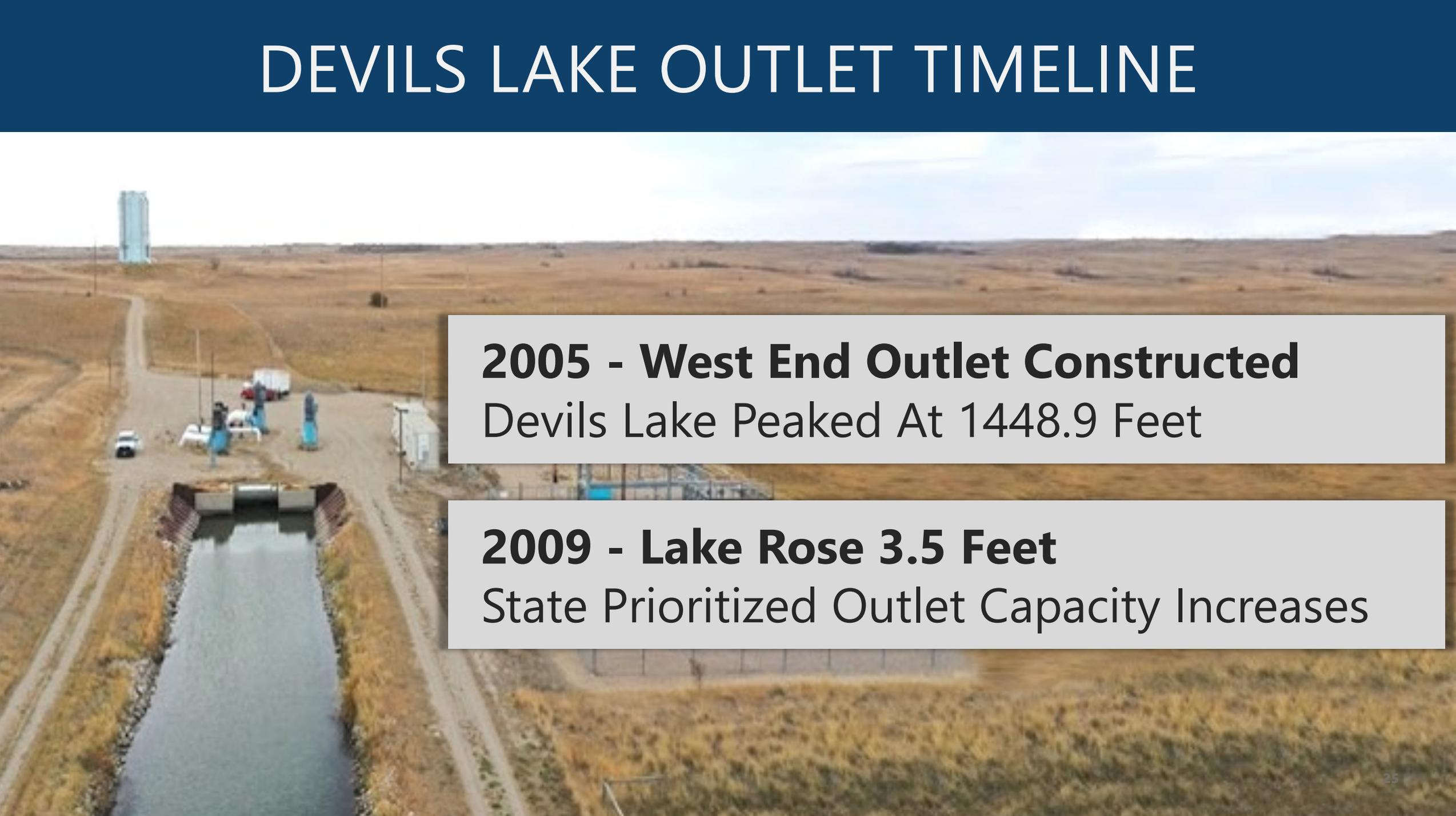
YAPING CHI, DEVILS LAKE ENGINEER

WATER SURFACE ELEVATION, DEVILS LAKE, NORTH DAKOTA

DEVILS LAKE WATER SURFACE ELEVATION



DEVILS LAKE OUTLET TIMELINE



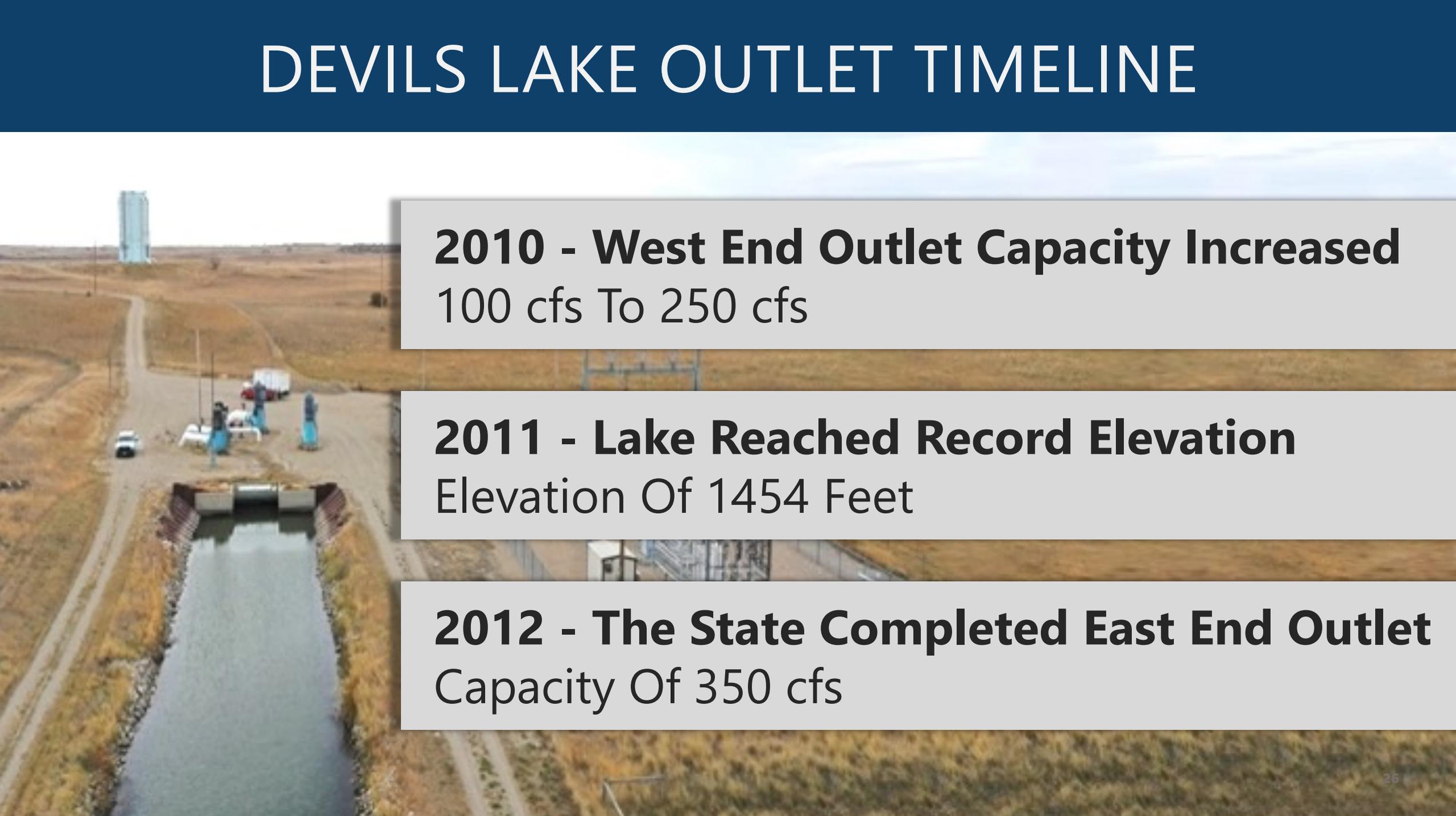
2005 - West End Outlet Constructed

Devils Lake Peaked At 1448.9 Feet

2009 - Lake Rose 3.5 Feet

State Prioritized Outlet Capacity Increases

DEVILS LAKE OUTLET TIMELINE



2010 - West End Outlet Capacity Increased
100 cfs To 250 cfs

2011 - Lake Reached Record Elevation
Elevation Of 1454 Feet

2012 - The State Completed East End Outlet
Capacity Of 350 cfs

DEVILS LAKE BASIN WATER BALANCE

AVERAGE ANNUAL ESTIMATES | 2010-2023

Precipitation = 20.14 Inches
Inflow = 250,000 Acre-Feet

Lake Precipitation
+
Basin Runoff (Inflow)



Lake Level Rises

Evaporation = 30.66 Inches
Outlets Discharge = 103,500 Acre-Feet

Lake Evaporation
+
Outlets Discharge



Lake Level Falls

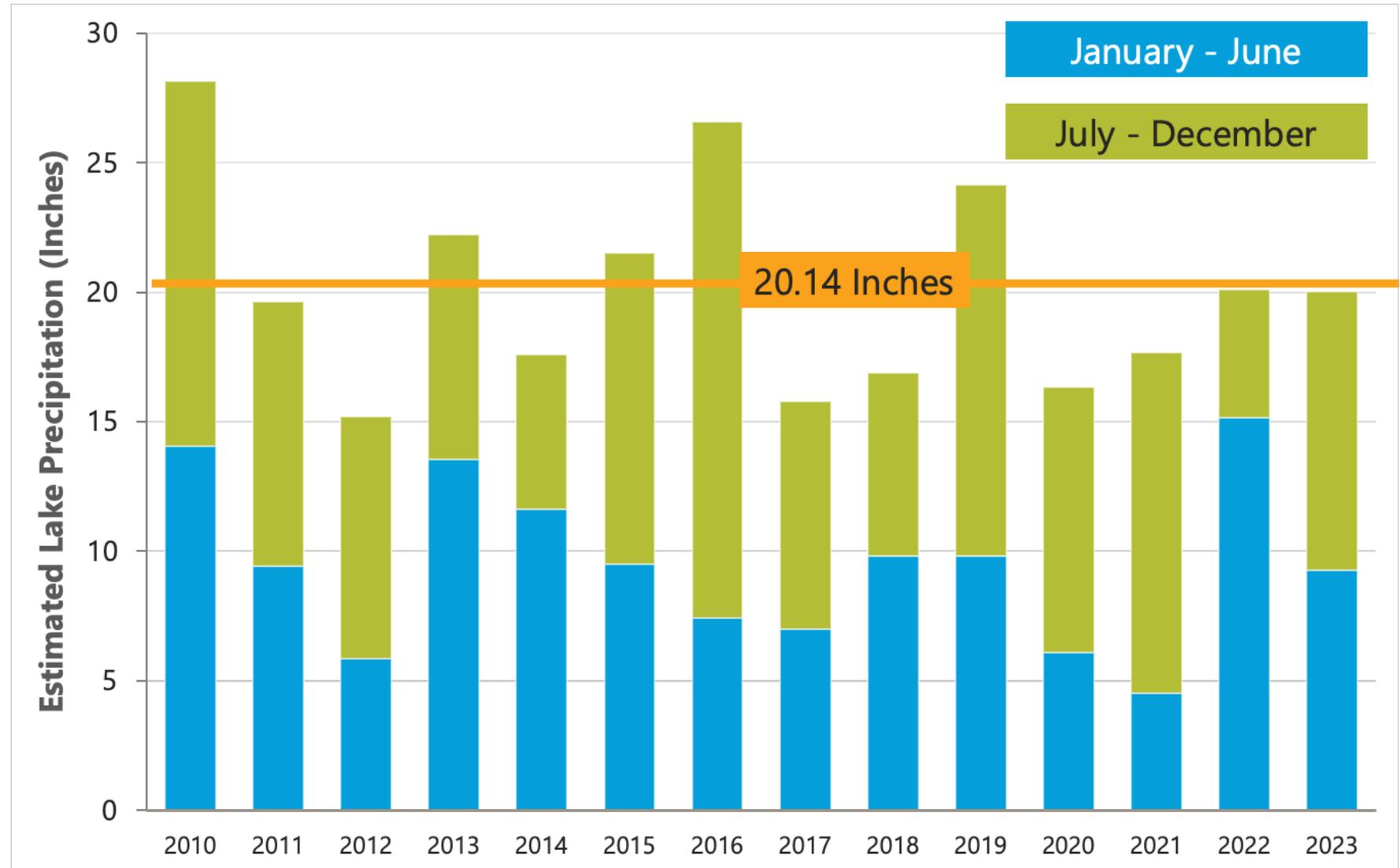
DEVILS LAKE ESTIMATED PRECIPITATION

**Average Annual
Precipitation
(2010-2023)**

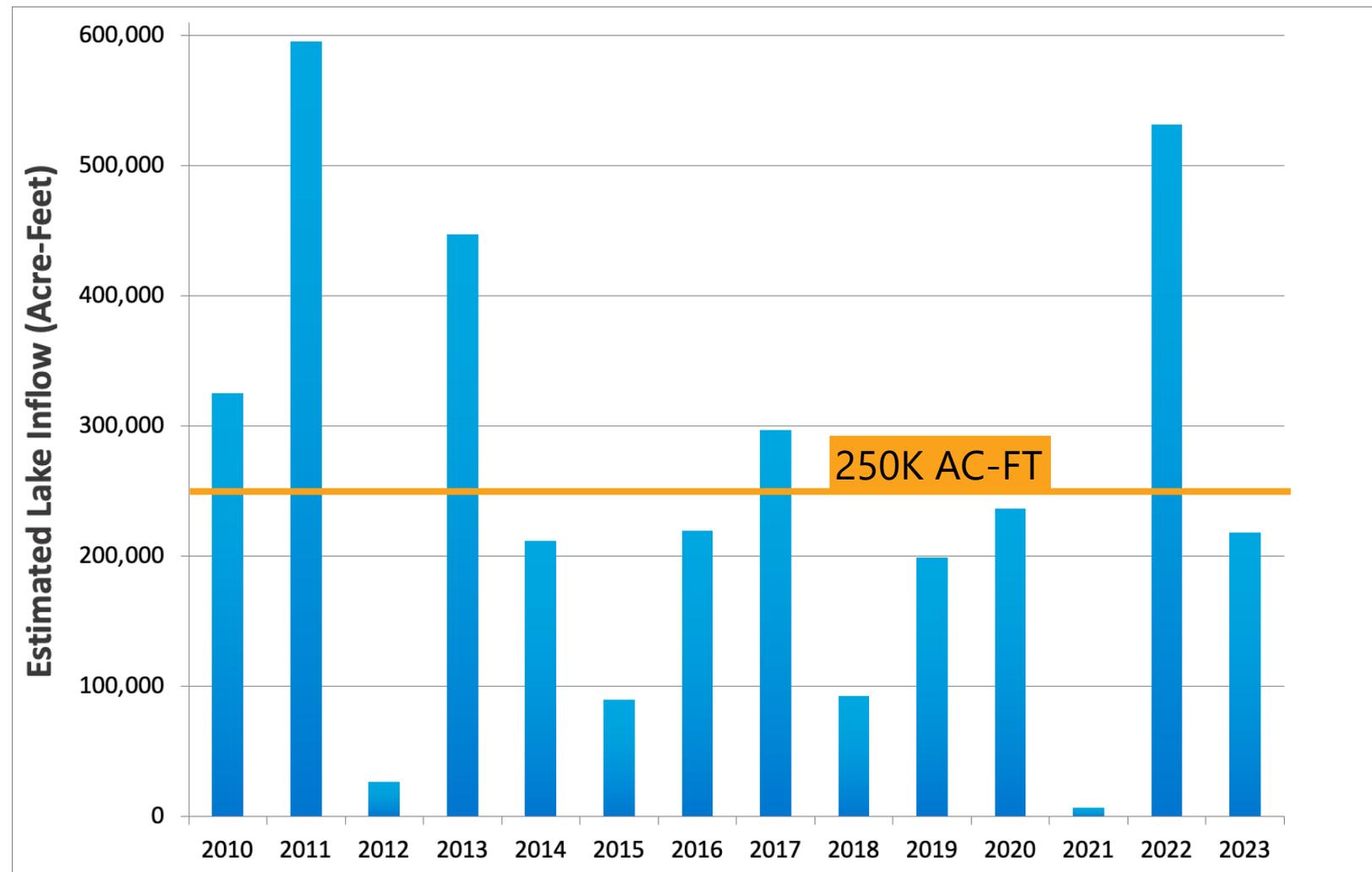
20.14 Inches

2023 Precipitation

20.04 Inches



DEVILS LAKE ESTIMATED INFLOW

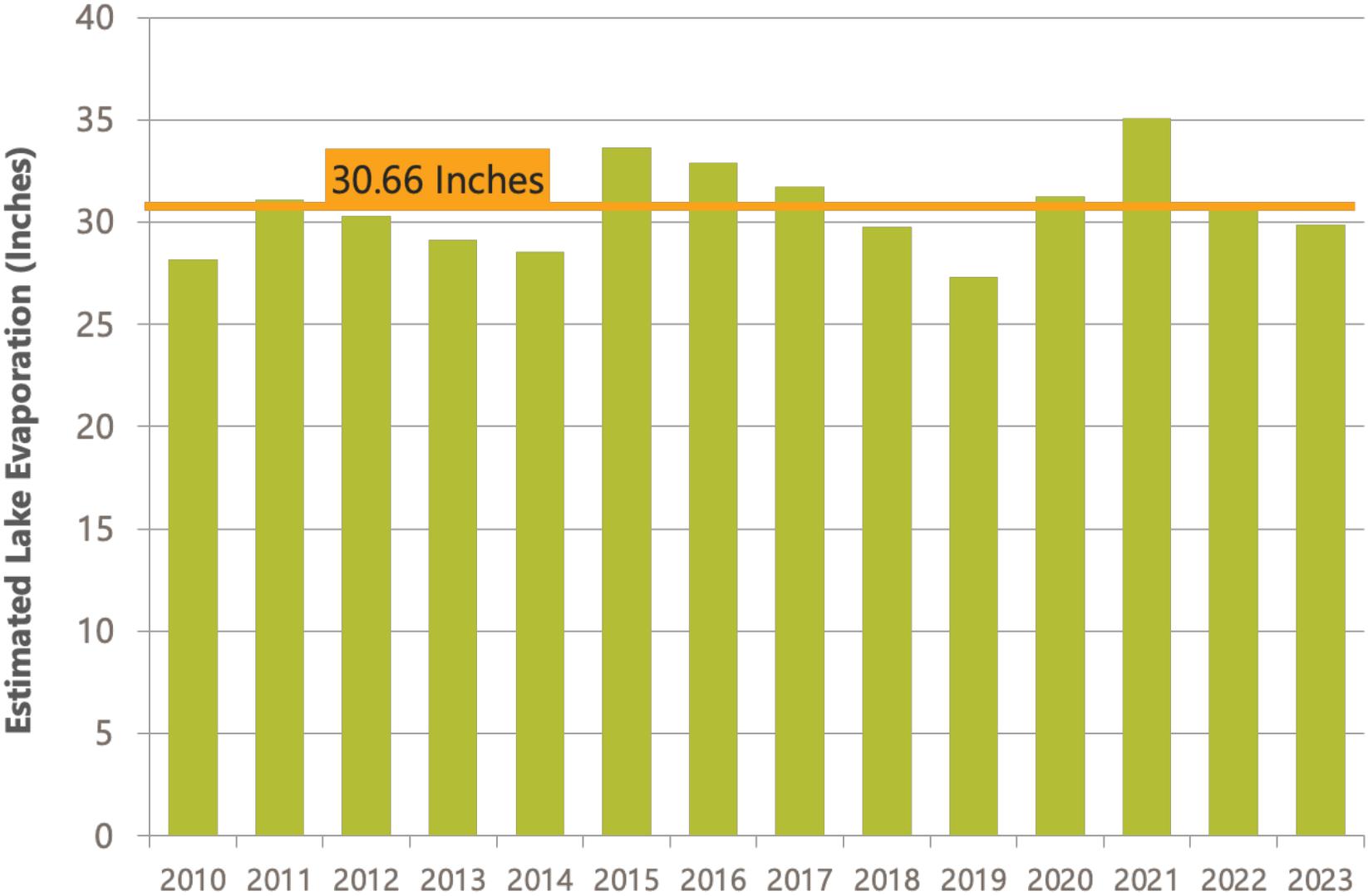


Average Annual Inflow
(2010-2023)

Is Approximately
250,000 Acre-Feet

2023 Estimated Inflow
218,290 Acre-Feet

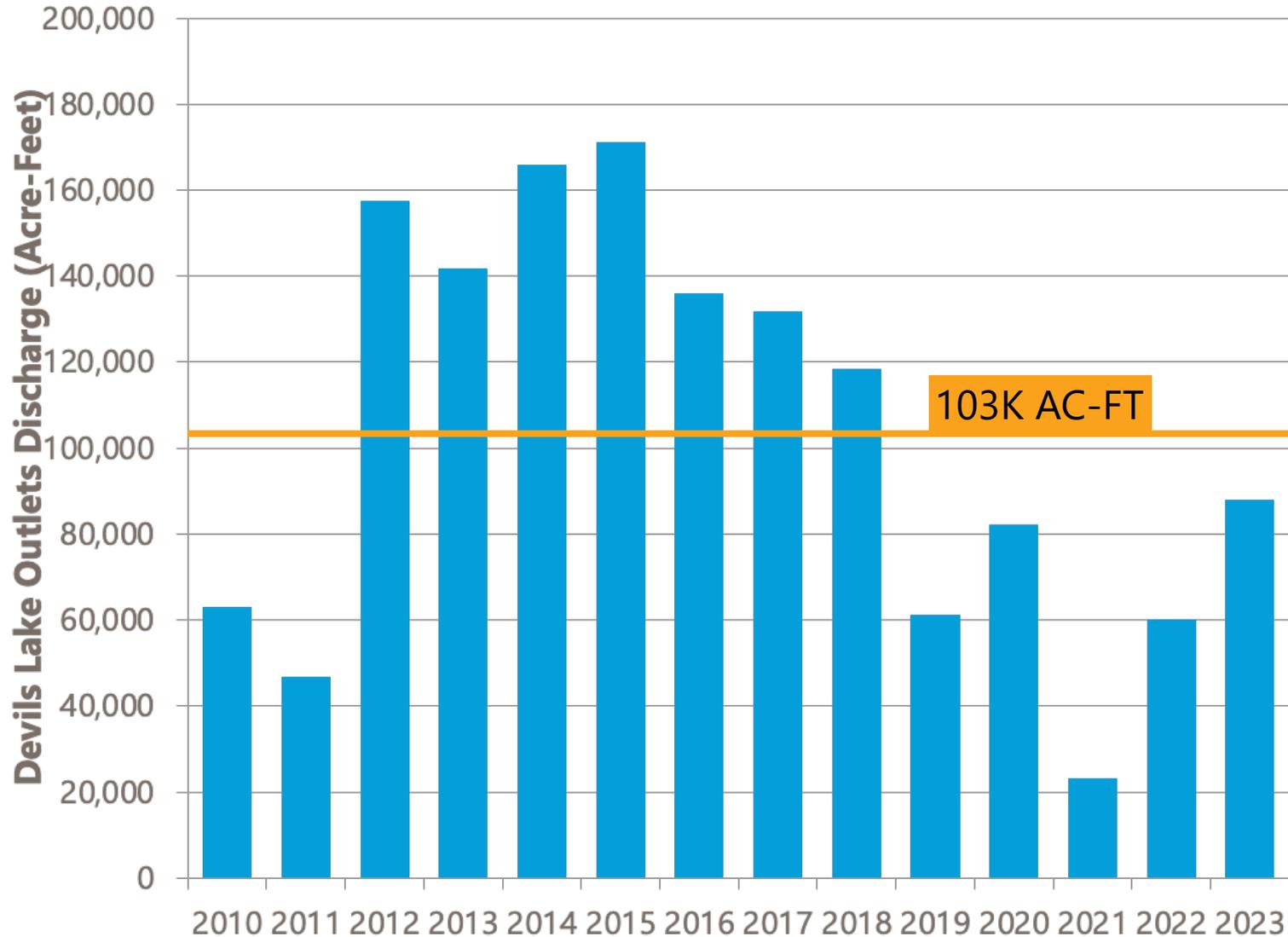
DEVILS LAKE ESTIMATED EVAPORATION



Average Annual Evaporation
(2010-2023)
30.66 Inches

2023 Evaporation
29.85 Inches

DEVILS LAKE OUTLETS DISCHARGE



Average Annual Outlets Discharge (2010-2023)

103,384 Acre-Feet

2023 Outlets Discharge

88,064 Acre-Feet

LAKE ELEVATION

1449.1 Feet April 3, 2024

Data Courtesy Of USGS Gage 05056500



Lake Elevations **Above 1446 Feet** Include Devils Lake & Stump Lake Combined

Devils Lake **Peaked At 1454.3 Feet** In **2011**

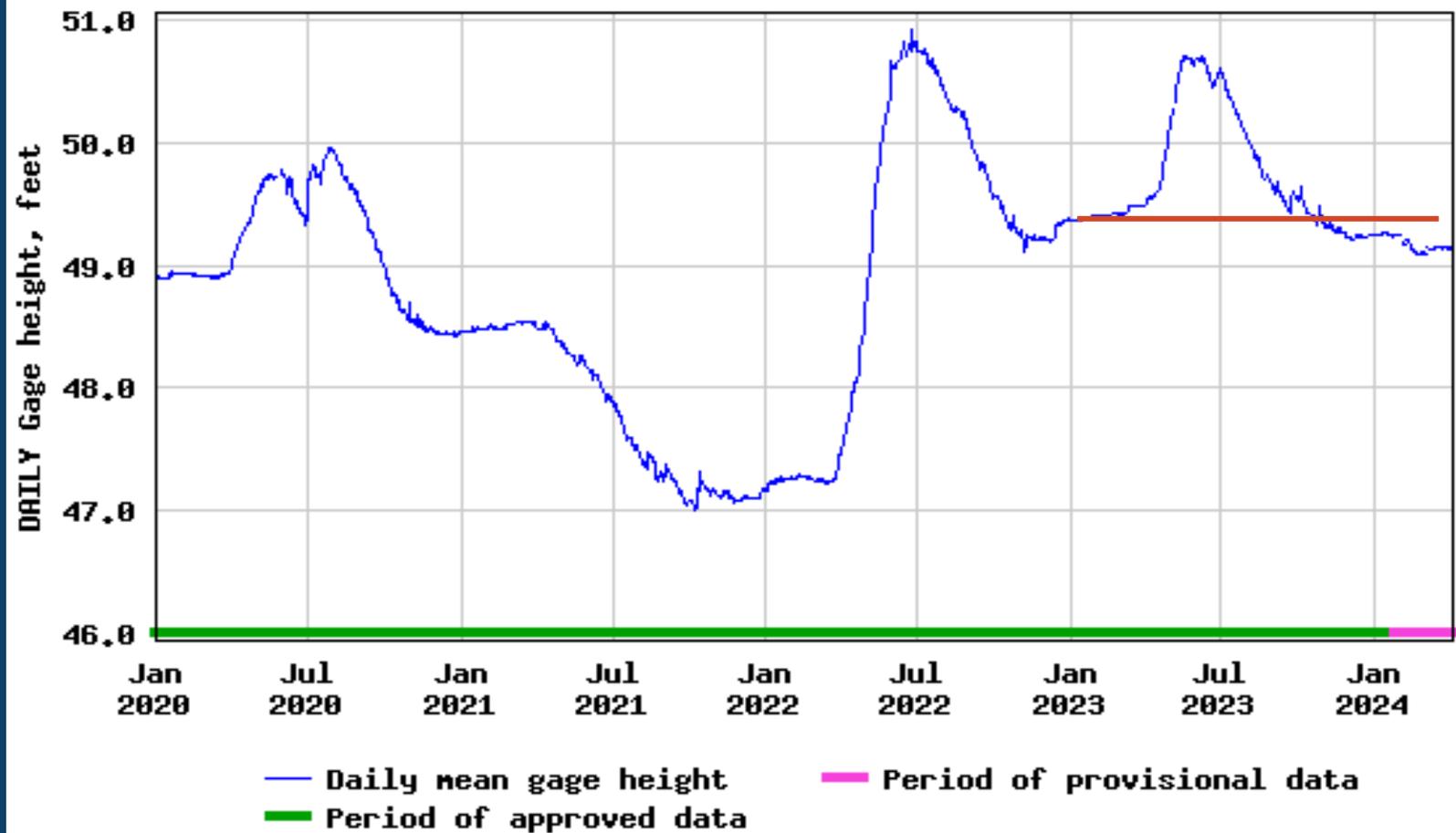
Devils Lake Has Been **Steadily Declining** Except For The **Spring Of 2022 And 2023**

Currently **Down Approximately 5 Feet** Since Its Peak

LAKE ELEVATION

2020 - PRESENT

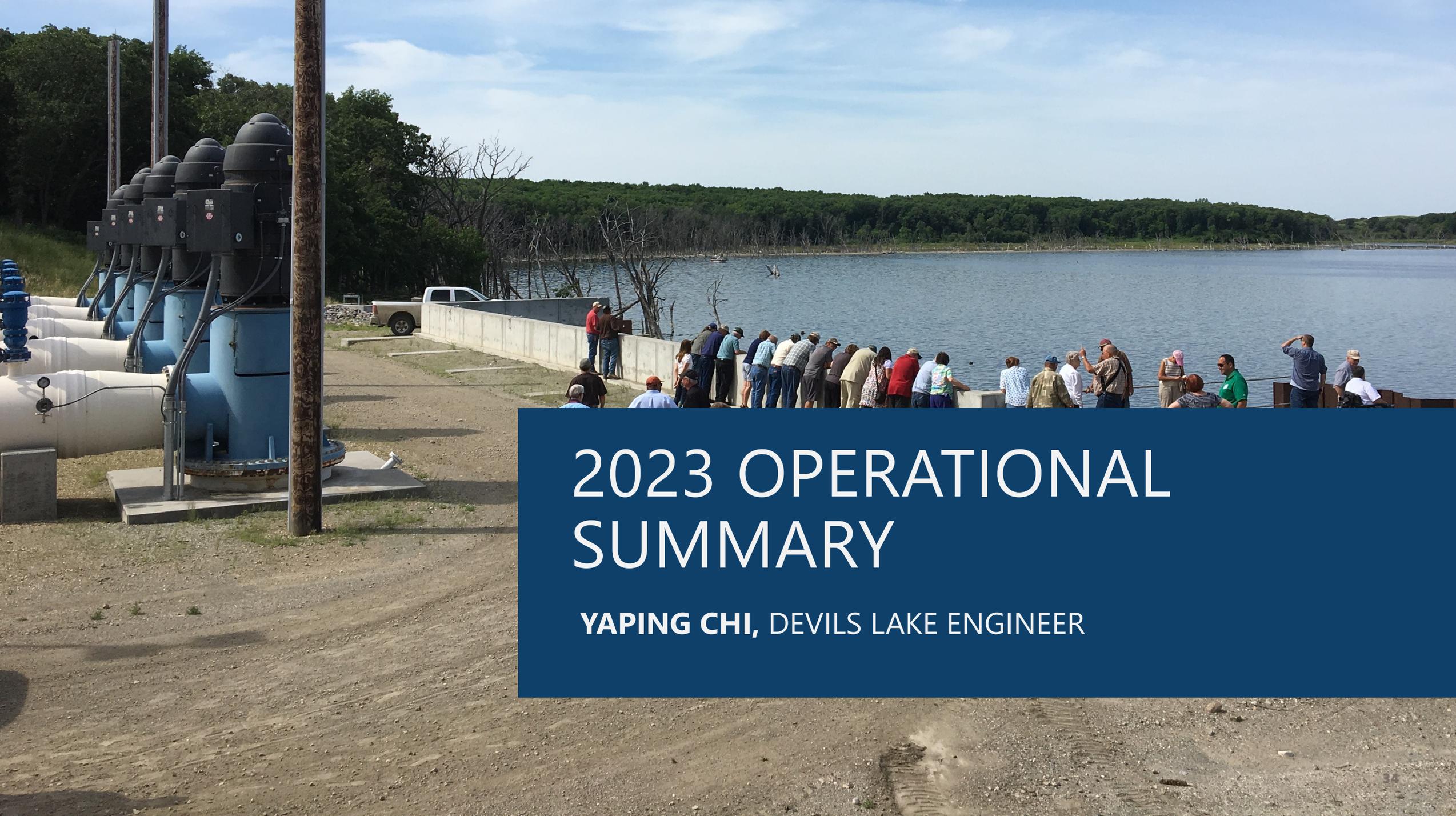
Data Courtesy Of USGS Gage 05056500



Historically Dry Conditions Throughout **2021** Caused **Significant Drop** In Lake Levels.

In **2023**, Devils Lake **Began** at Level **1449.4 ft** and **Ended** at Level **1449.2 ft**.

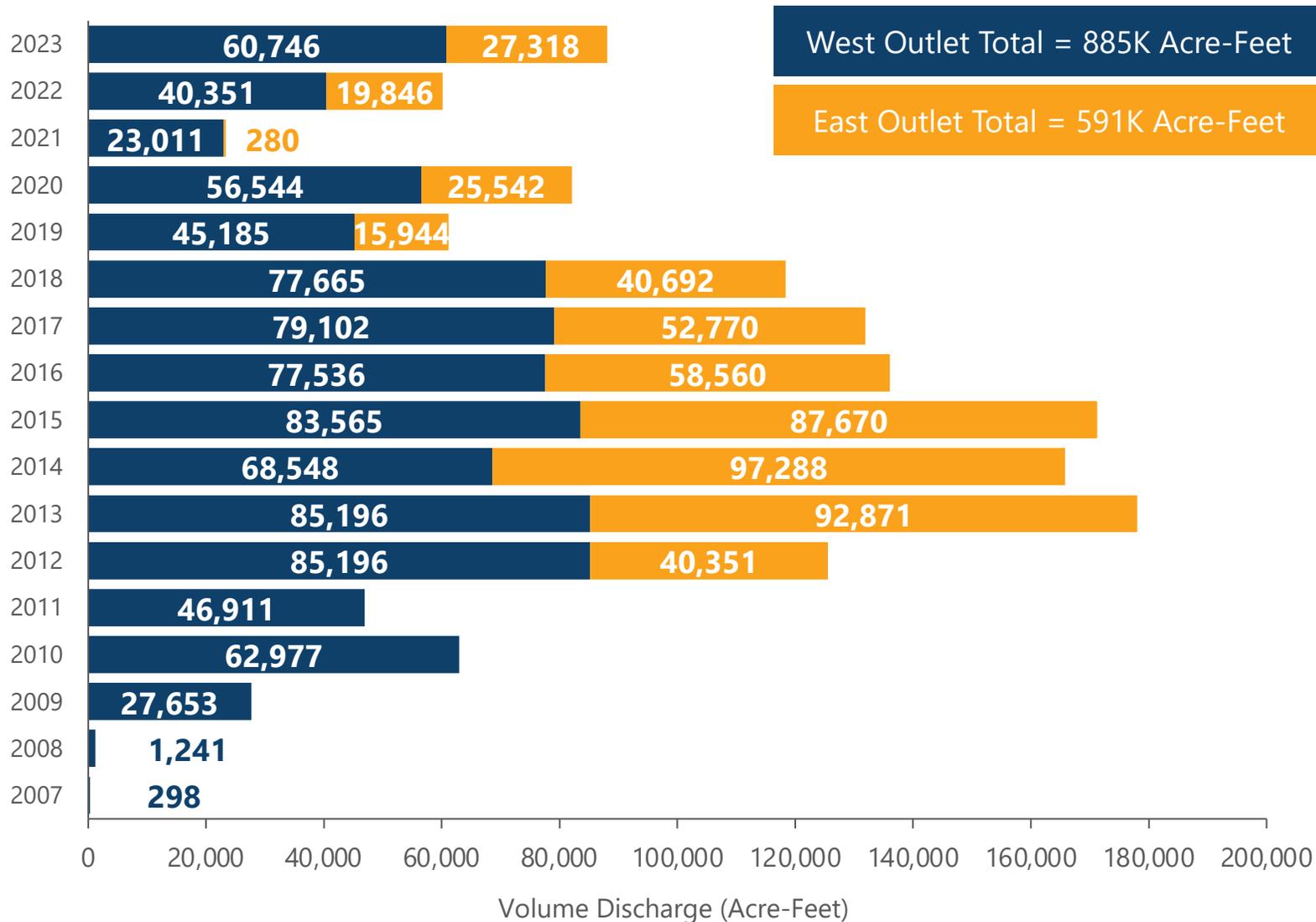
In **2024**, Devils Lake Is **Expected** To Rise Approximately to **1449.7 ft**.



2023 OPERATIONAL SUMMARY

YAPING CHI, DEVILS LAKE ENGINEER

2007-2023 DEVILS LAKE OUTLET DISCHARGE



**2023 Total Discharge
88,000 Acre-Feet**

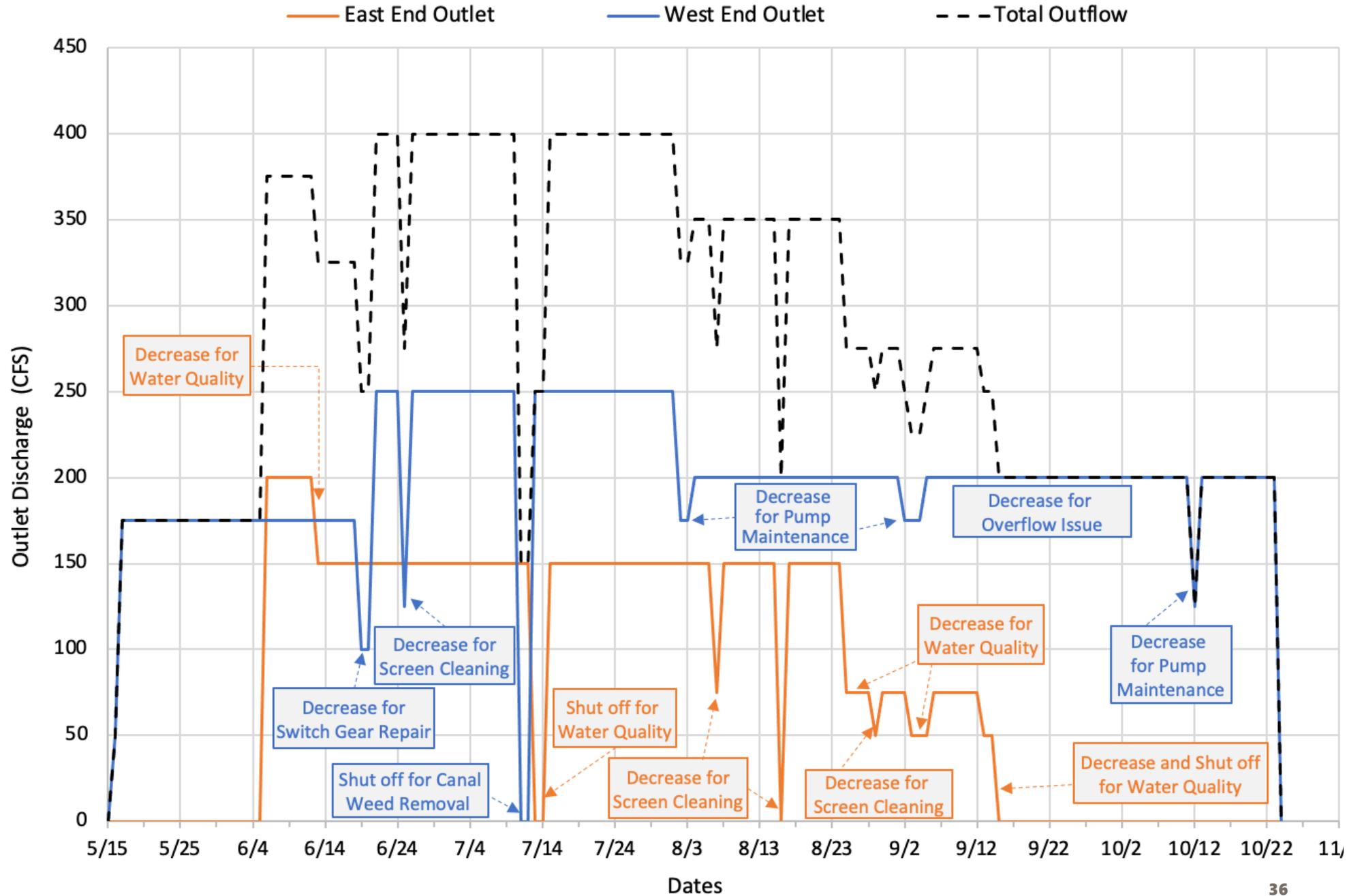
**West End Outlet Operated
159 Days In 2023**

**East End Outlet Operated
98 Days In 2023**

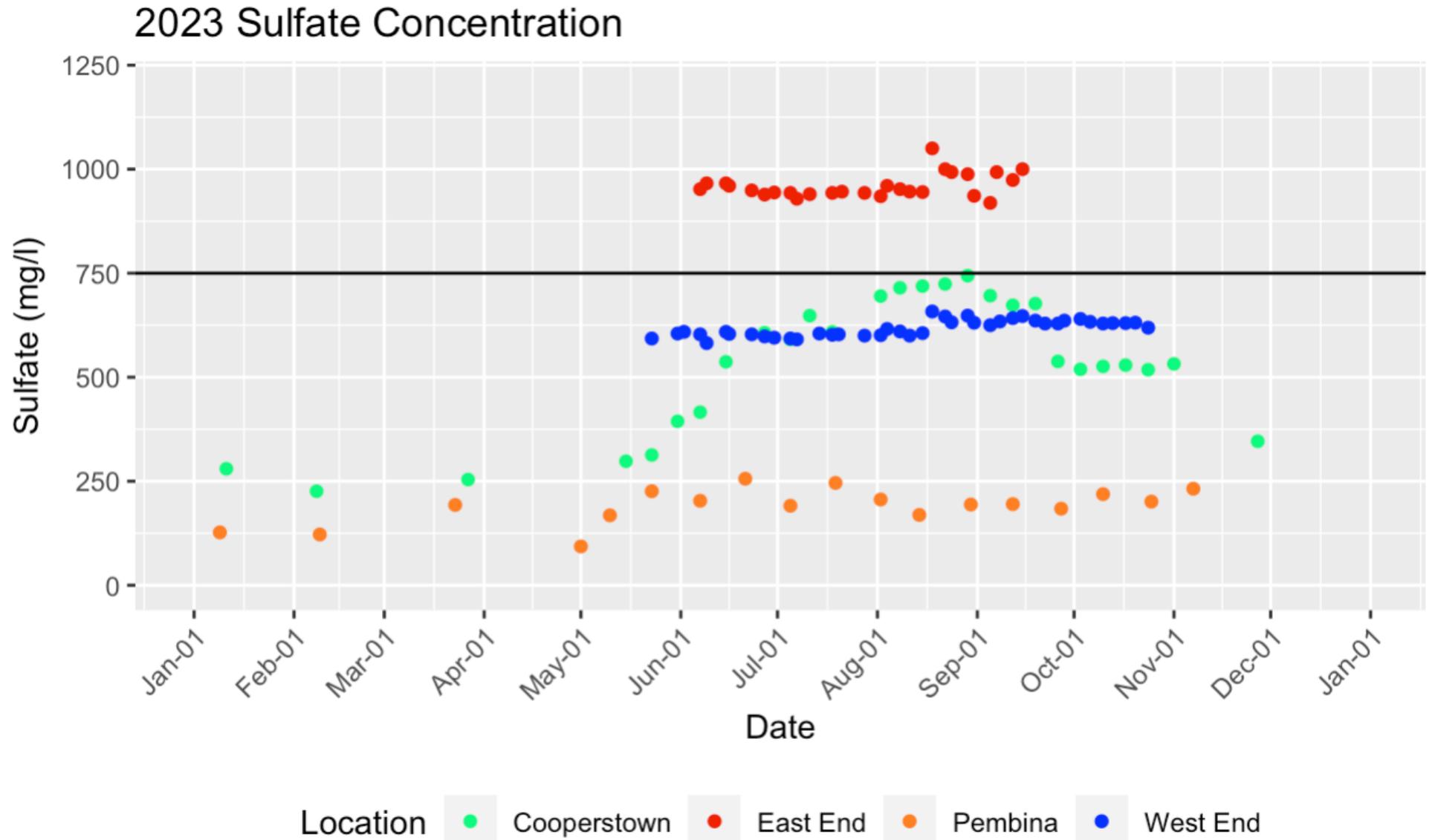
**Combined Discharge Of
Over 1.4M Acre-Feet
(2007 - 2023)**

**Lowered By 0.5 Feet
In 2023 With Outlets**

2023 DEVILS LAKE OUTLETS DISCHARGE



2023 SULFATE LEVELS



WEST END OUTLET CIP UPDATE



DWR Entered Into An Agreement With Bartlett & West/AECOM Joint Venture To Complete A Capital Improvement Plan (CIP) For the Devils Lake West End Outlet.

Field Inspections Were Conducted Before And After The Operation Season In 2023.

DWR Received The Final Report In April 2024.

This Report Has Identified The Infrastructure That Requires Updates/Maintenance And Estimated The Timeframe To Update It.

DEVILS LAKE ENGINEERING SERVICE



DWR Has Selected Bartlett & West/AECOM, A Joint Venture To Provide Engineering Services As Requested By The Department For Maintaining The Continued Operations Of Both The Devils Lake West End Outlet And East End Outlet.

It Is A 5-year Contract, Ending On 3/1/2029.



OUTLOOK FOR 2024 OUTLETS OPERATIONS

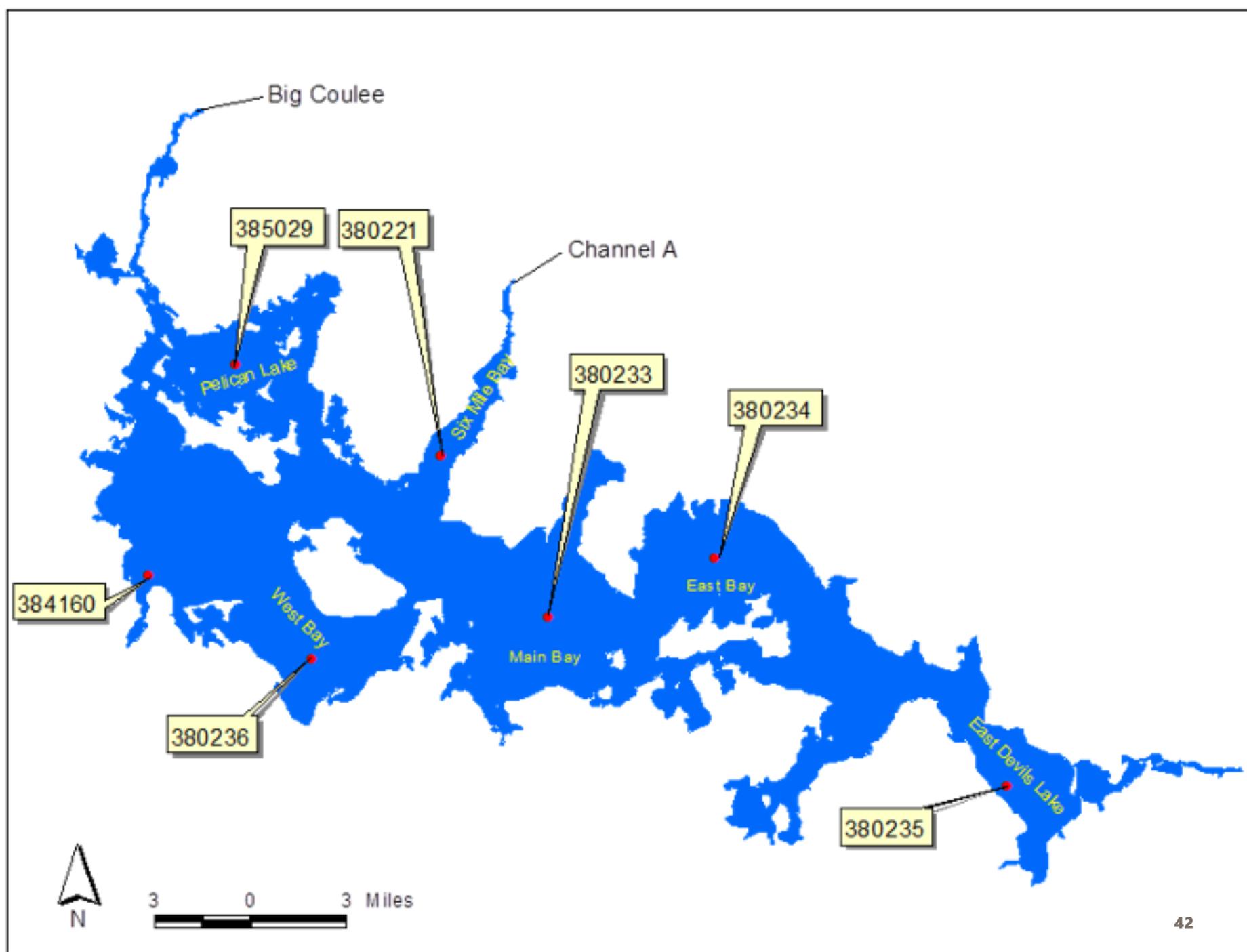
YAPING CHI, Devils Lake Engineer

2023 WATER QUALITY REVIEW

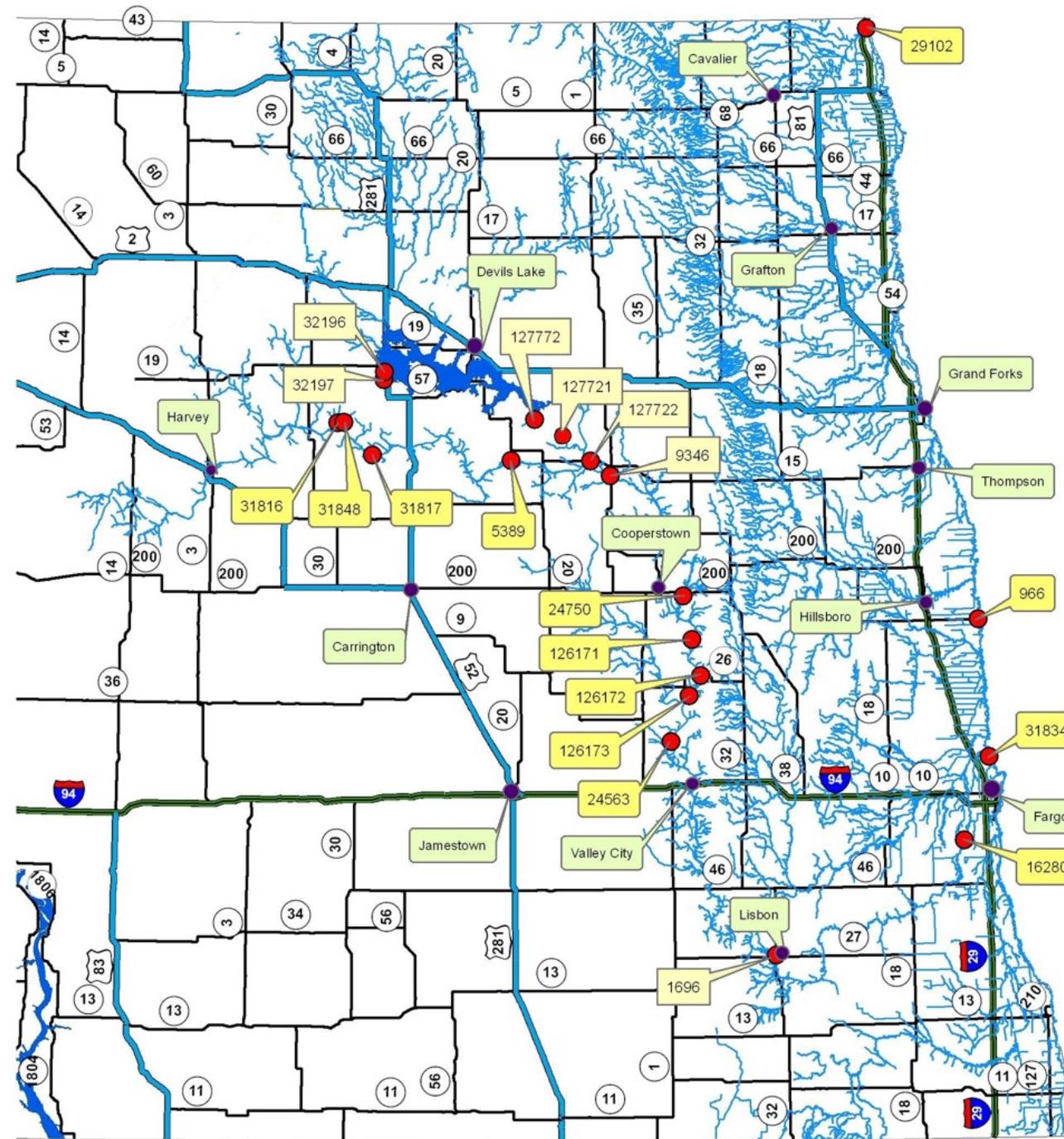
NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY



DEVILS LAKE SAMPLING SITES



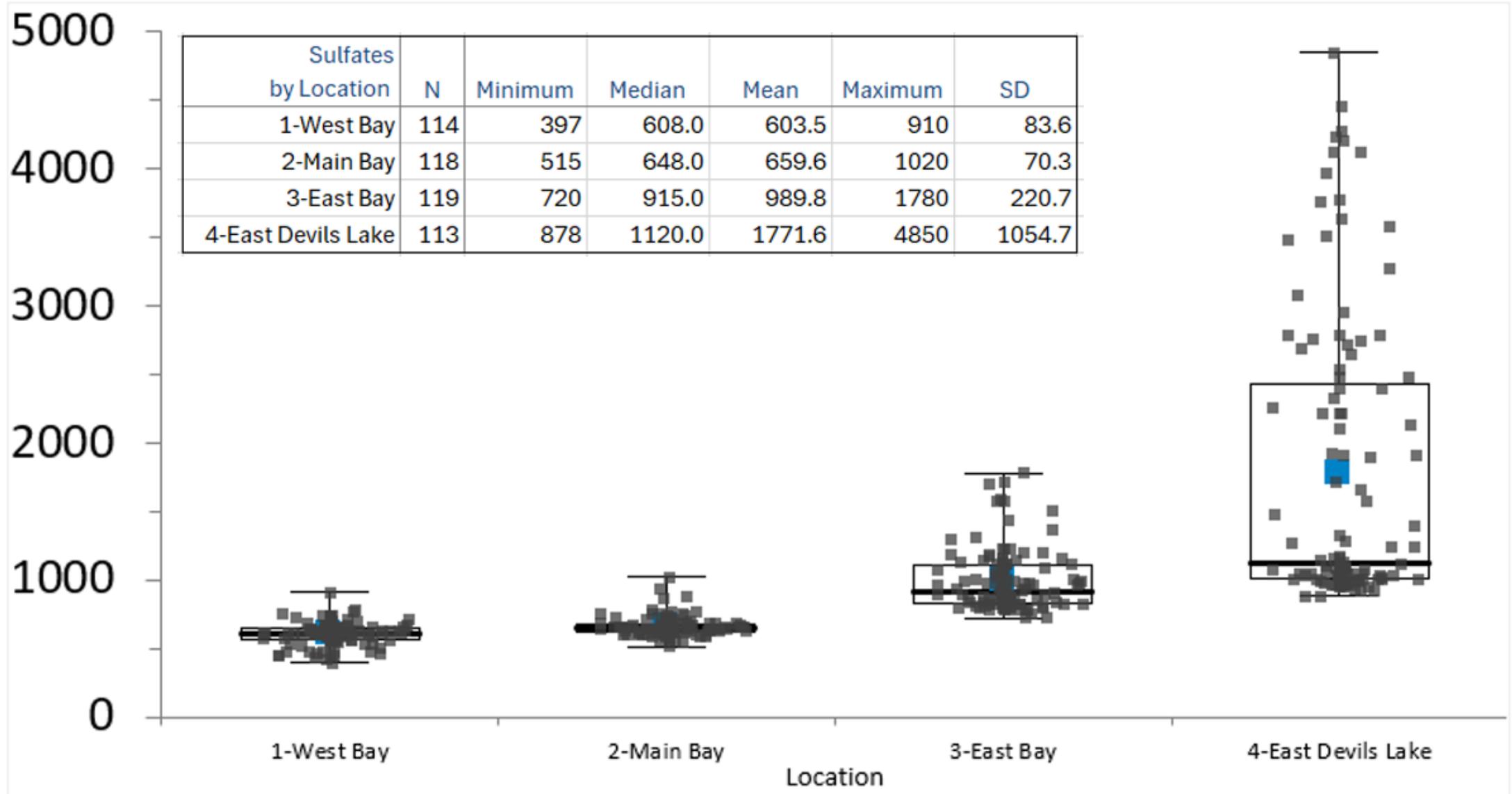
DEVILS LAKE OUTLET MONITORING SITES



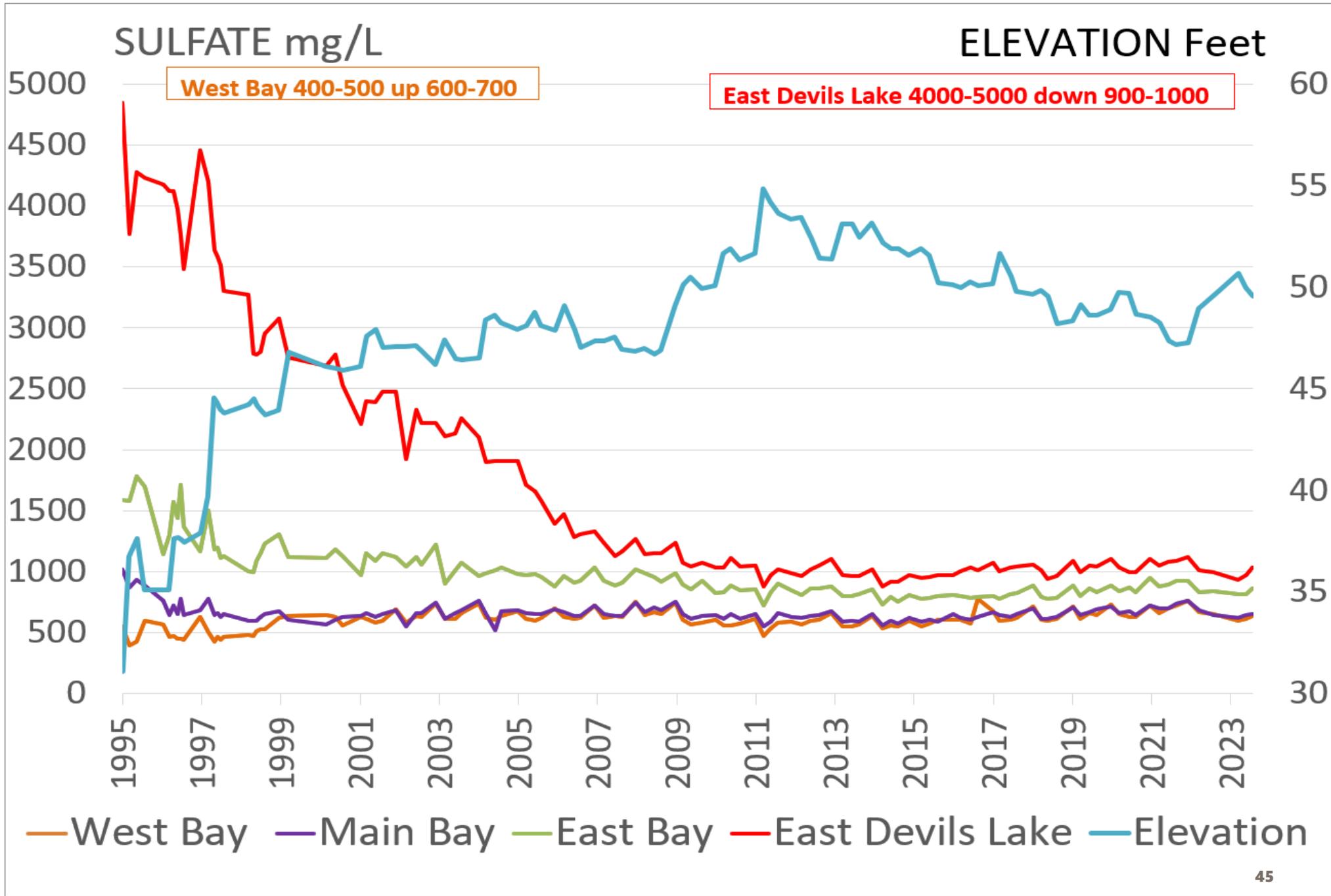
DEVILS LAKE OUTLET MONITORING SITES

- 381816 Sheyenne River Near Flora
- 32196 Devils Lake West Bay - South Of Minnewauken
- 32197 Round Lake Portion Of Devils Lake
- 31848 Devils Lake State Outlet
- 31817 Sheyenne River Near Bremen
- 5389 Sheyenne River Near Warwick
- 127772 East Devils Lake - East End Outlet Intake
- 127721 Devils Lake, East End Outlet
- 127722 Tolna Coulee at Tolna Dam
- 9346 Sheyenne River South of Pekin
- 24750 Sheyenne River Near Cooperstown
- 126171 Lake Ashtabula East Of Hannaford
- 126172 Lake Ashtabula At Sibley Crossing Bridge
- 126173 Lake Ashtabula Downstream Location At Ashtabula Crossing
- 24563 Sheyenne River Below Baldhill Dam
- 1696 Sheyenne River, North Side of Lisbon, ND
- 16280 Sheyenne River Near Horace
- 31834 Red River Near Harwood
- 966 Red River Near Halstad Mn
- 29102 Red River At Pembina

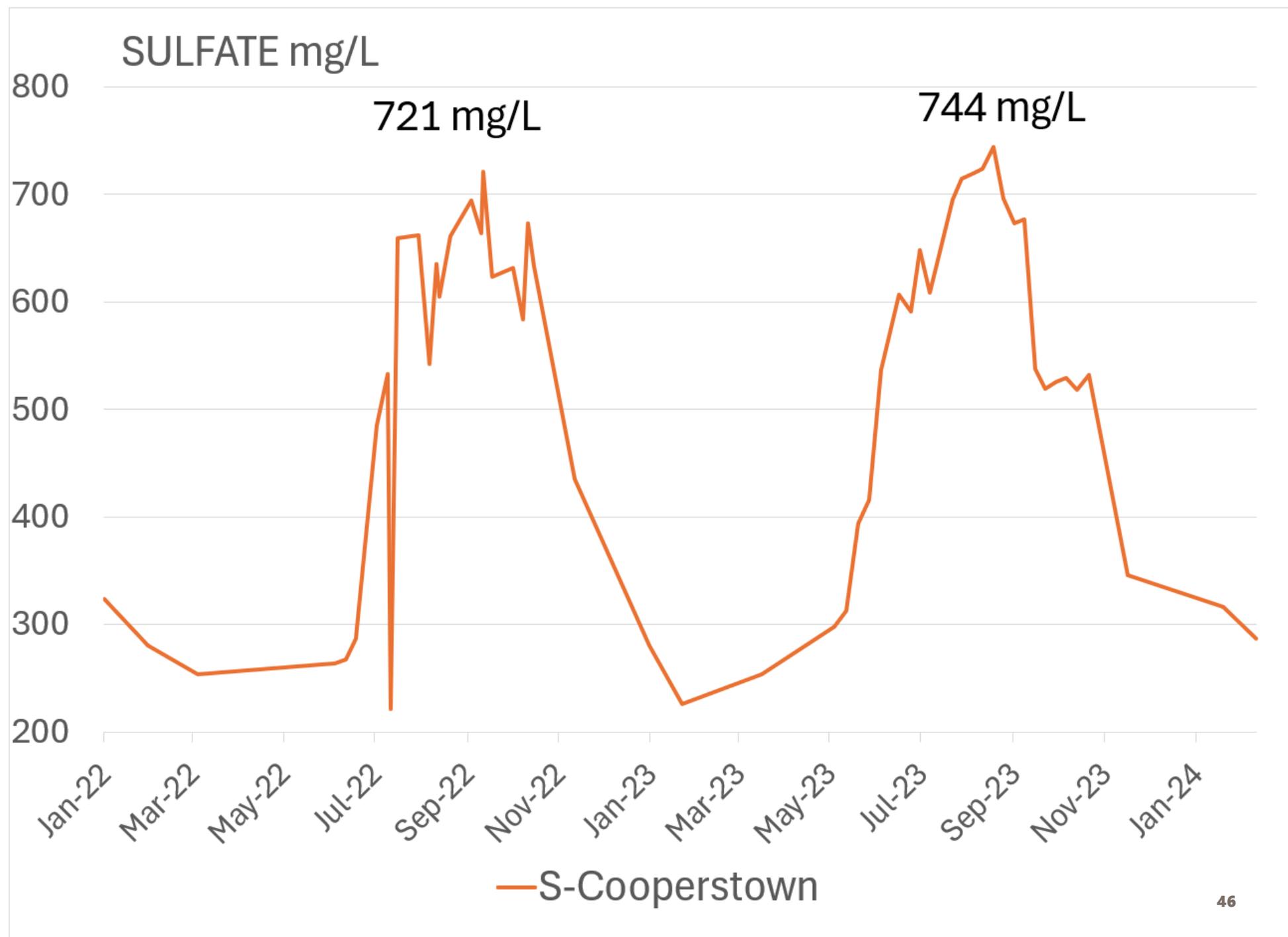
SULFATES DEVILS LAKE 1995-2024



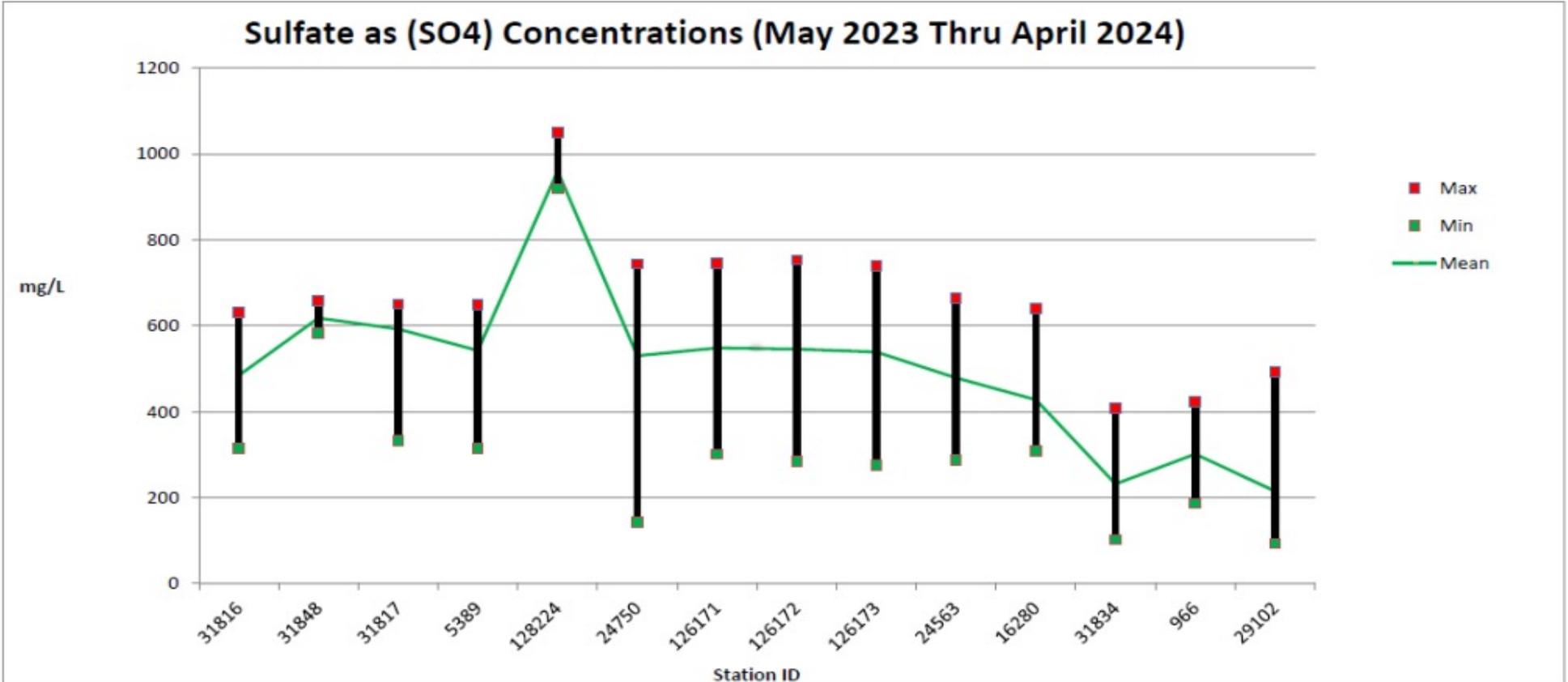
ELEVATION & SULFATES DEVILS LAKE 1995- 2024



SULFATES AT COOPERSTOWN 2022-2023



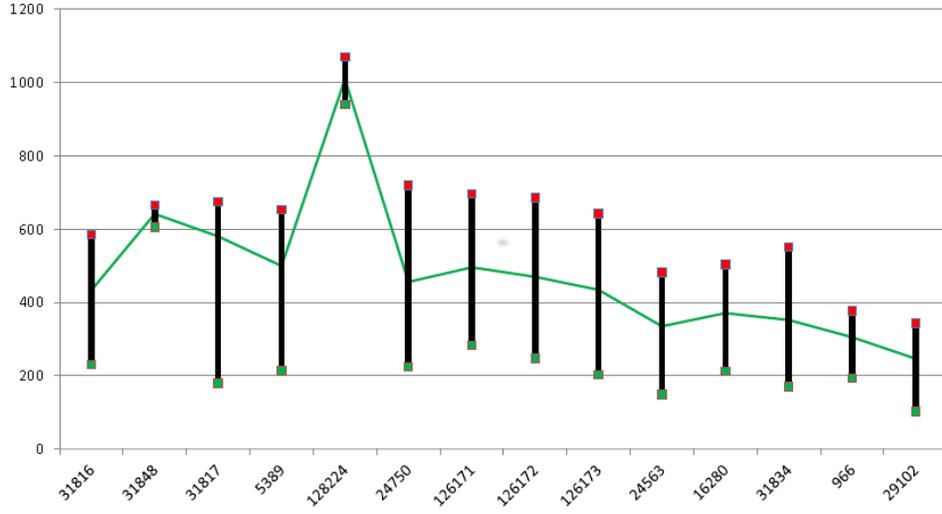
SULFATE ON THE SHEYENNE & RED RIVERS



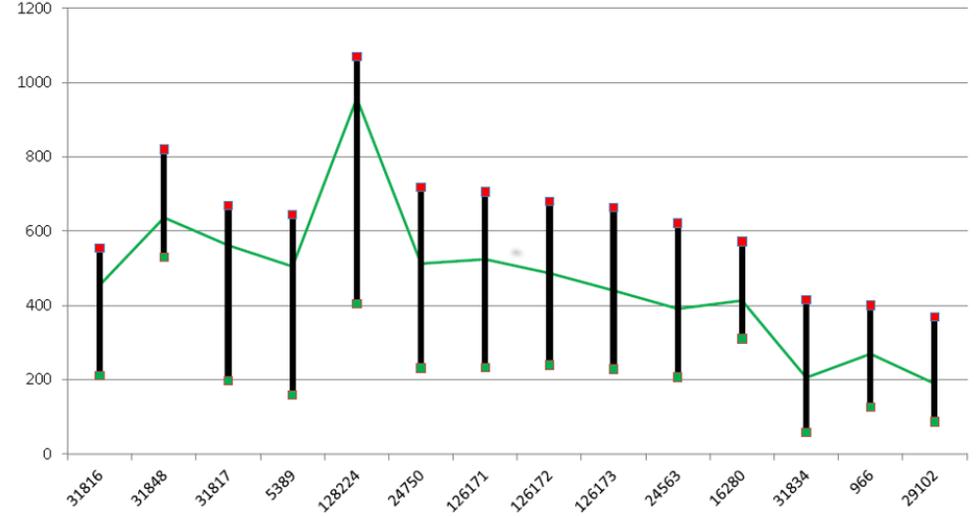
StationID	Station Description	Max	Min	Mean	Median	# Of Samples	LastCollectionDate	LastResult
31816	Sheyenne River Near Flora	631	314	484.12	479	43	24-Oct-23	467
31848	Devils Lake State Outlet	658	582	617.88	616	41	24-Oct-23	619
31817	Sheyenne River Near Bremen	651	333	592.12	604	43	24-Oct-23	615
5389	Sheyenne River Near Warwick	648	314	542.36	568.5	22	24-Oct-23	571
128224	East End Outlet at County Road 4	1050	919	959.67	949	27	15-Sep-23	1000
24750	Sheyenne River Near Cooperstown	744	143	530.00	537	27	19-Mar-24	143
126171	Lake Ashtabula East Of Hannaford	746	301	548.17	550.5	12	17-Oct-23	523
126172	Lake Ashtabula At Sibley Crossing Bridge	753	285	545.25	584.5	12	17-Oct-23	557
126173	Lake Ashtabula Downstream Location At Ashtabula	739	275	538.75	597	12	17-Oct-23	645
24563	Sheyenne River Below Baldhill Dam	664	288	478.85	480	27	19-Mar-24	598
16280	Sheyenne River Near Horace	640	309	427.93	419	27	19-Mar-24	334
31834	Red River Near Harwood	408	102	231.76	239	17	19-Mar-24	215
966	Red River Near Halstad Mn	424	187	301.06	301	17	19-Mar-24	187
29102	Red River At Pembina	492	93.3	215.02	199.5	18	12-Mar-24	197

SULFATE MONITORING

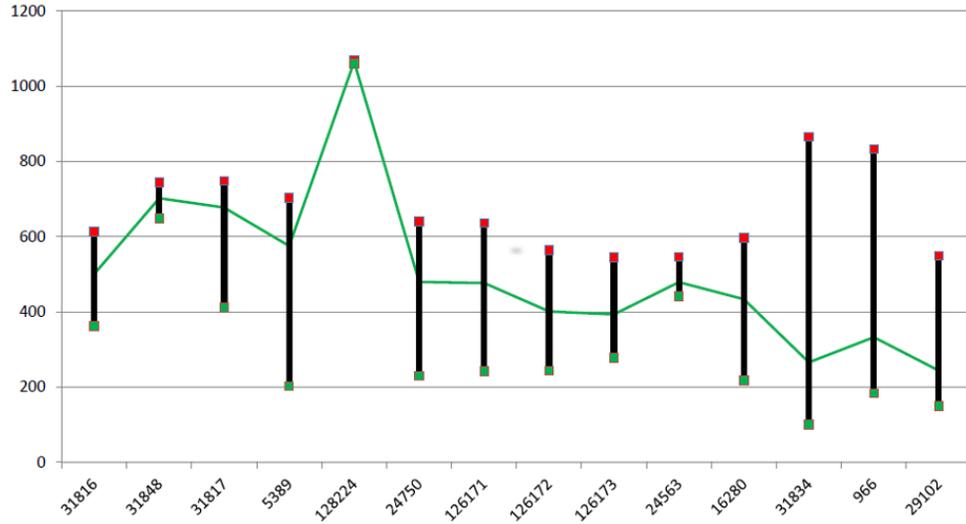
Sulfate as (SO₄) Concentrations (May 2019 Thru April 2020)



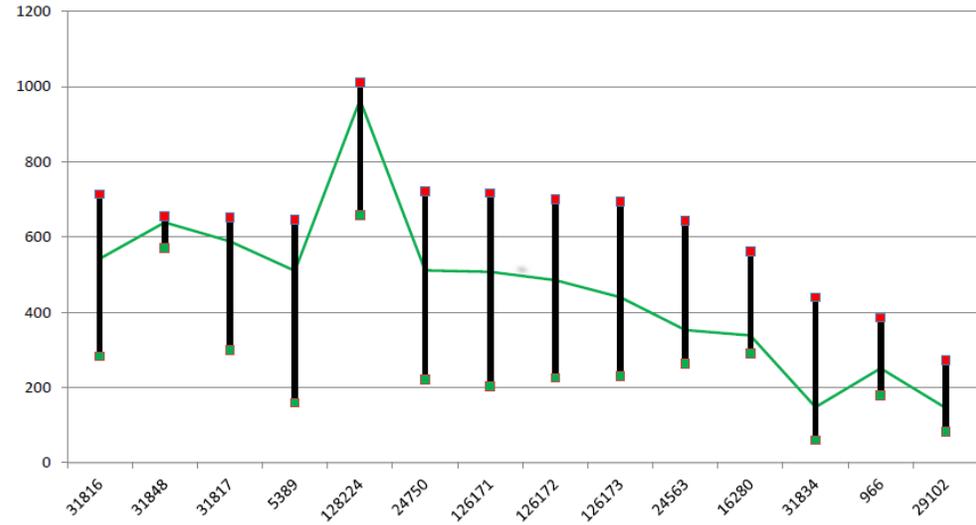
Sulfate as (SO₄) Concentrations (May 2020 Thru April 2021)



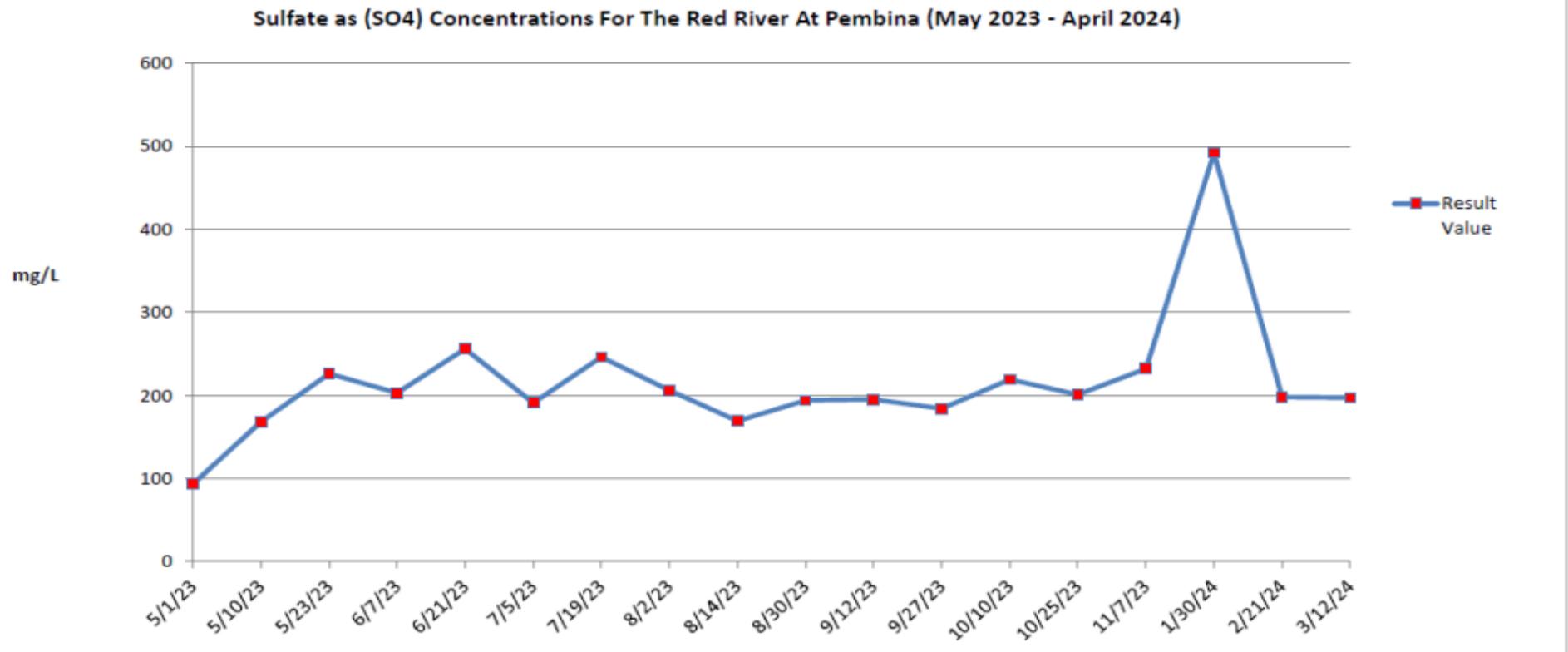
Sulfate as (SO₄) Concentrations (May 2021 Thru April 2022)



Sulfate as (SO₄) Concentrations (May 2022 Thru April 2023)



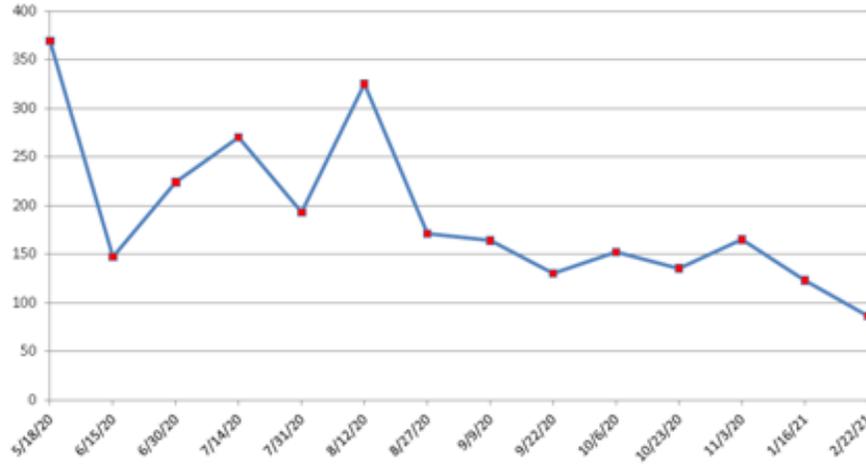
SULFATES AT PEMBINA



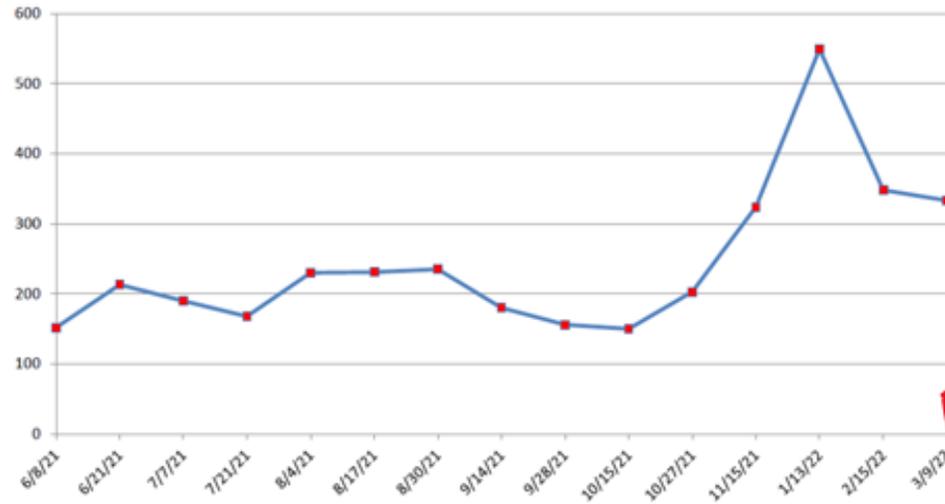
Date	Station Description	Result Value
1-May-23	Red River At Pembina (Station ID 29102)	93.3
10-May-23	Red River At Pembina (Station ID 29102)	168
23-May-23	Red River At Pembina (Station ID 29102)	226
7-Jun-23	Red River At Pembina (Station ID 29102)	203
21-Jun-23	Red River At Pembina (Station ID 29102)	256
5-Jul-23	Red River At Pembina (Station ID 29102)	191
19-Jul-23	Red River At Pembina (Station ID 29102)	246
2-Aug-23	Red River At Pembina (Station ID 29102)	206
14-Aug-23	Red River At Pembina (Station ID 29102)	169
30-Aug-23	Red River At Pembina (Station ID 29102)	194
12-Sep-23	Red River At Pembina (Station ID 29102)	195
27-Sep-23	Red River At Pembina (Station ID 29102)	184
10-Oct-23	Red River At Pembina (Station ID 29102)	219
25-Oct-23	Red River At Pembina (Station ID 29102)	201
7-Nov-23	Red River At Pembina (Station ID 29102)	232
30-Jan-24	Red River At Pembina (Station ID 29102)	492
21-Feb-24	Red River At Pembina (Station ID 29102)	198
12-Mar-24	Red River At Pembina (Station ID 29102)	197

SULFATE AT PEMBINA MAY 2020 – MARCH 2024

Sulfate as (SO4) Concentrations For The Red River At Pembina (May 2020 - April 2021)

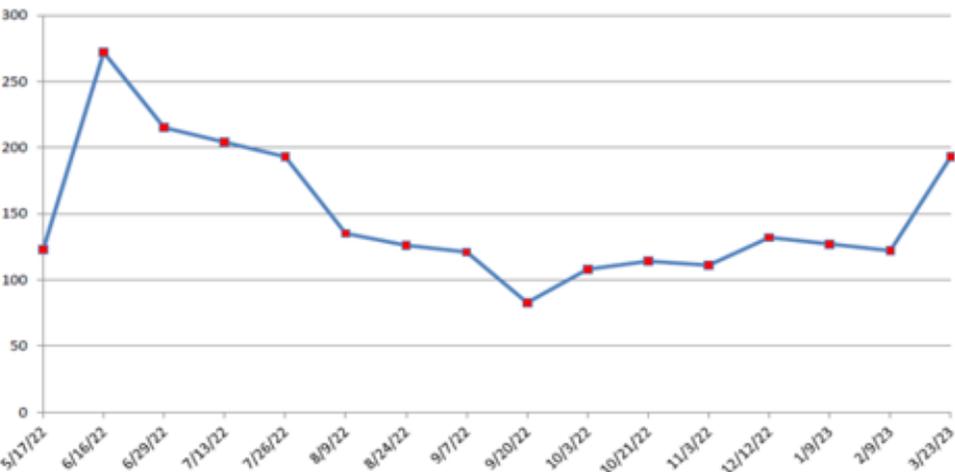


Sulfate as (SO4) Concentrations For The Red River At Pembina (May 2021 - April 2022)



Year	Maximum
19-20	343
20-21	369
21-22	545
22-23	272
23-24	492

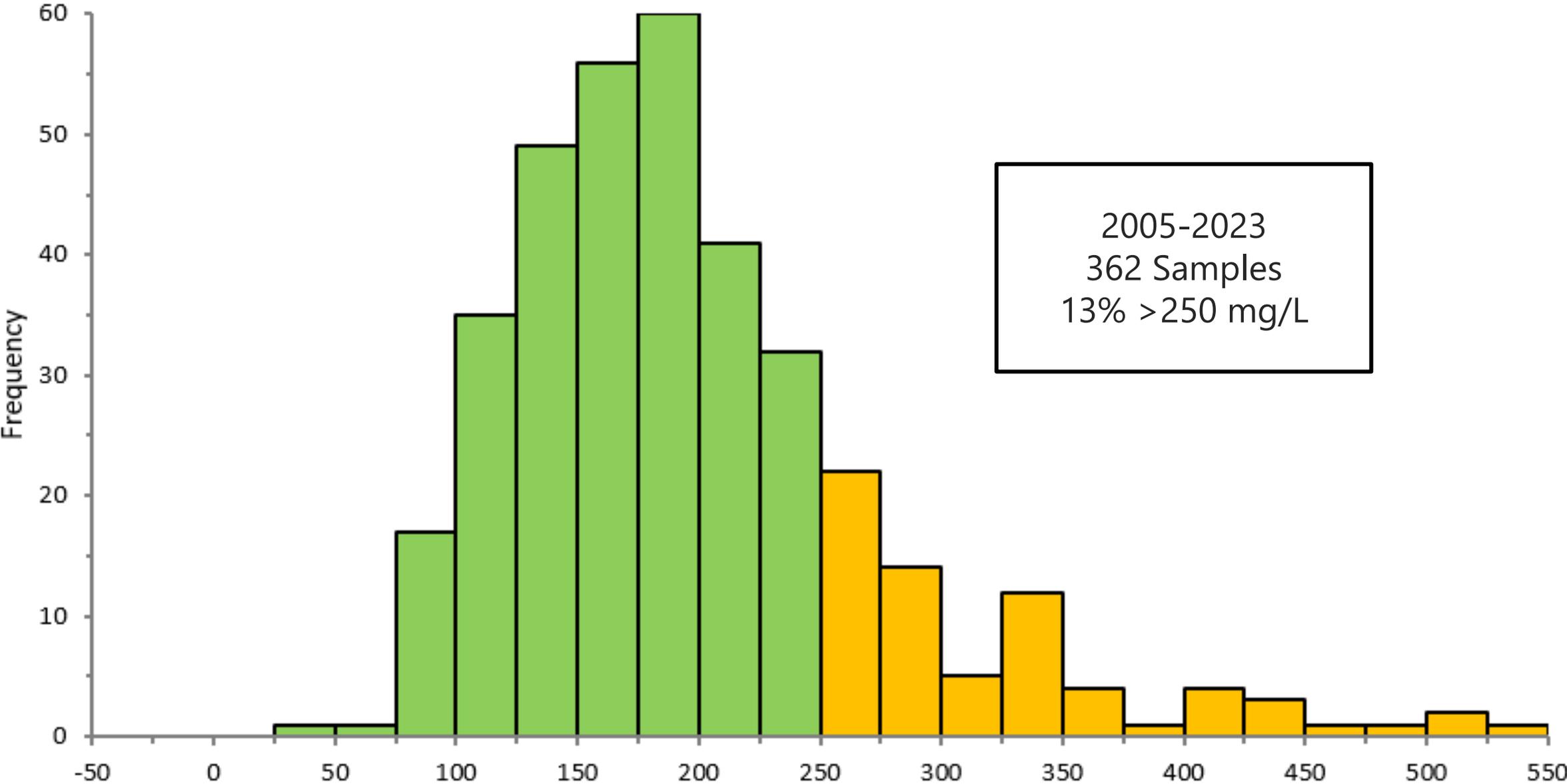
Sulfate as (SO4) Concentrations For The Red River At Pembina (May 2022 - April 2023)



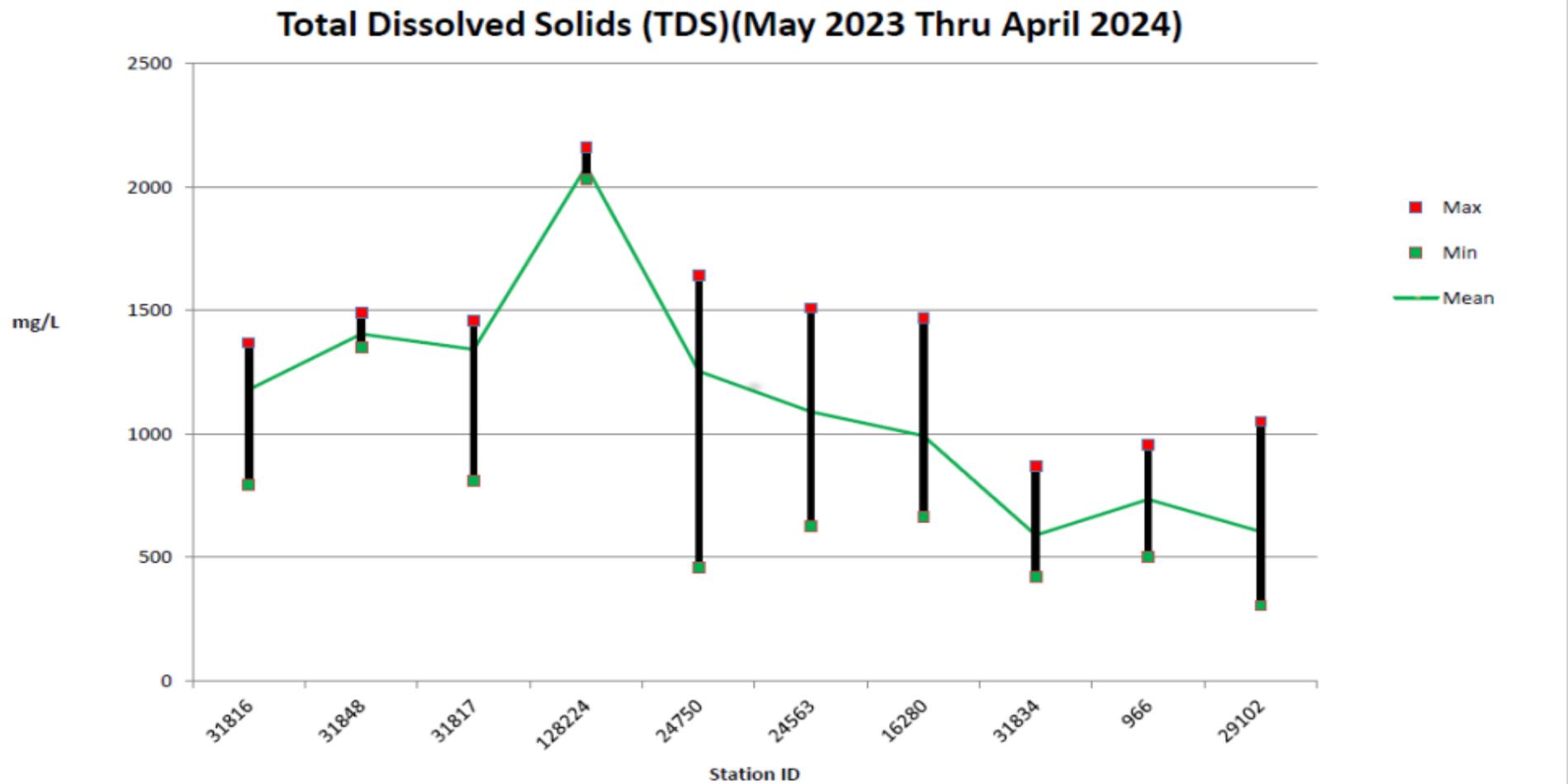
Sulfate as (SO4) Concentrations For The Red River At Pembina (May 2023 - April 2024)



SULFATE AT PEMBINA FREQUENCY

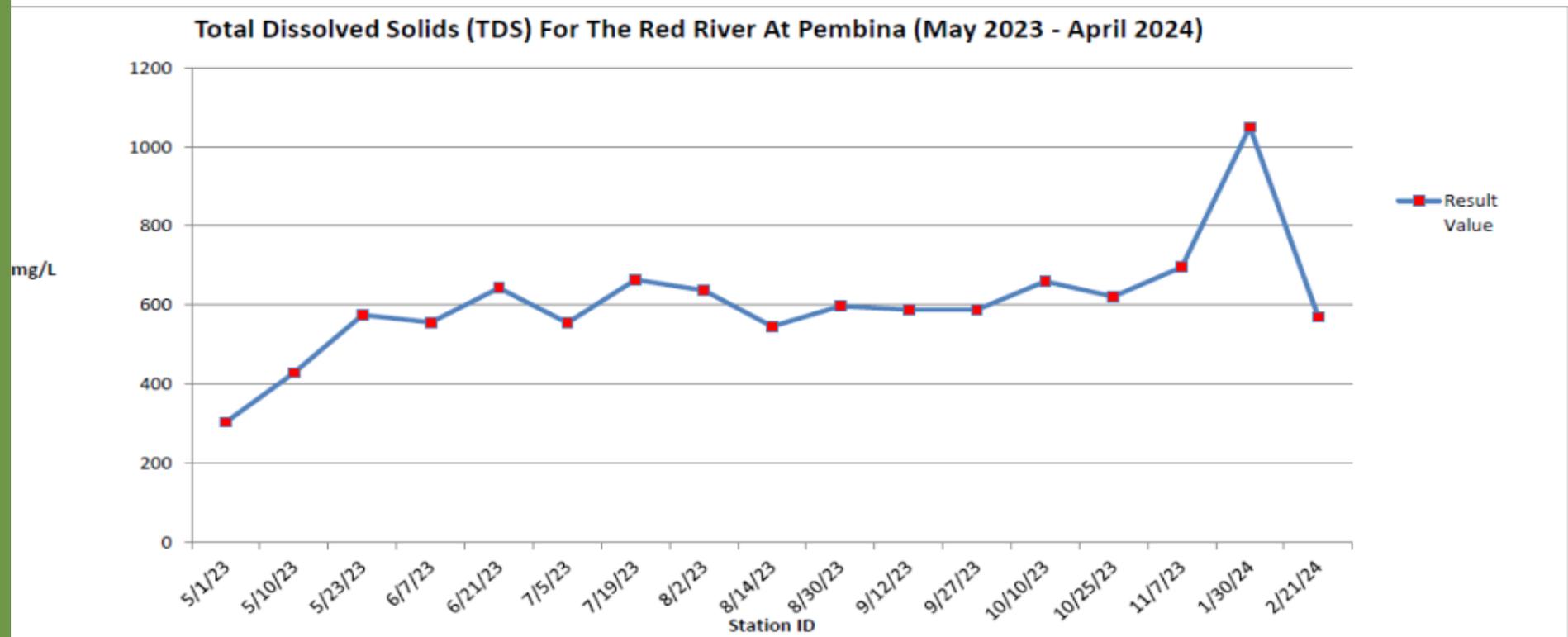


TOTAL DISSOLVED SOLIDS SHEYENNE & RED RIVER



StationID	Station Description	Max	Min	Mean	Median	# Of Samples	LastCollectionDate	LastResult
31816	Sheyenne River Near Flora	1370	794	1179.77	1200	22	24-Oct-23	1210
31848	Devils Lake State Outlet	1490	1350	1404.00	1400	20	24-Oct-23	1410
31817	Sheyenne River Near Bremen	1460	811	1342.32	1390	22	24-Oct-23	1420
128224	East End Outlet at County Road 4	2160	2030	2083.08	2070	13	12-Sep-23	2130
24750	Sheyenne River Near Cooperstown	1640	458	1254.04	1250	27	19-Mar-24	458
24563	Sheyenne River Below Baldhill Dam	1510	624	1089.07	1110	27	19-Mar-24	1270
16280	Sheyenne River Near Horace	1470	663	991.67	981	27	19-Mar-24	794
31834	Red River Near Harwood	867	420	589.12	555	17	19-Mar-24	541
966	Red River Near Halstad Mn	954	501	734.00	736	17	19-Mar-24	501
29102	Red River At Pembina	1050	304	603.28	588	18	12-Mar-24	580

TOTAL DISSOLVED SOLIDS AT PEMBINA



Date	Station Description	Result Value
01-May-23	Red River At Pembina (Station ID 29102)	304
10-May-23	Red River At Pembina (Station ID 29102)	429
23-May-23	Red River At Pembina (Station ID 29102)	575
07-Jun-23	Red River At Pembina (Station ID 29102)	556
21-Jun-23	Red River At Pembina (Station ID 29102)	643
05-Jul-23	Red River At Pembina (Station ID 29102)	555
19-Jul-23	Red River At Pembina (Station ID 29102)	664
02-Aug-23	Red River At Pembina (Station ID 29102)	637
14-Aug-23	Red River At Pembina (Station ID 29102)	546
30-Aug-23	Red River At Pembina (Station ID 29102)	597
12-Sep-23	Red River At Pembina (Station ID 29102)	588
27-Sep-23	Red River At Pembina (Station ID 29102)	588
10-Oct-23	Red River At Pembina (Station ID 29102)	660
25-Oct-23	Red River At Pembina (Station ID 29102)	621
7-Nov-23	Red River At Pembina (Station ID 29102)	696
30-Jan-24	Red River At Pembina (Station ID 29102)	1050
21-Feb-24	Red River At Pembina (Station ID 29102)	570

A large brown bear stands on its hind legs on the left side of the frame, looking towards the right. In the lower right corner, two children are sitting on the ground, leaning against a red and white striped basket. The child on the left wears a white beanie and a red jacket, while the child on the right wears a blue beanie and a blue jacket. They appear to be in a forest with birch trees and dry grass. A green banner with the word "QUESTIONS?" is overlaid on the right side of the image.

QUESTIONS?



FINAL COMMENTS

THANK YOU



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