MAY 7, 2025

DEVILS LAKE
OUTLETS MANAGEMENT ADVISORY COMMITTEE UPDATE

NORTH DAKOTA DWR

NORTH Dakota | Water Resources
Be Legendary.

INTRODUCTION

Introduction
Reice Haase, Director, NDDWR

Legislative Update
Reice Haase, Director, NDDWR

Devils Lake Basin Overview
Reice Haase, Director, NDDWR

National Weather Service Situational Update
Amanda Lee, Service Hydrologist, NWS Grand Forks

2024 Water Quality Review
Tate Libunao, NDDEQ

2024 Operational Summary
Yaping Chi, Devils Lake Engineer, NDDWR

Devils Lake Outlets Engineering Service
Yaping Chi, Devils Lake Engineer, NDDWR

2025 Outlet Operations Outlook
Yaping Chi, Devils Lake Engineer, NDDWR

Status By Committee Members

Questions & Answers

LEGISLATIVE UPDATE

Senate Bill 2308

Eliminated DLOMAC

Clarified DWR's Role In The Management Of The Devils Lake Outlets

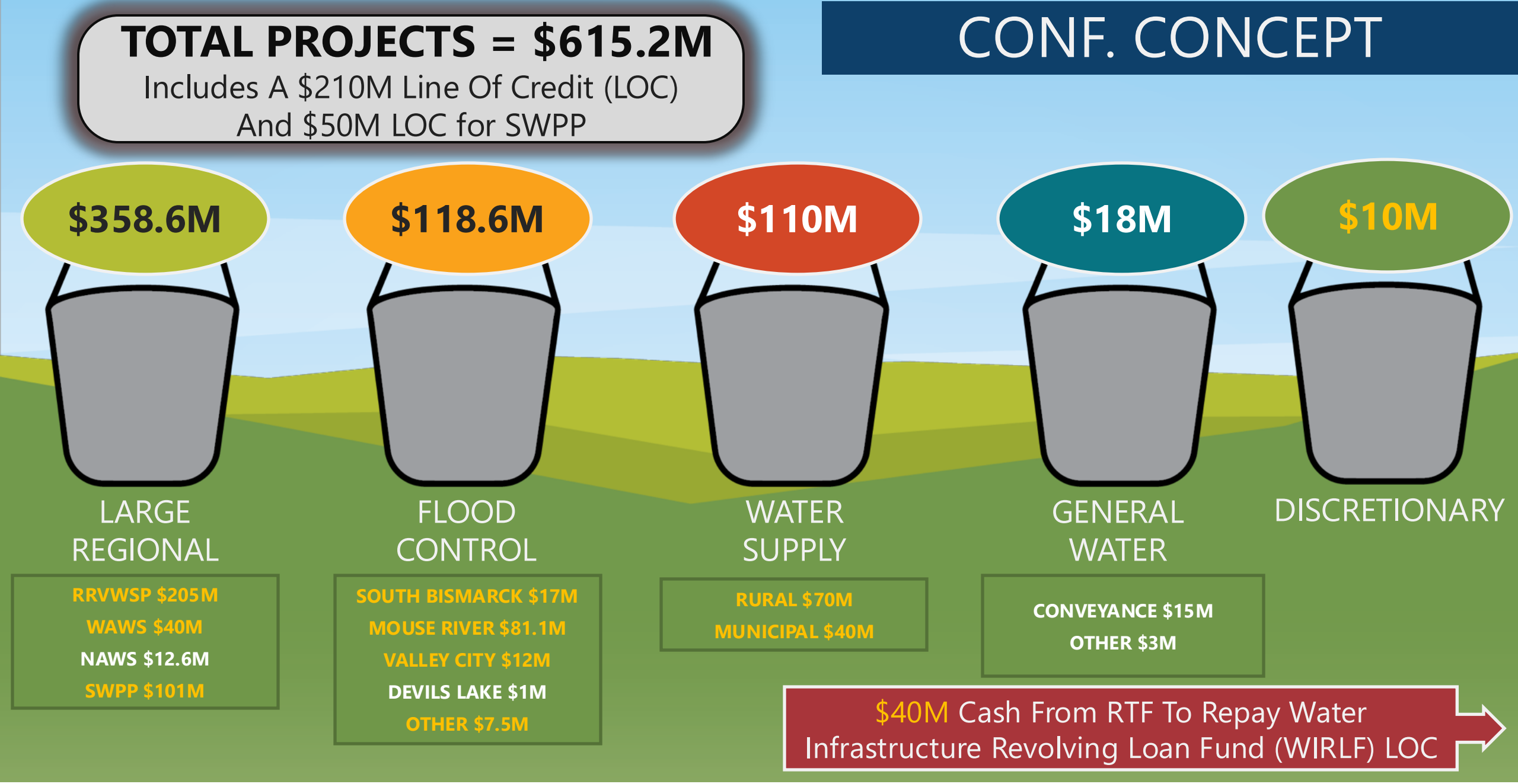
Becomes Effective On **August 1, 2025**

Governor's Designee	Reice Haase
MN Representative	Katrina Kessler
Towner County	Joel Anderson
City of Fargo	Bruce Grubb
City of Grand Forks	Kenneth Vein
City of Lisbon	Tim Meyer
Spirit Lake Nation	Lonna Jackson-Street
Benson County	Tammy Kuk
Ramsey County	Vacant
Nelson County	Ben Varnson
City of Valley City	Gwendolyn Crawford
Manitoba, Canada	Nicole Armstrong
Barnes County	Cindy Schwehr
Devils Lake Basin Joint Water Resource Board	Jeff Frith
City of Devils Lake	Dick Johnson
ND State Senate	Senator Terry Wanzek

CONF. CONCEPT

TOTAL PROJECTS = $615.2M

Includes A $210M Line Of Credit (LOC)
And $50M LOC for SWPP



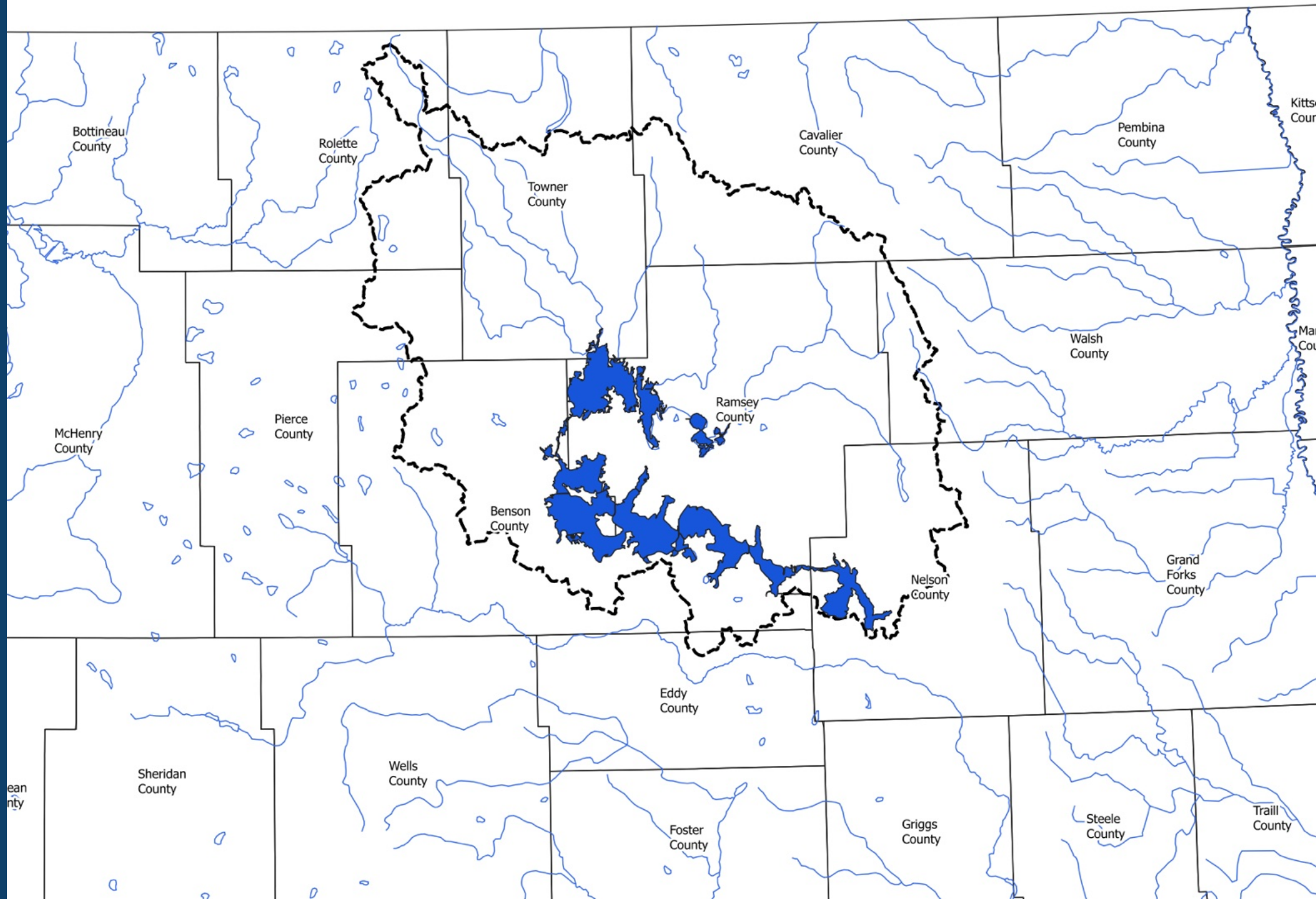
$40M Cash From RTF To Repay Water Infrastructure Revolving Loan Fund (WIRLF) LOC

2025-2027 RESOURCES TRUST FUND (RTF) BUCKETS

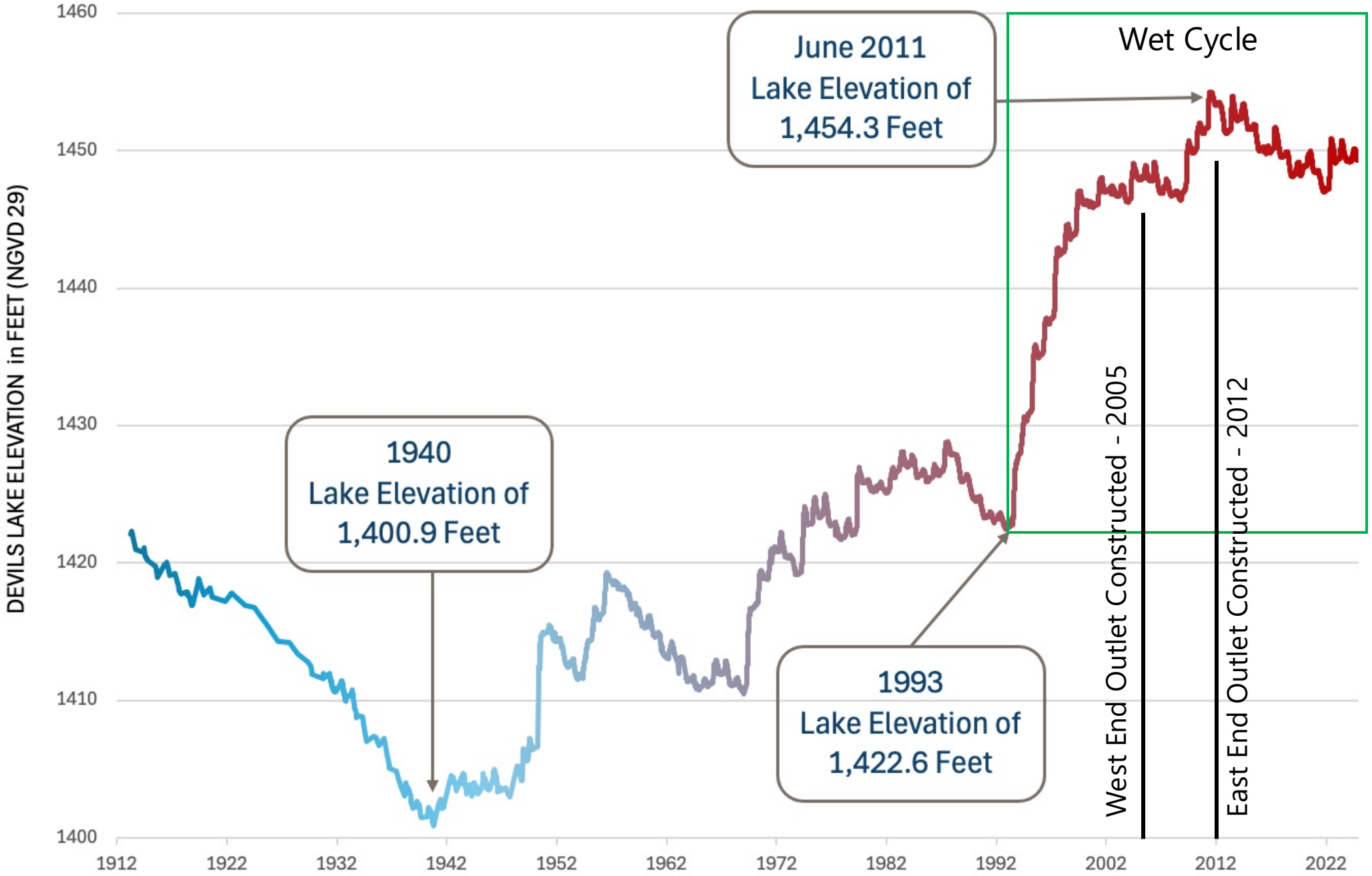
DEVILS LAKE BASIN OVERVIEW

REICE HAASE, DIRECTOR

DEVILS LAKE BASIN MAP



DEVILS LAKE WATER SURFACE ELEVATION TIMELINE



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

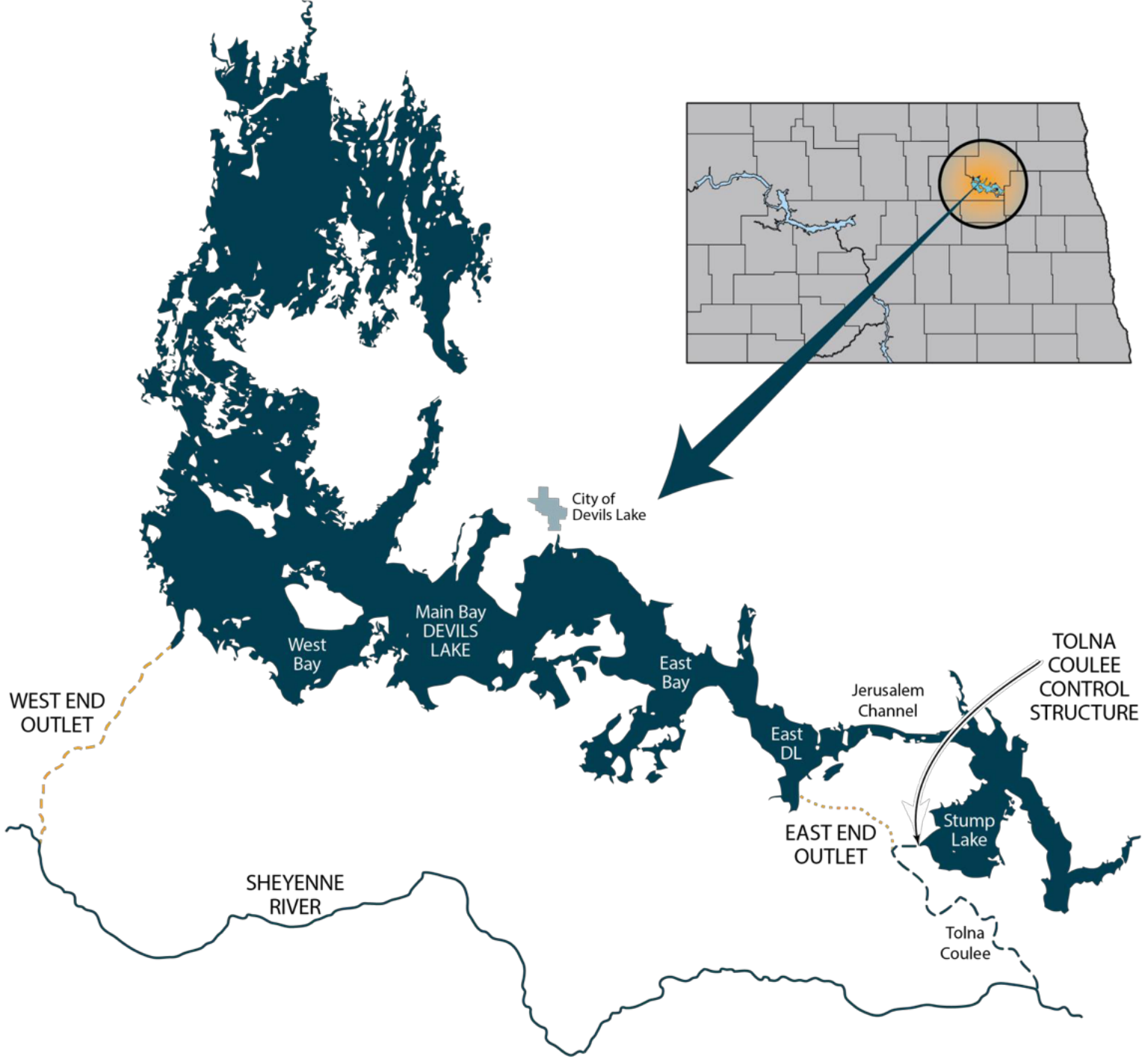
DEVILS LAKE OUTLET TIMELINE

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 OUTLETS LOCATION MAP



NATIONAL WEATHER SERVICE UPDATE

Amanda Lee

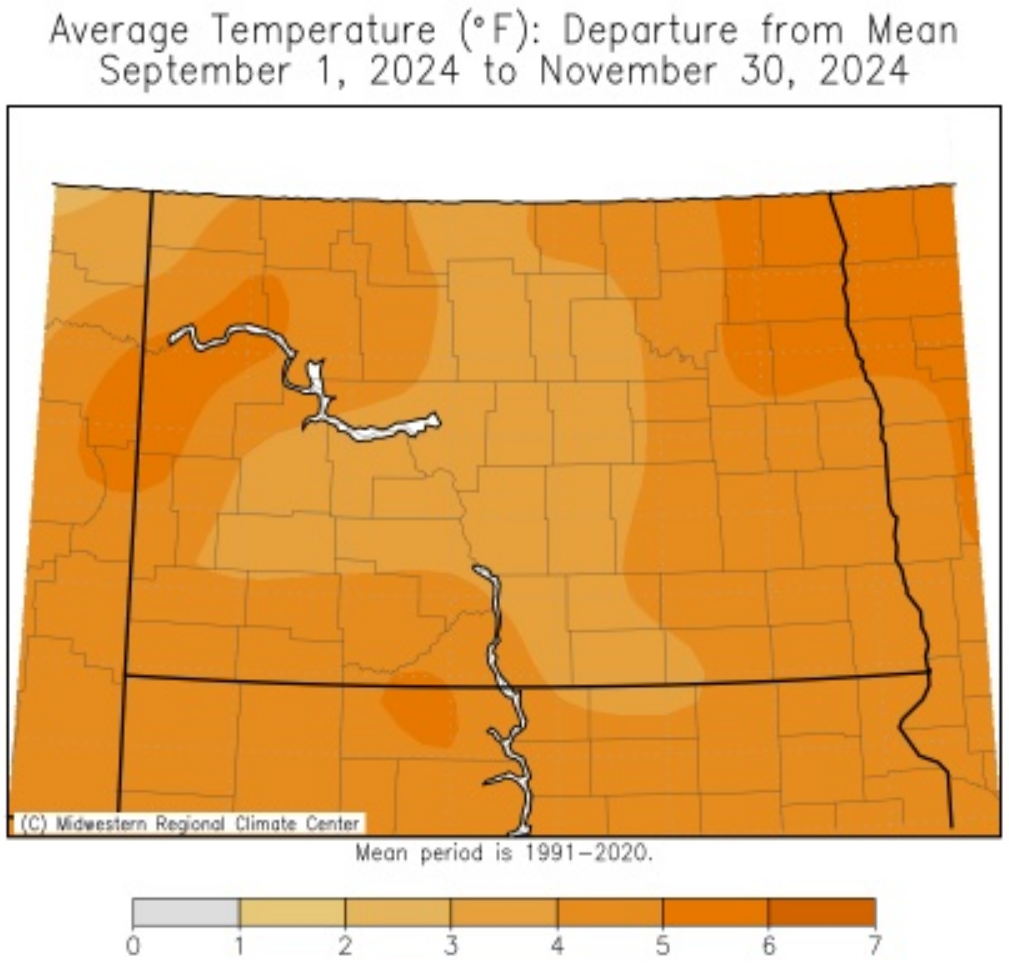
NWS Grand Forks

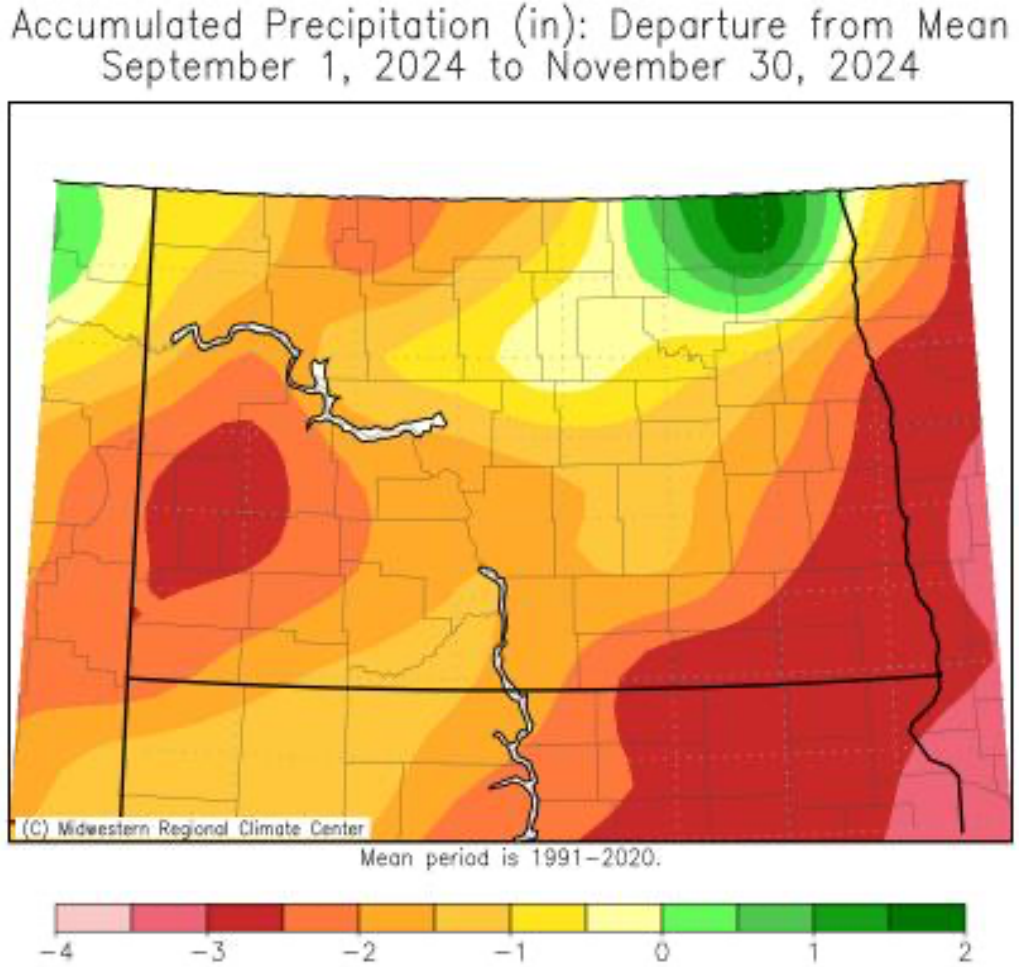
amanda.lee@noaa.gov

OVERVIEW

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

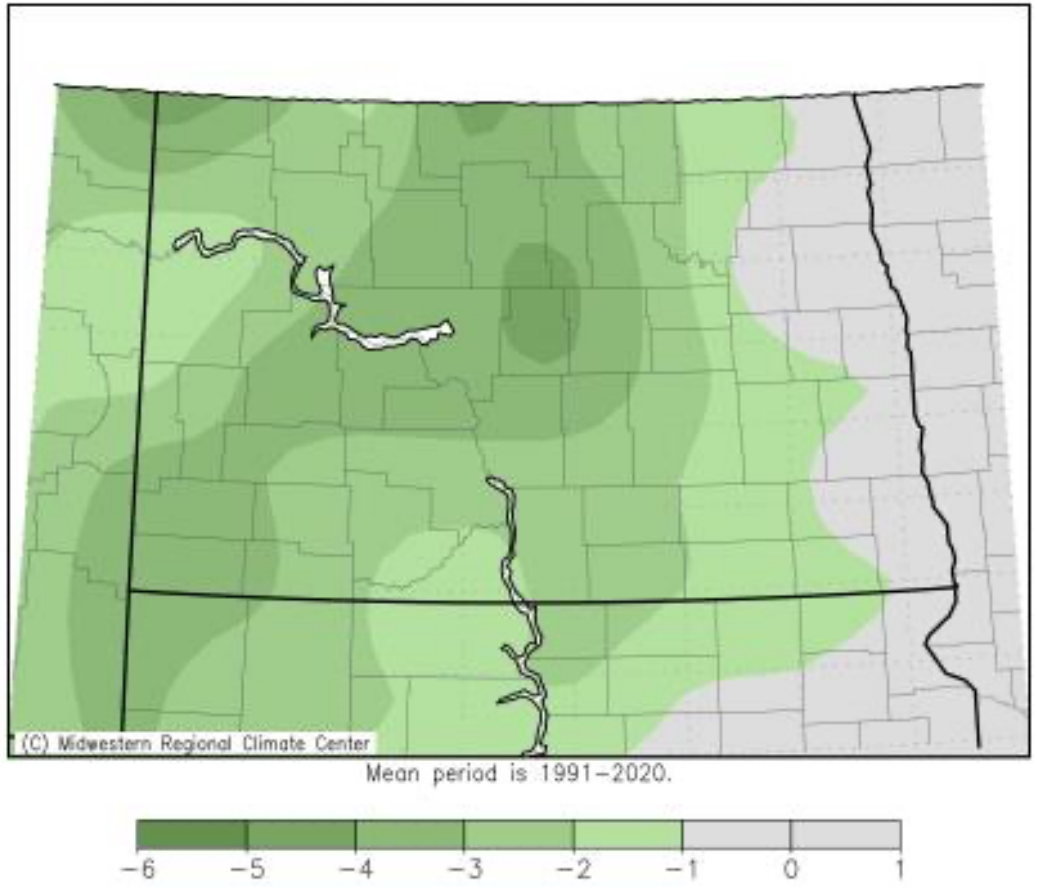
FALL TEMPERATURES AND PRECIPITATION (September - November 2024)



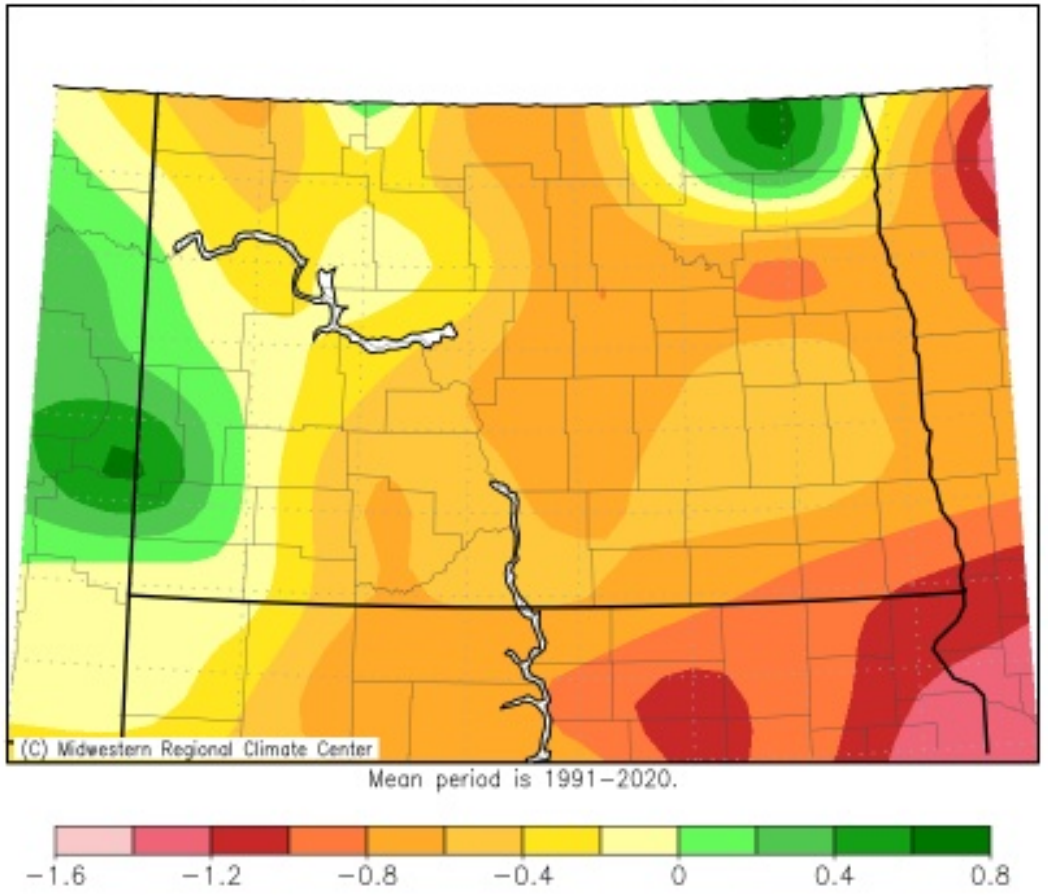


WINTER TEMPERATURES AND PRECIPITATION (December 2024 - February 2025)

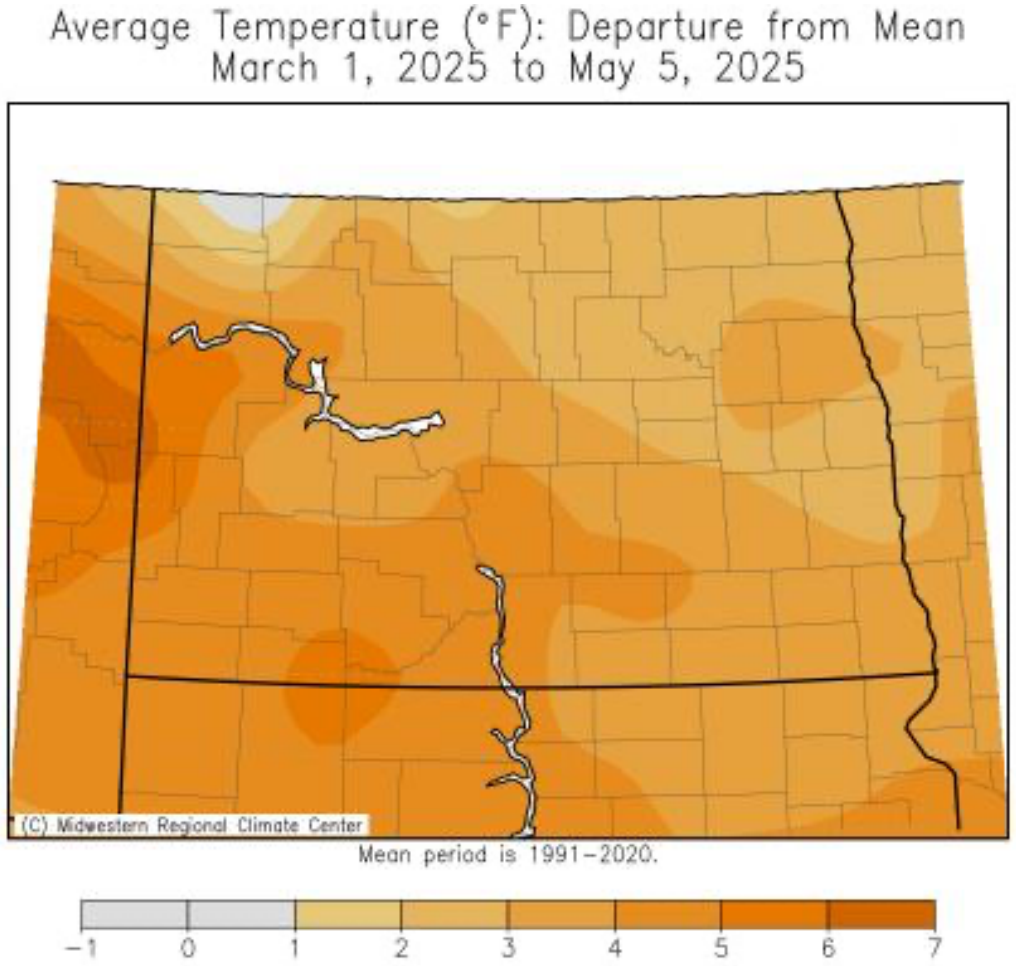
Average Temperature (°F): Departure from Mean
December 1, 2024 to February 28, 2025

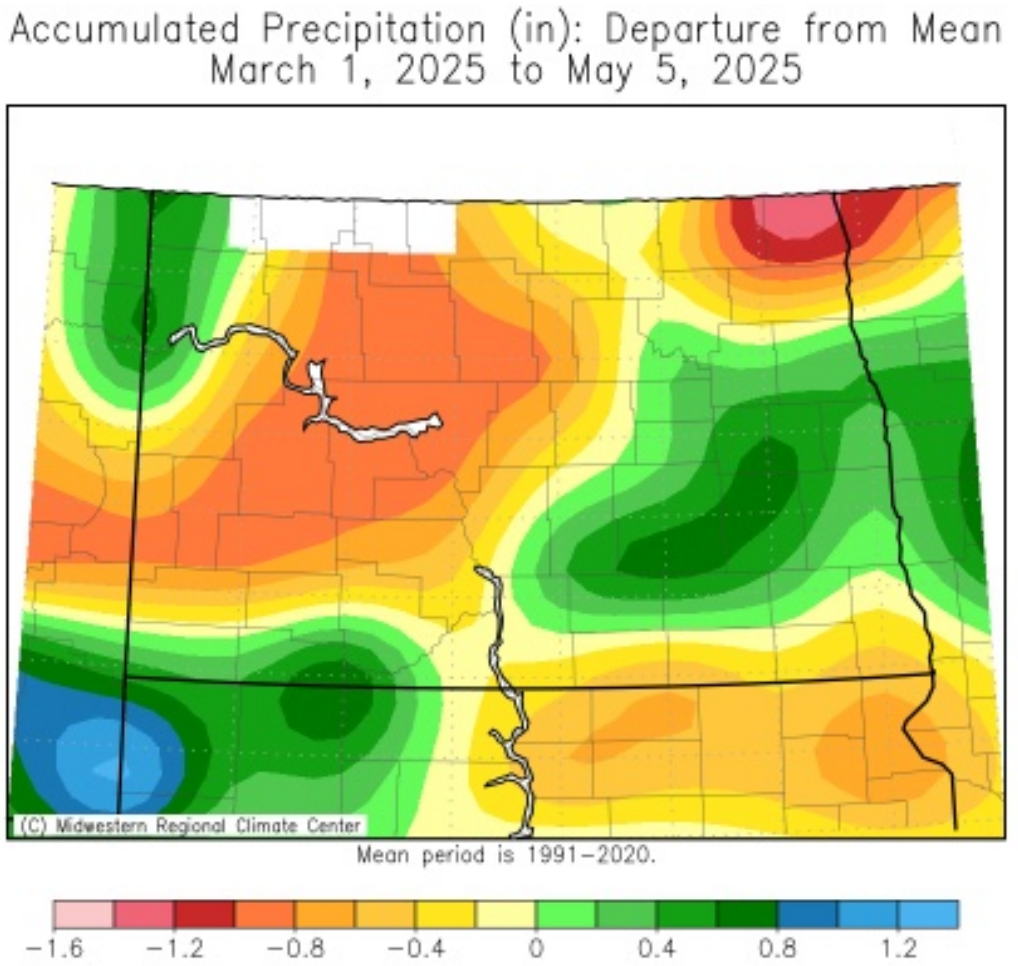


Accumulated Precipitation (in): Departure from Mean
December 1, 2024 to February 28, 2025

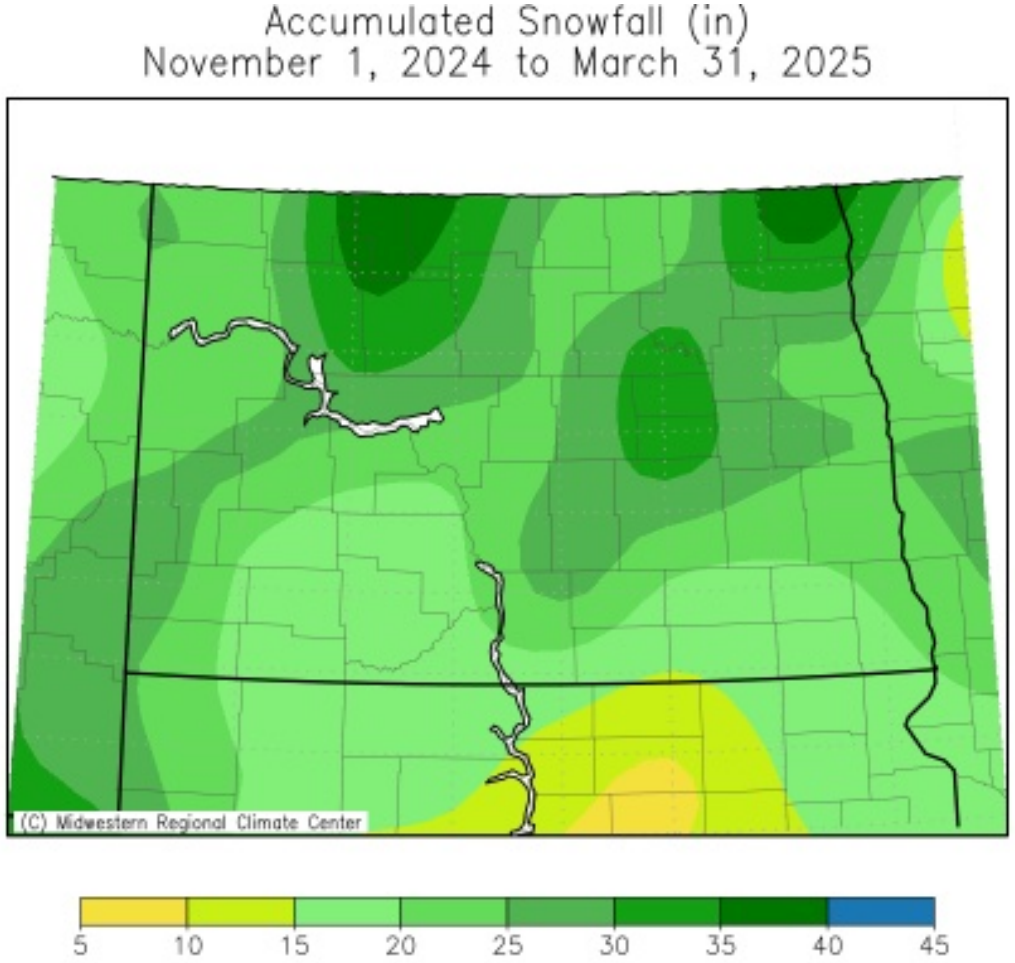


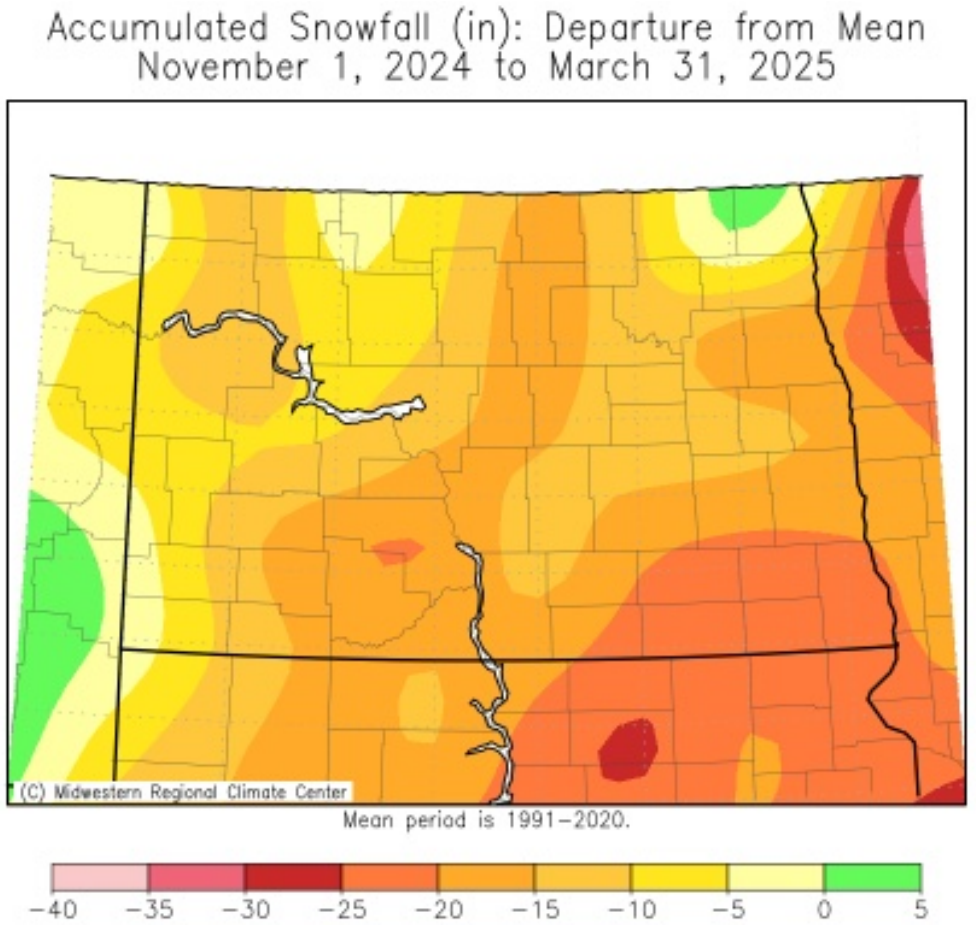
SPRING TEMPERATURES AND PRECIPITATION (March 1, 2025 – May 5, 2025)



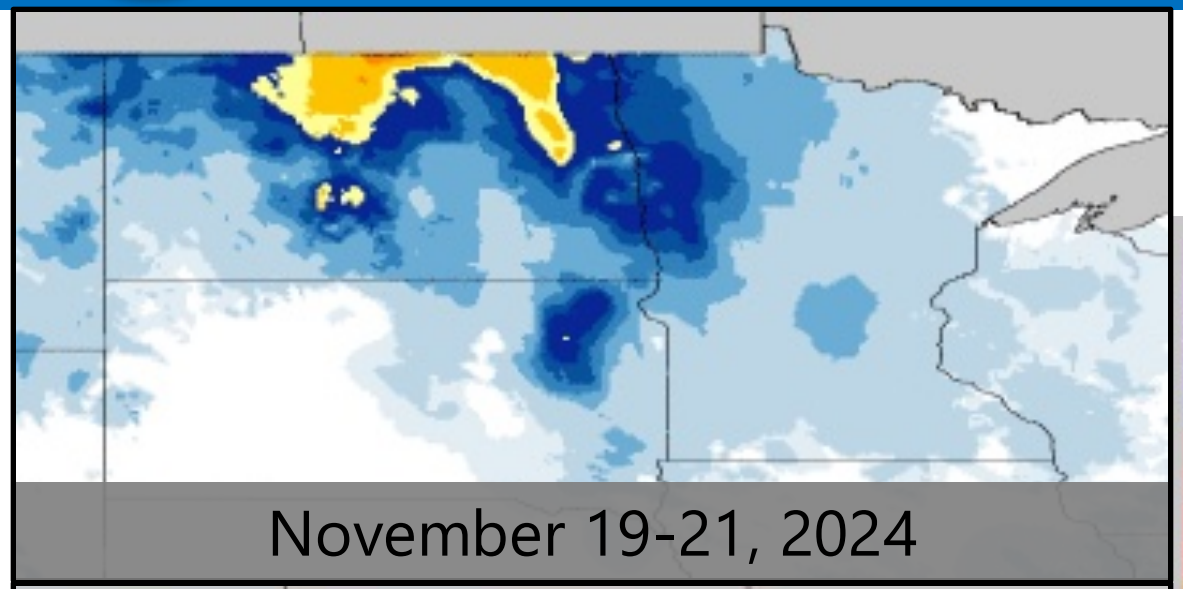


“COLD SEASON” SNOWFALL (November 2024 - March 2025)

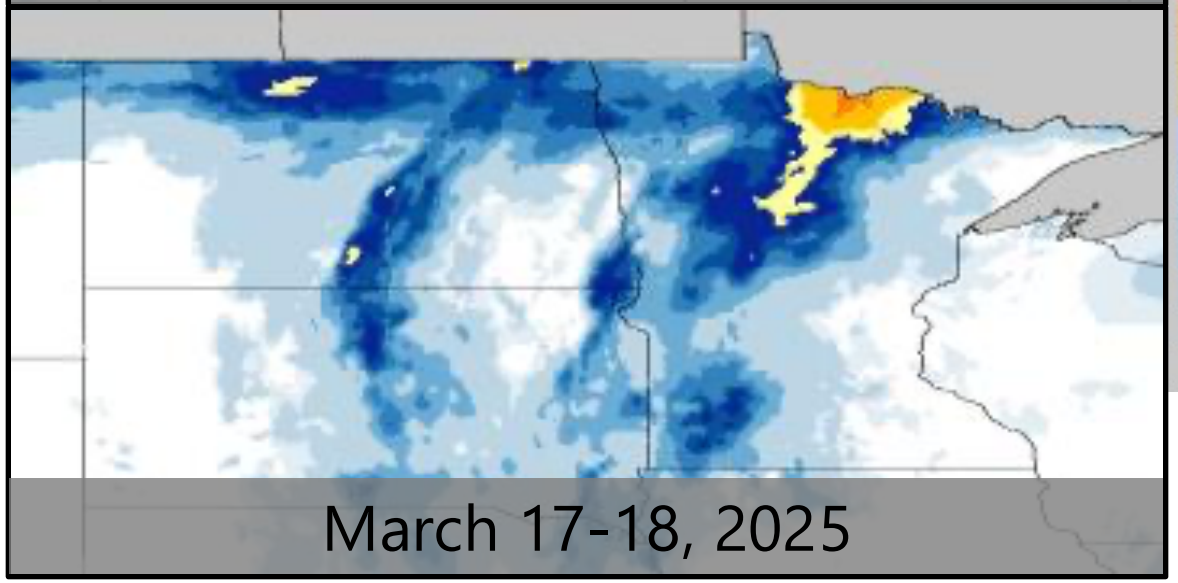




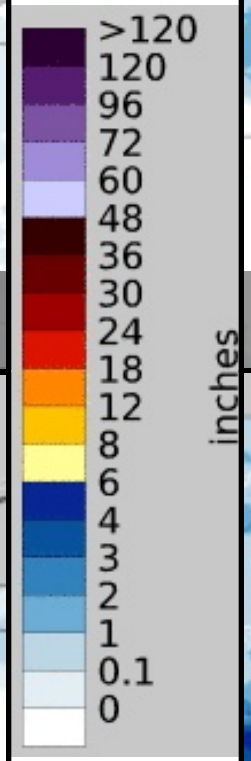
LARGEST 2024-2025 WINTER SNOWS IN THE DEVILS LAKE BASIN

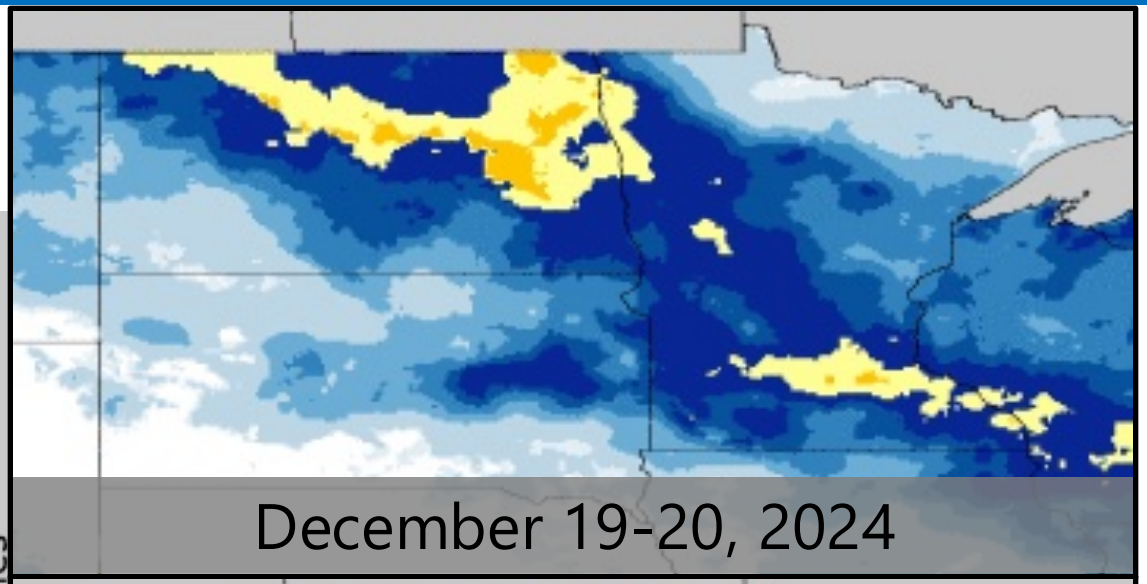


November 19-21, 2024

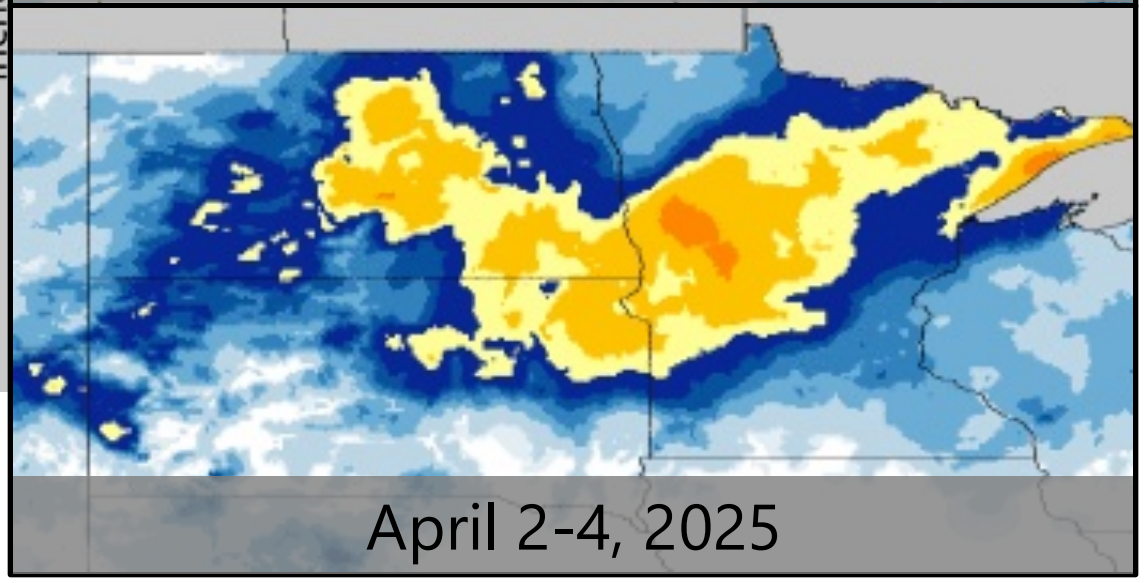


March 17-18, 2025





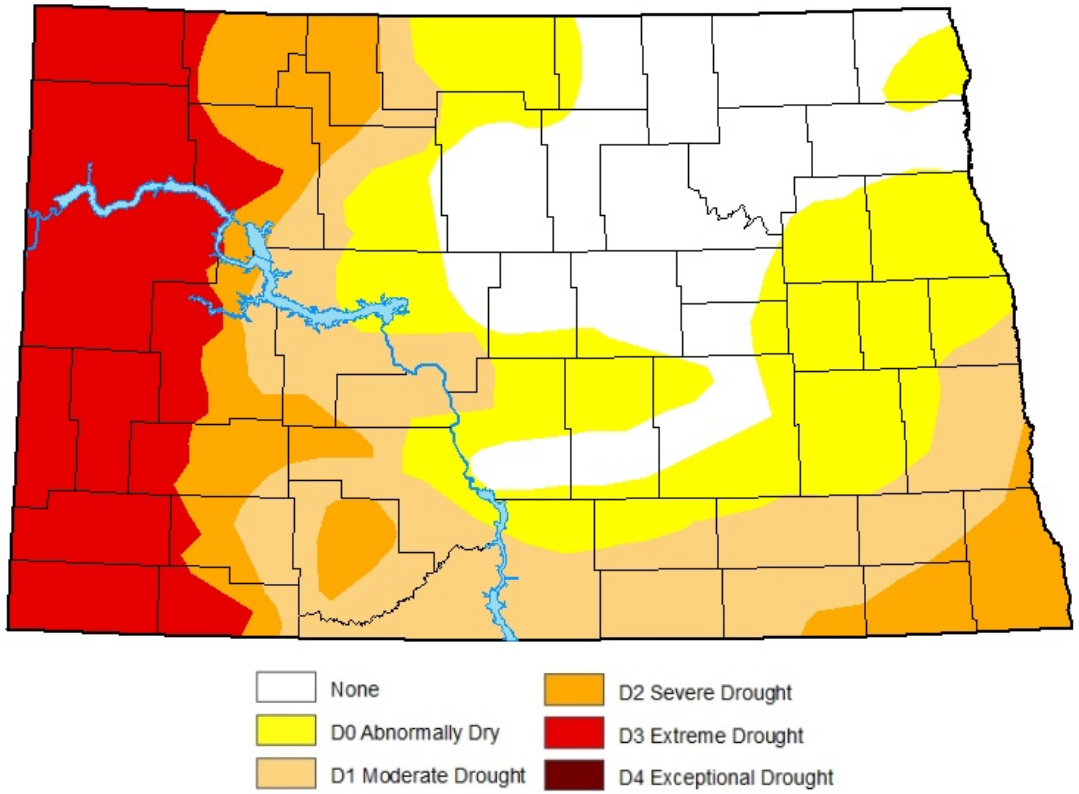
December 19-20, 2024



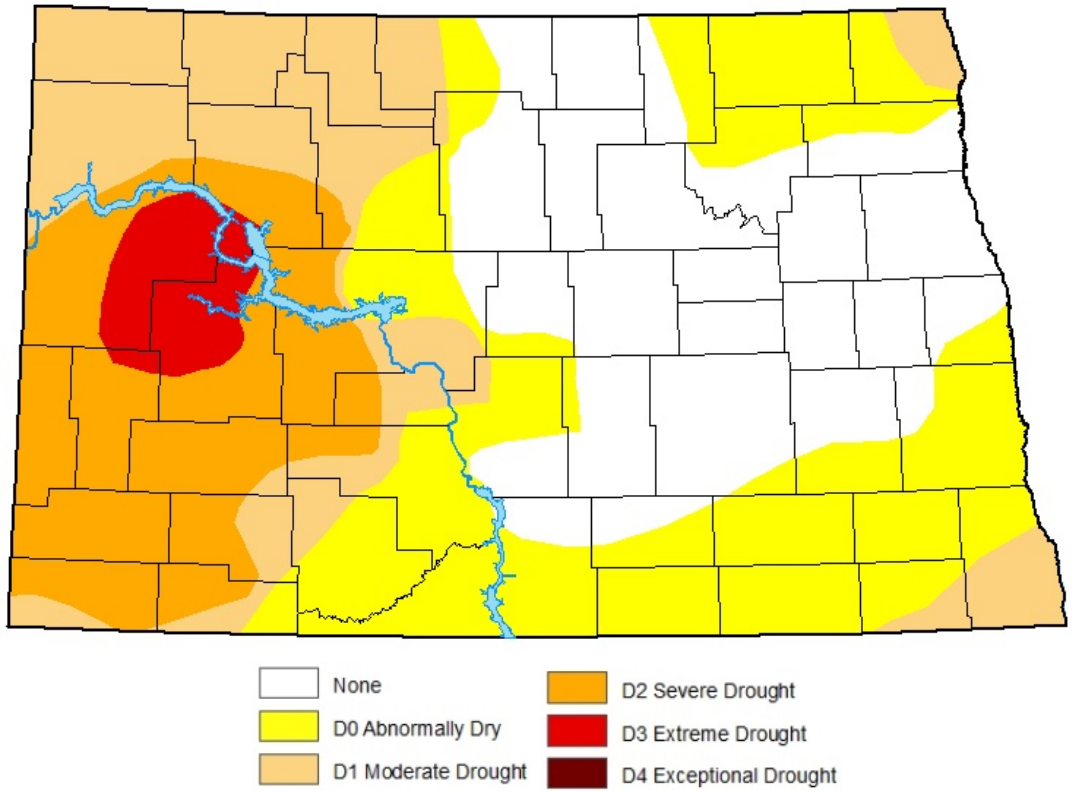
April 2-4, 2025

U.S. DROUGHT MONITOR

November 7, 2024



May 1, 2025

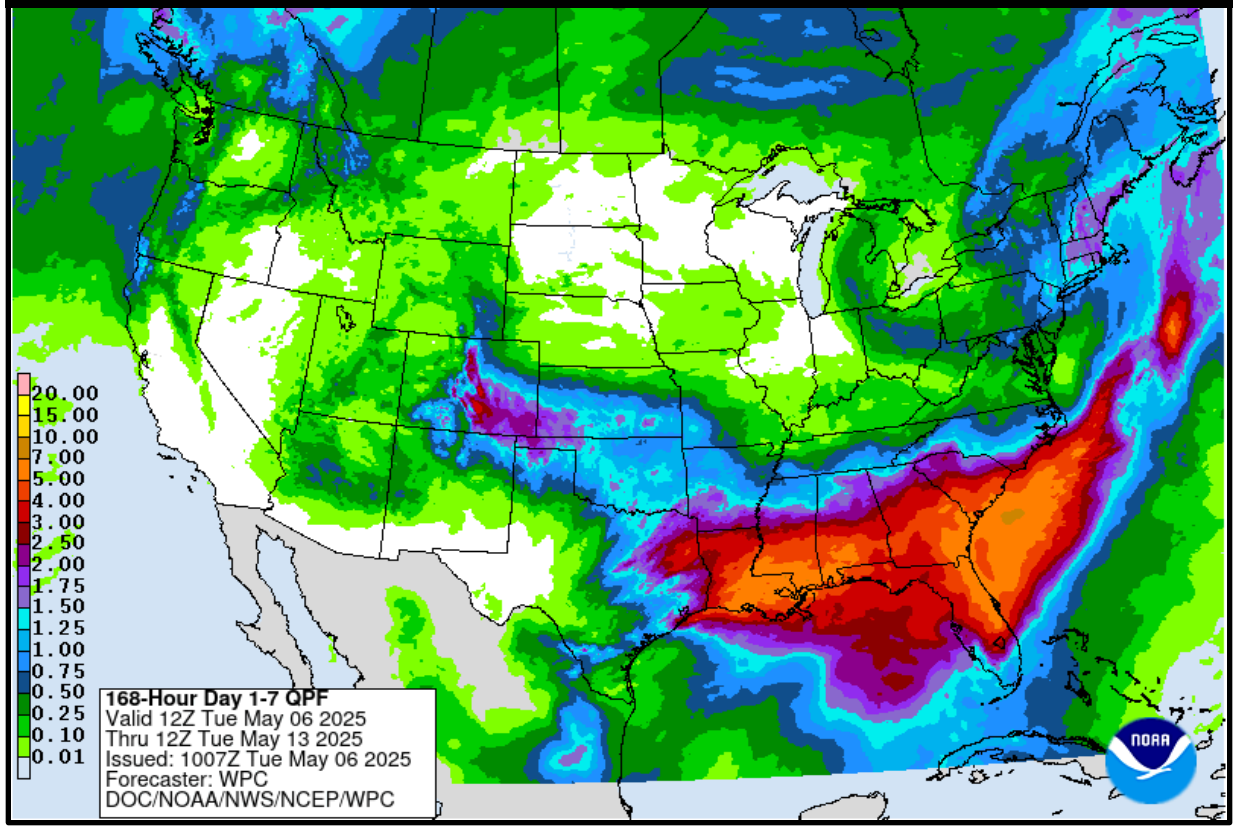


ONE WEEK FORECAST

- Generally dry and breezy through the weekend and into early next week
- Above normal temperatures continue
  - Highs: upper 60s to upper 70s
  - Lows: mid 40s to mid 50s

- Normal High Temperatures
  - Beginning of May: upper 50s
  - End of May: around 70
- Normal Low Temperatures
  - Beginning of May: mid 30s
  - End of May: around 50

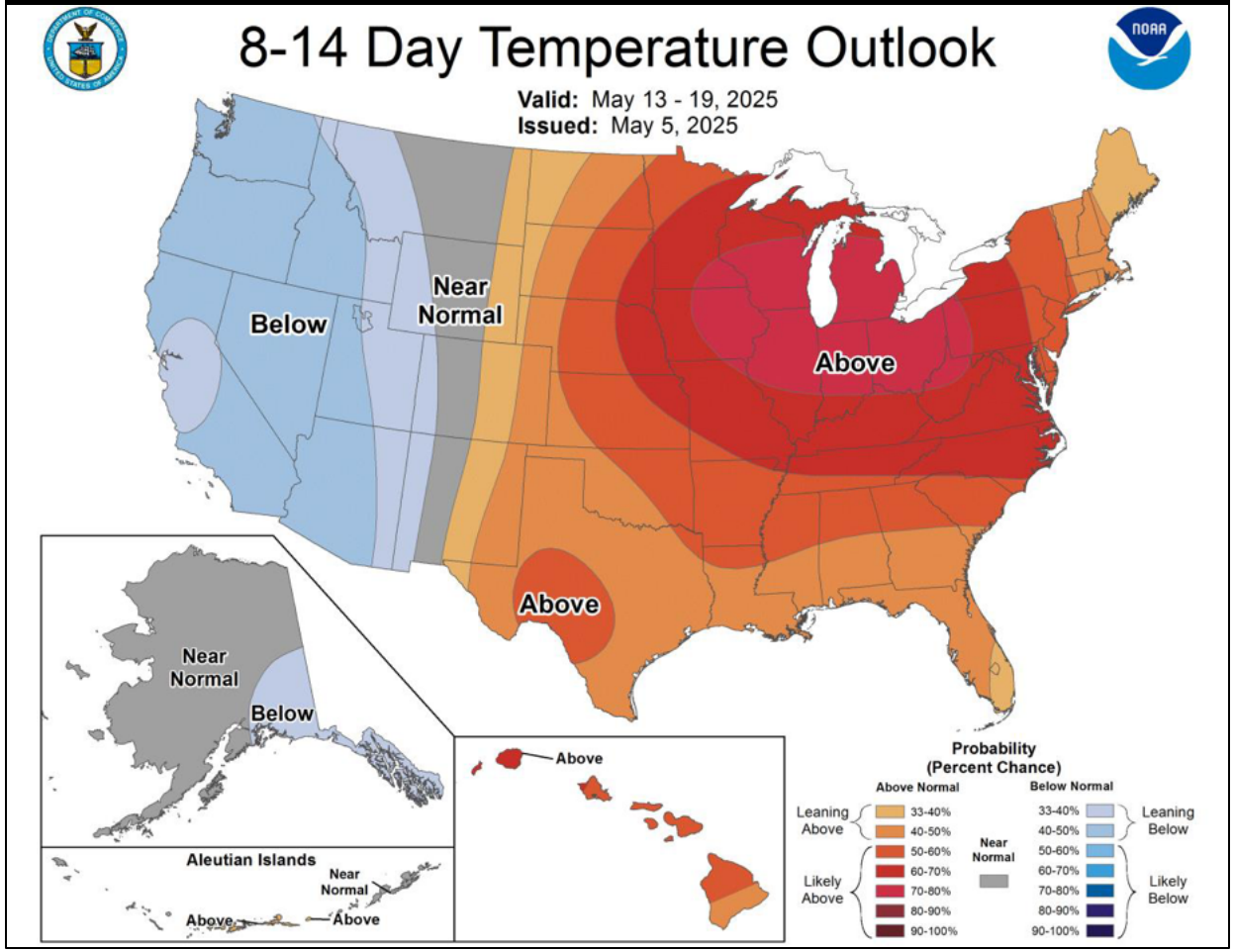
Forecast Precipitation through Monday Night



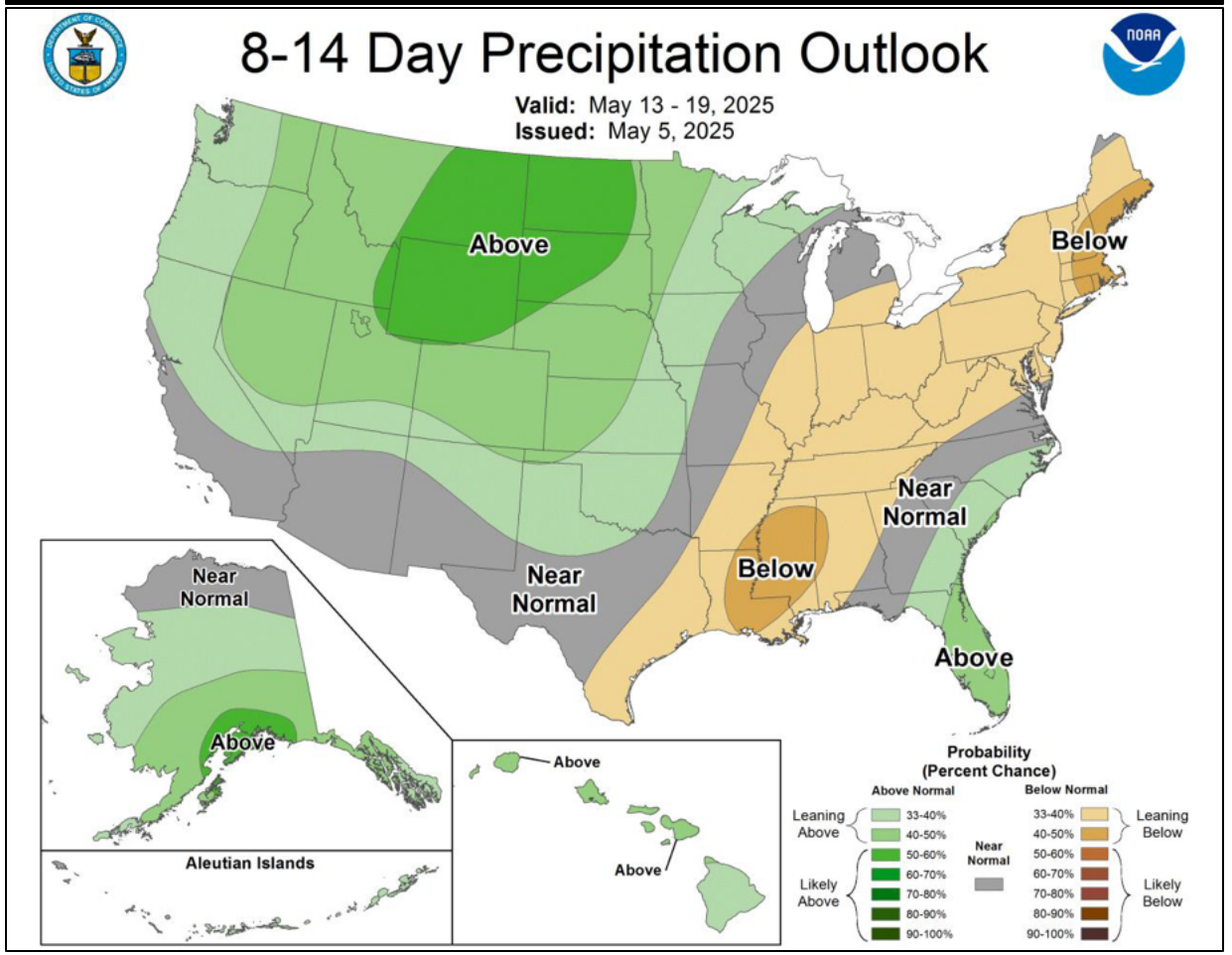
Forecast as of Tuesday morning

MID-MAY

Temperature

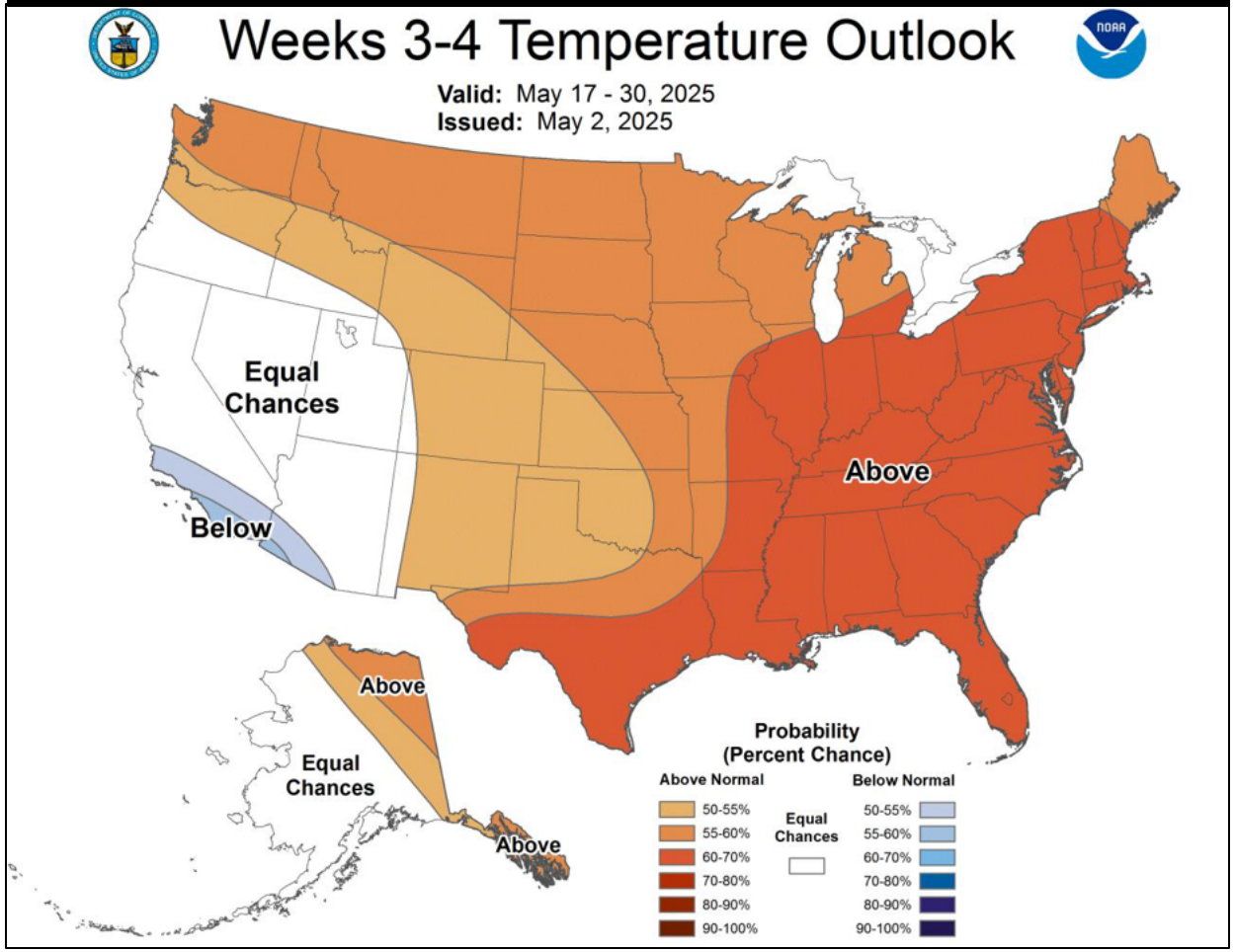


Precipitation

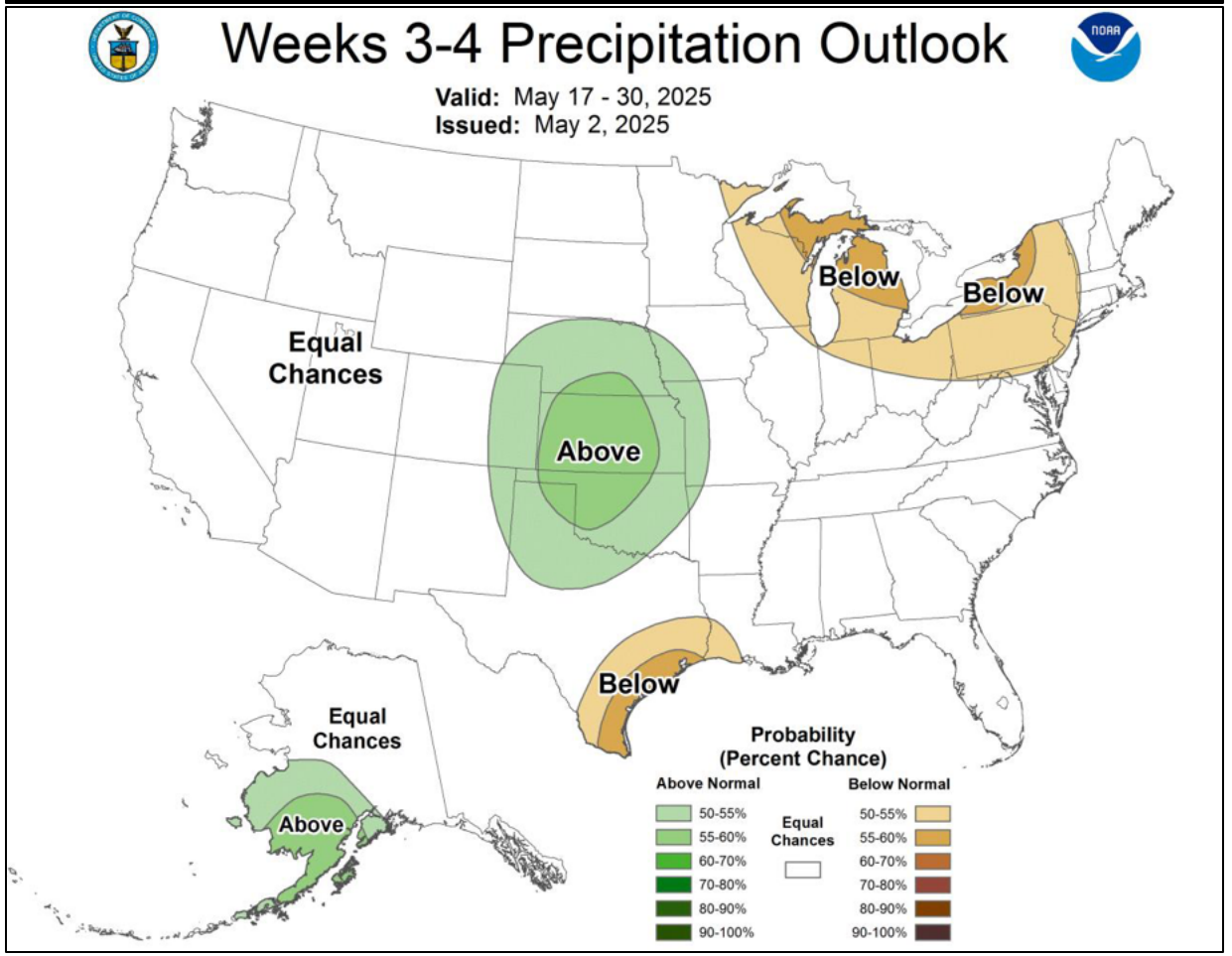


END OF MAY

Temperature

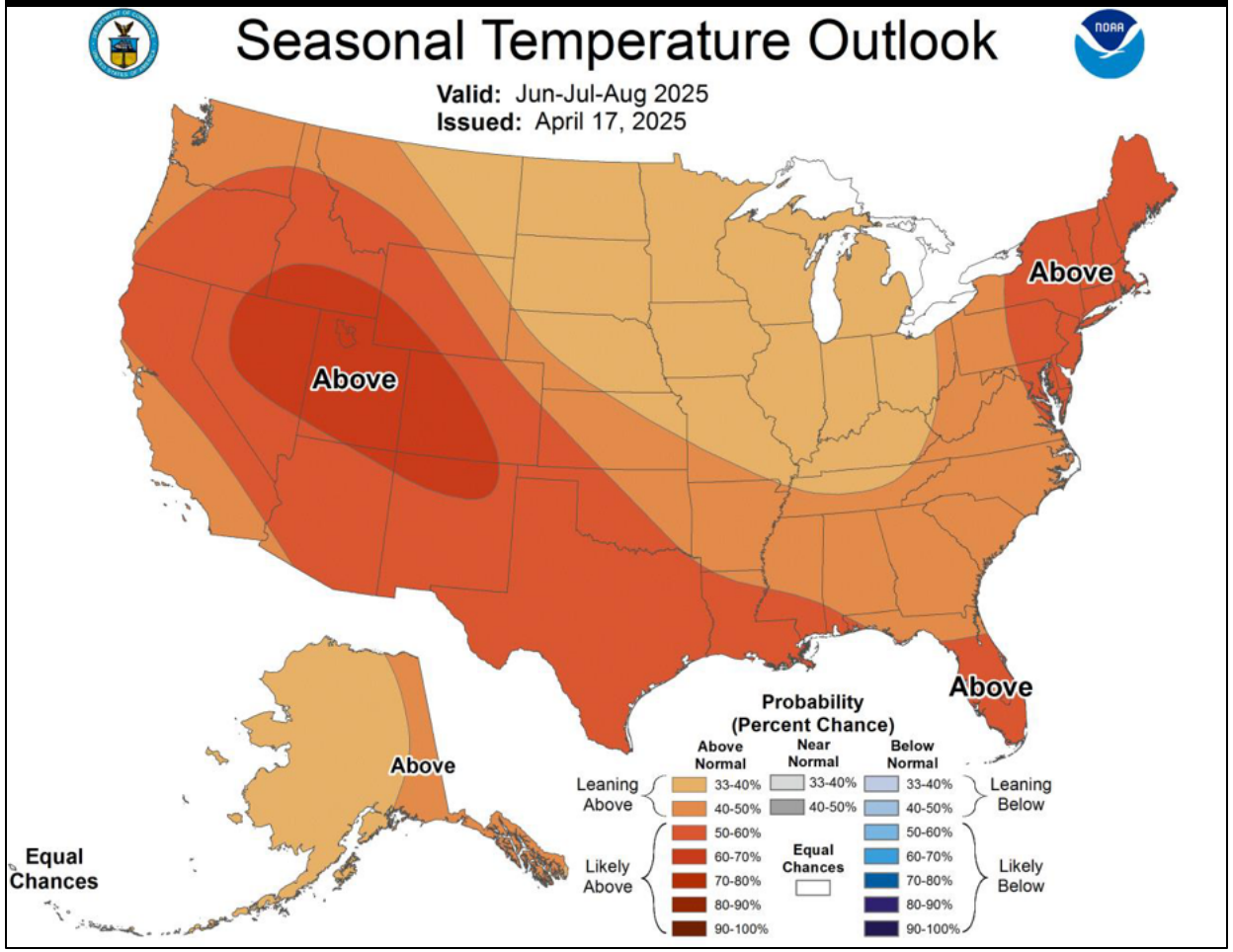


Precipitation

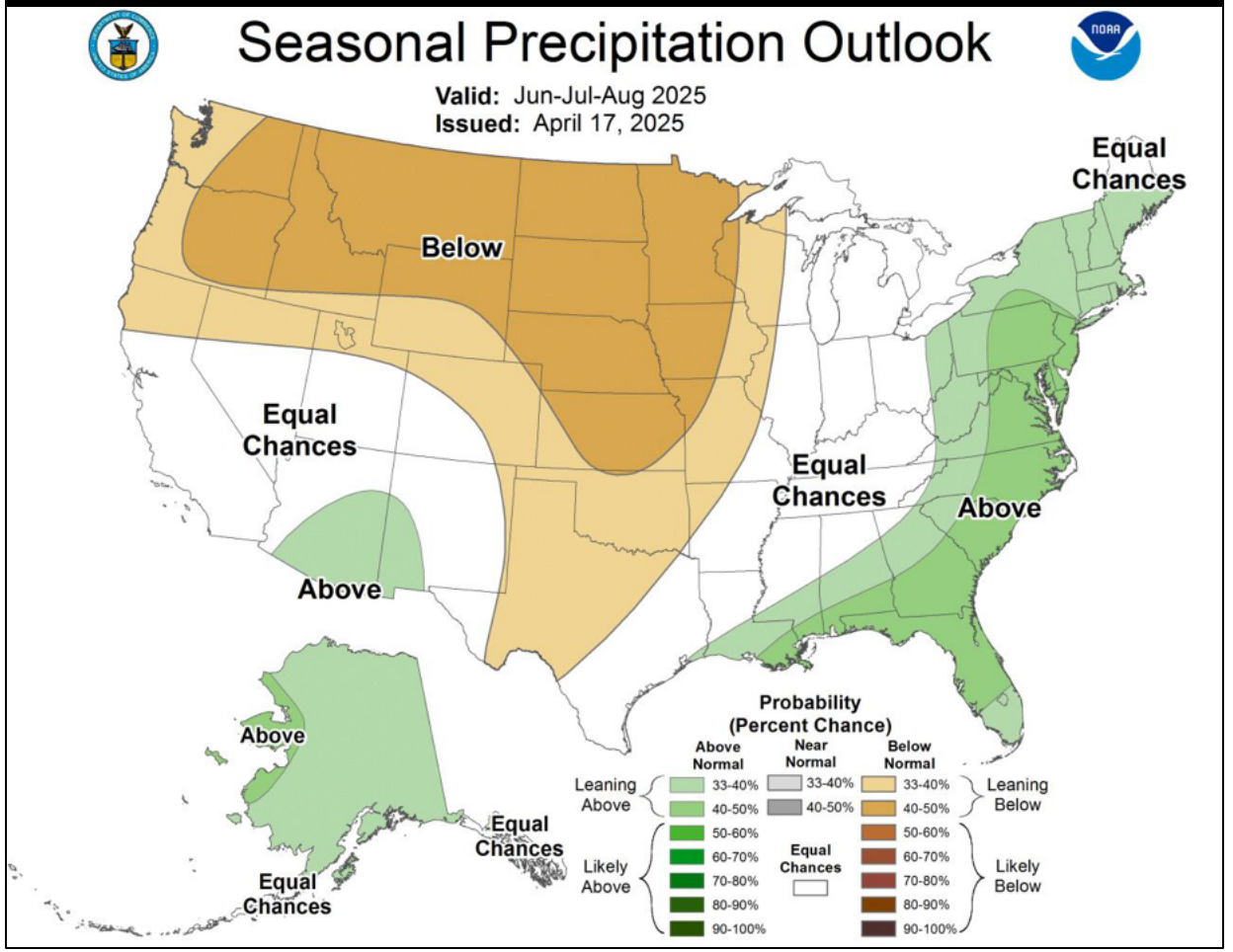


SUMMER
(June, July, and August)

Temperature

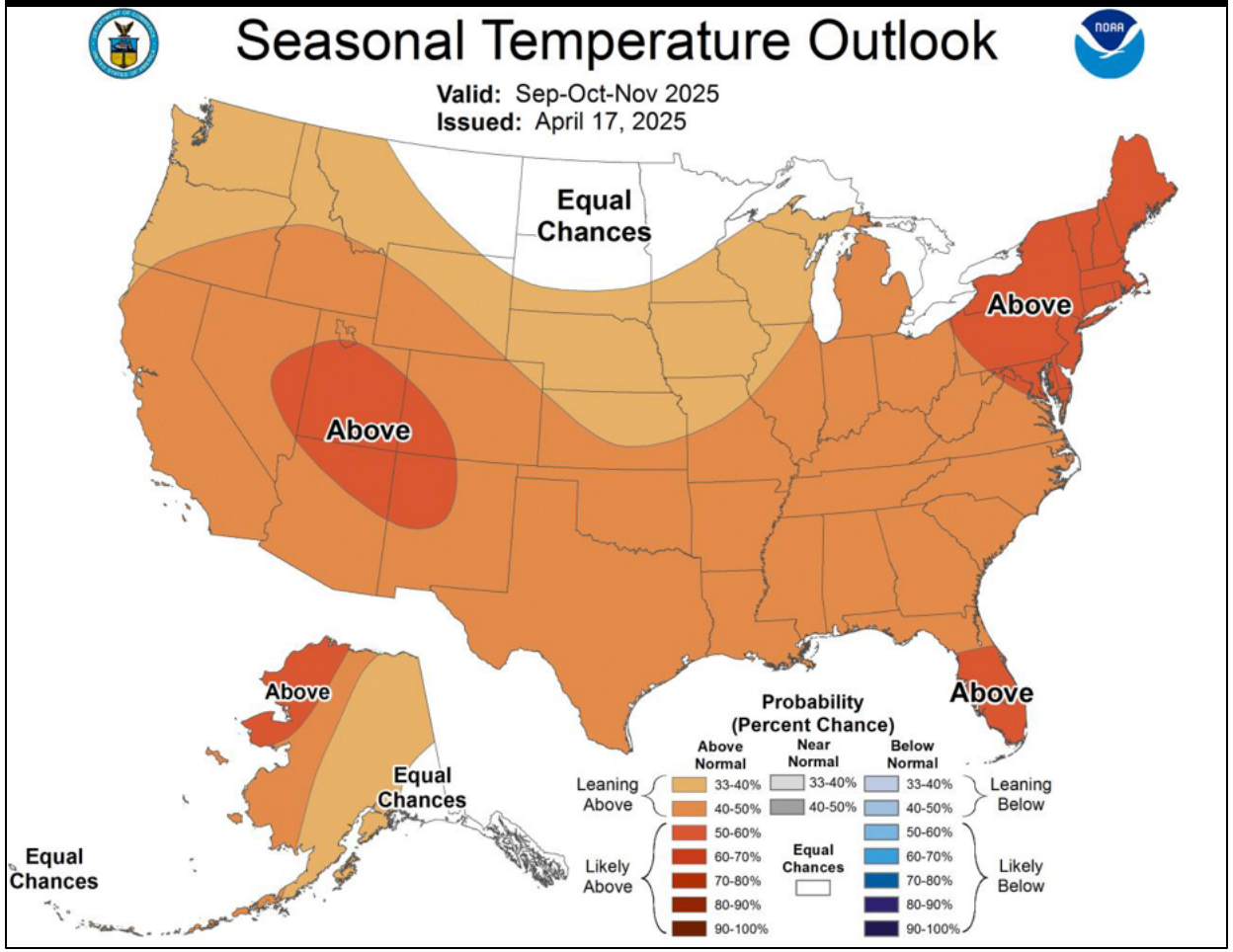


Precipitation

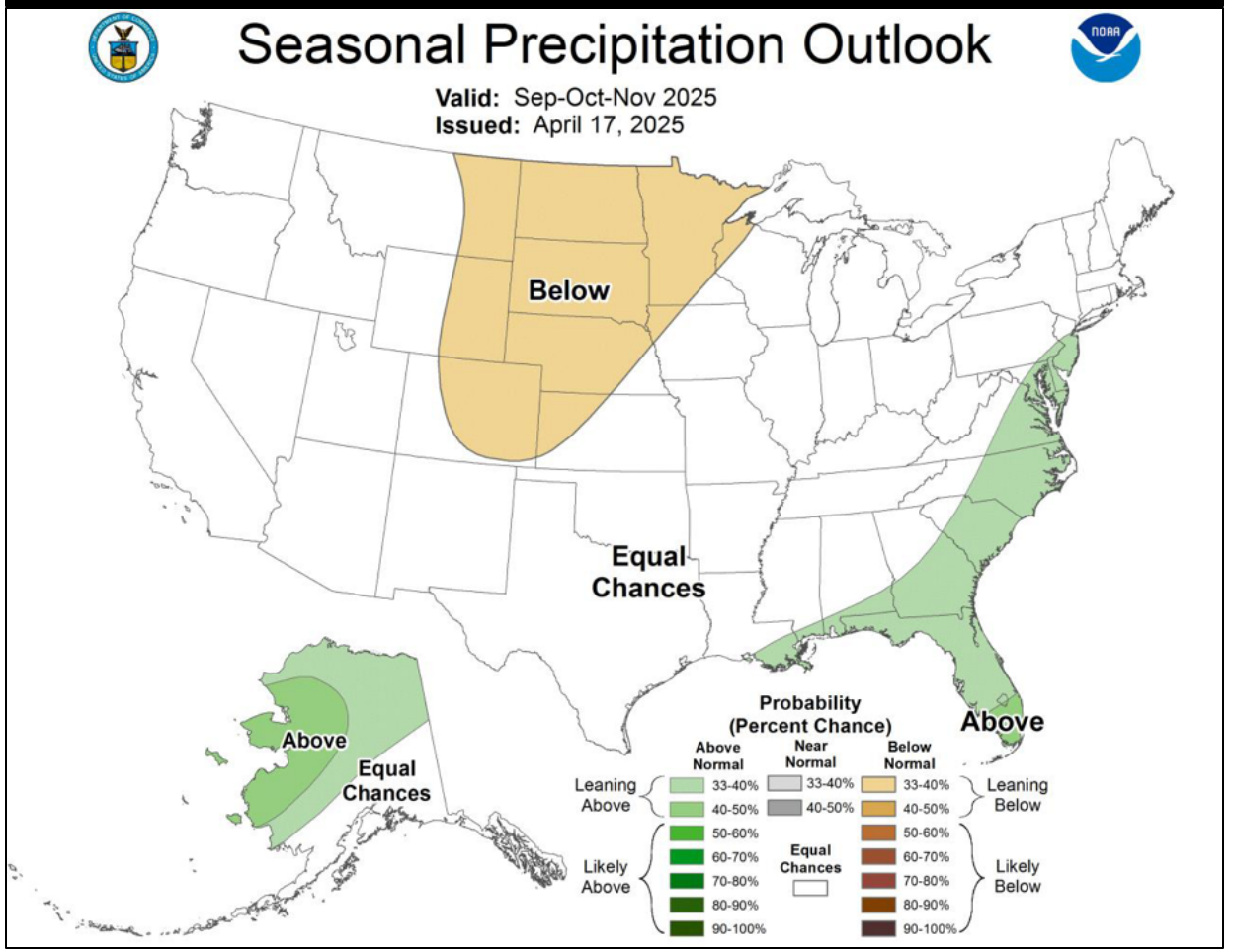


FALL
(September, October, and November)

Temperature

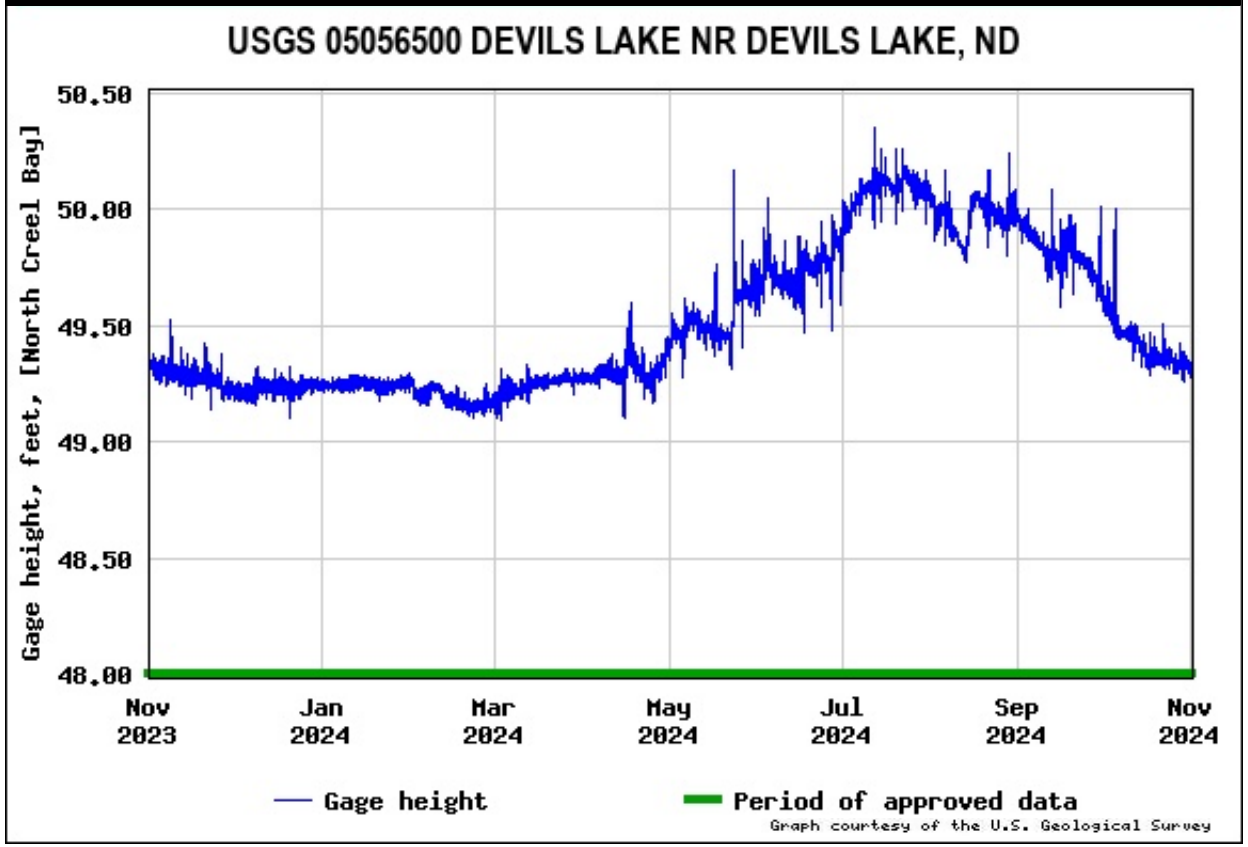


Precipitation

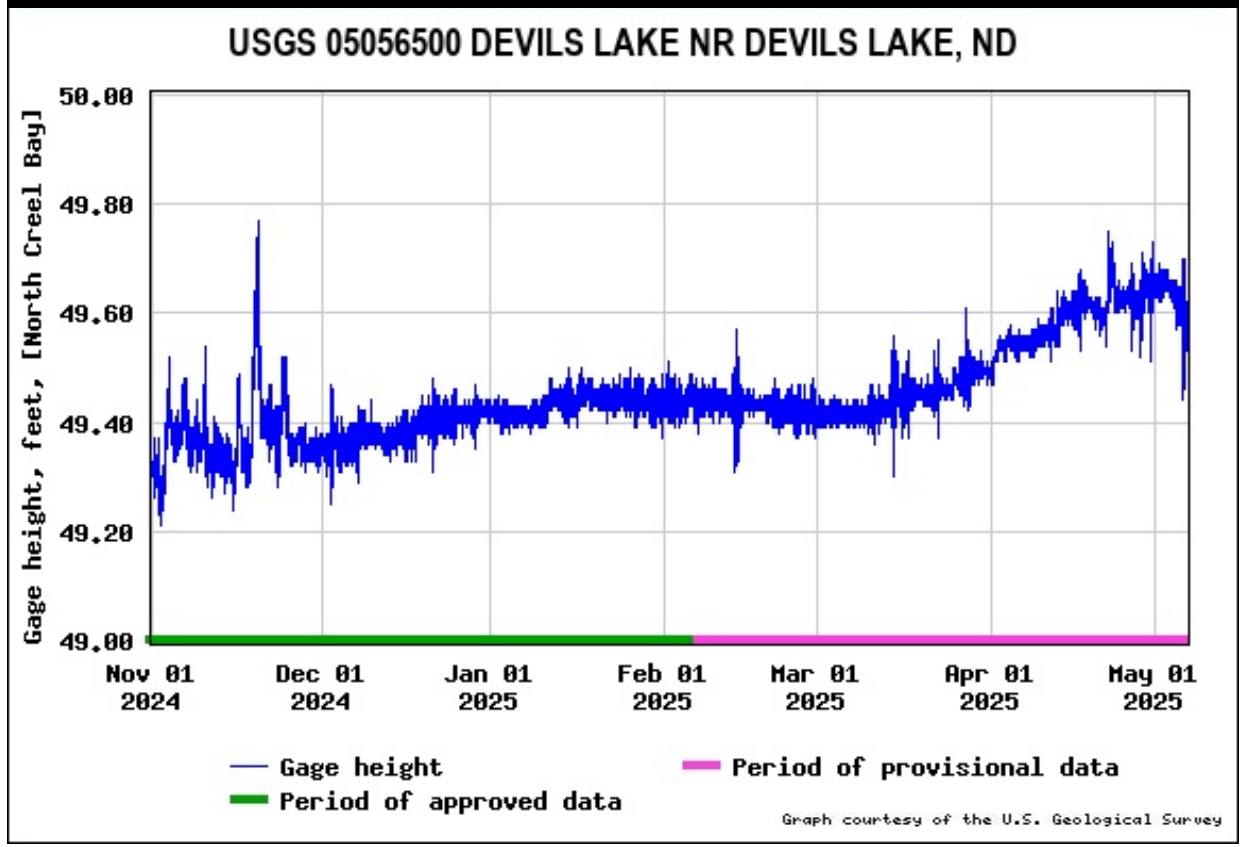


LAKE LEVELS

November 1, 2023 - November 1, 2024



November 1, 2024 - Current

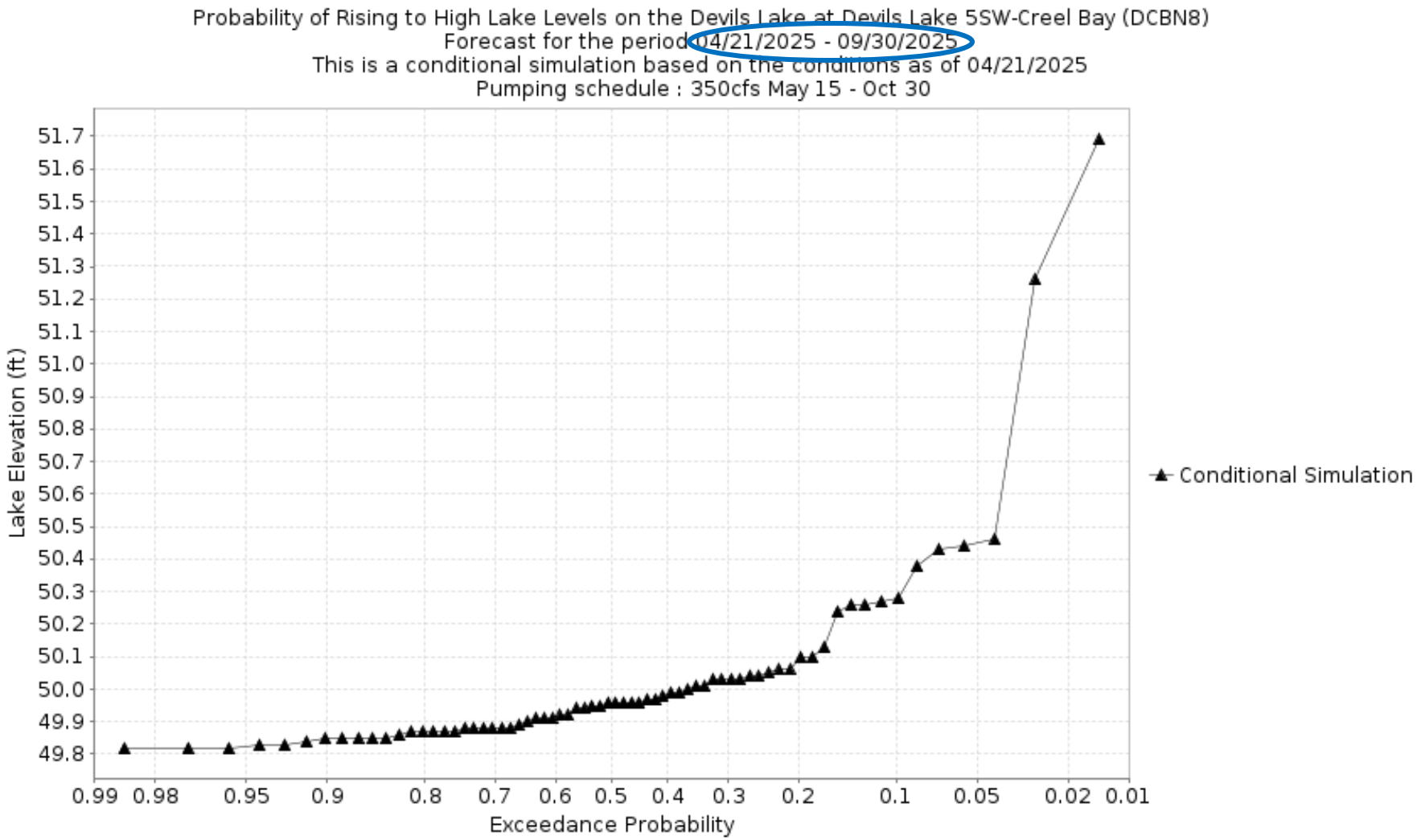


EXCEEDANCE PROBABILITIES

- 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



Current Lake Level

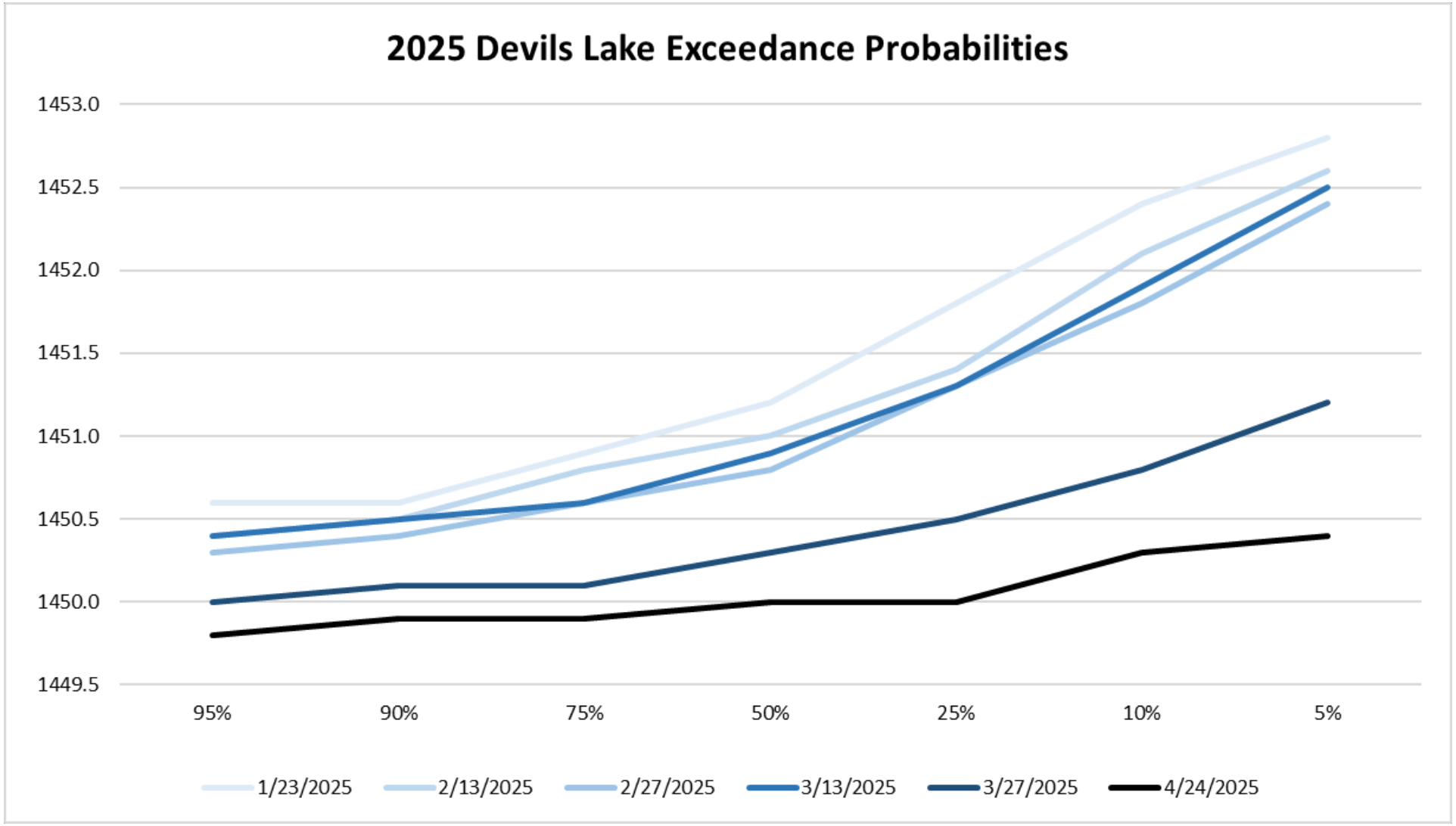
Creel Bay
1449.61 ft (5/6)

Stump Lake
1449.60 ft (5/6)

Next Exceedance Outlook

Thursday,
May 22, 2025

EXCEEDANCE PROBABILITIES



Current Lake Level

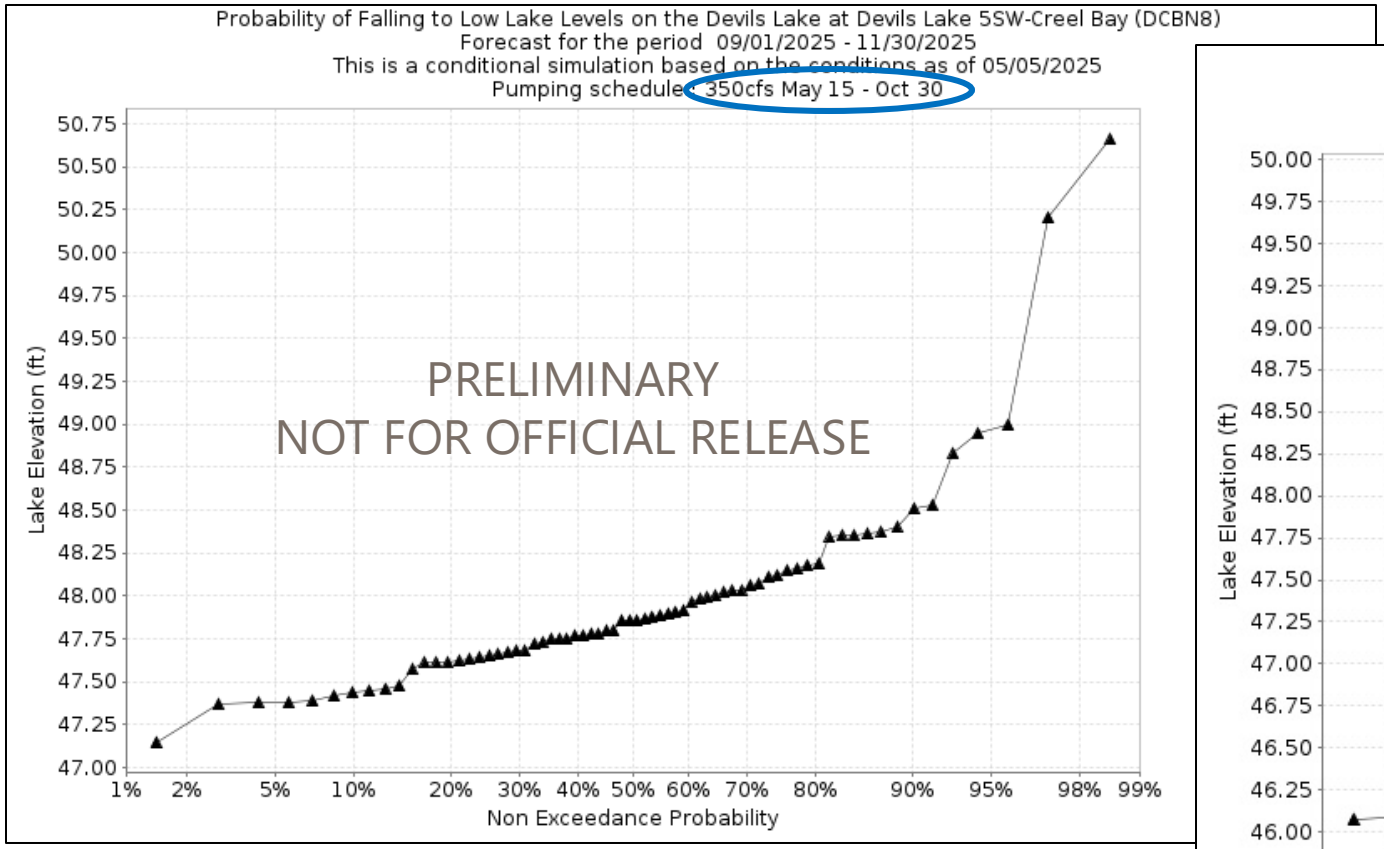
Creel Bay
1449.61 ft (5/6)

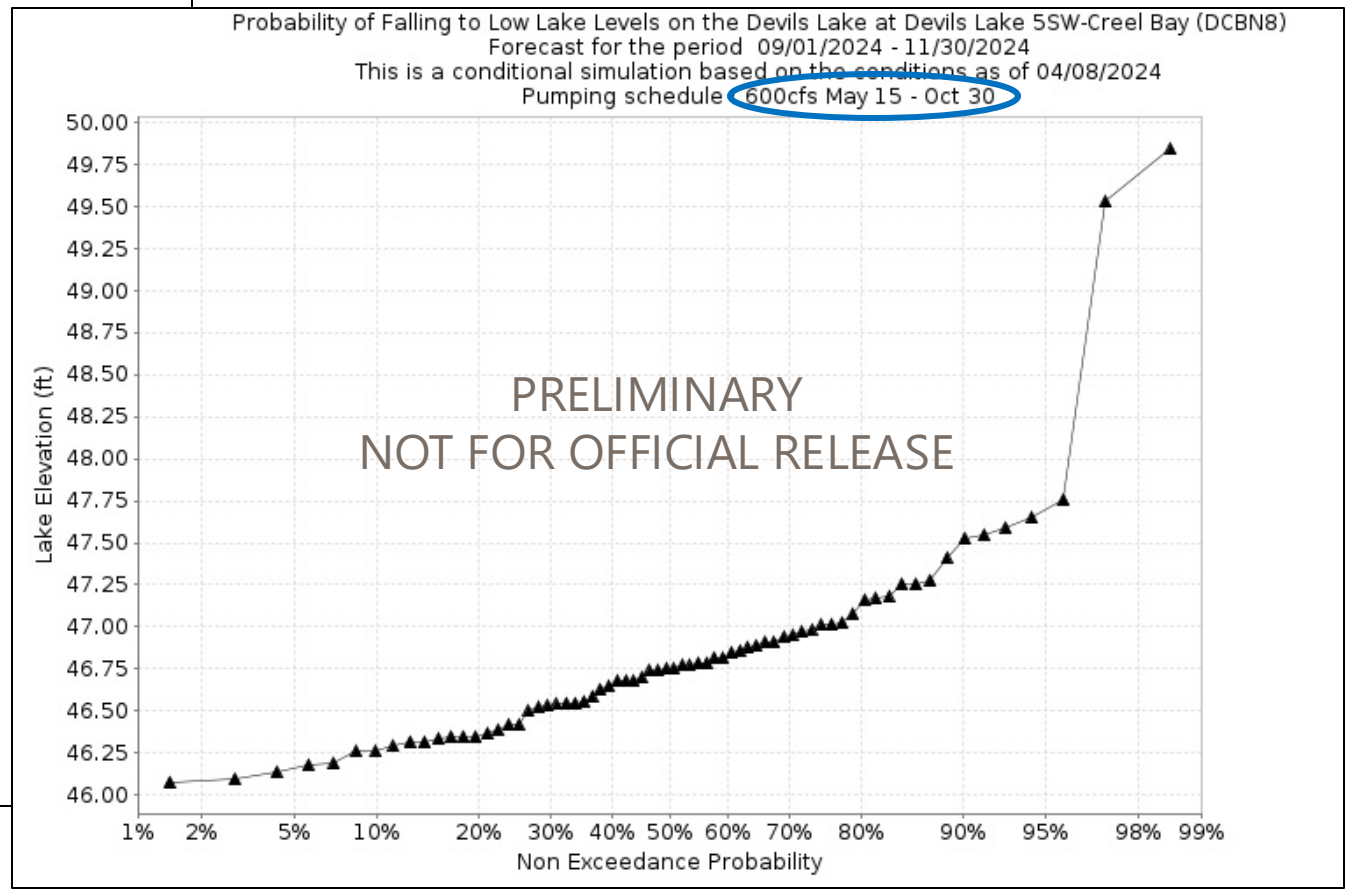
Stump Lake
1449.60 ft (5/6)

Next Exceedance Outlook

Thursday,
May 22, 2025

NON-EXCEEDANCE PROBABILITIES





First non-exceedance outlook to be issued
Thursday, June 26, 2025

Current Lake Level

Creel Bay
1449.61 ft (5/6)

NATIONAL WEATHER SERVICE UPDATE

Amanda Lee

NWS Grand Forks

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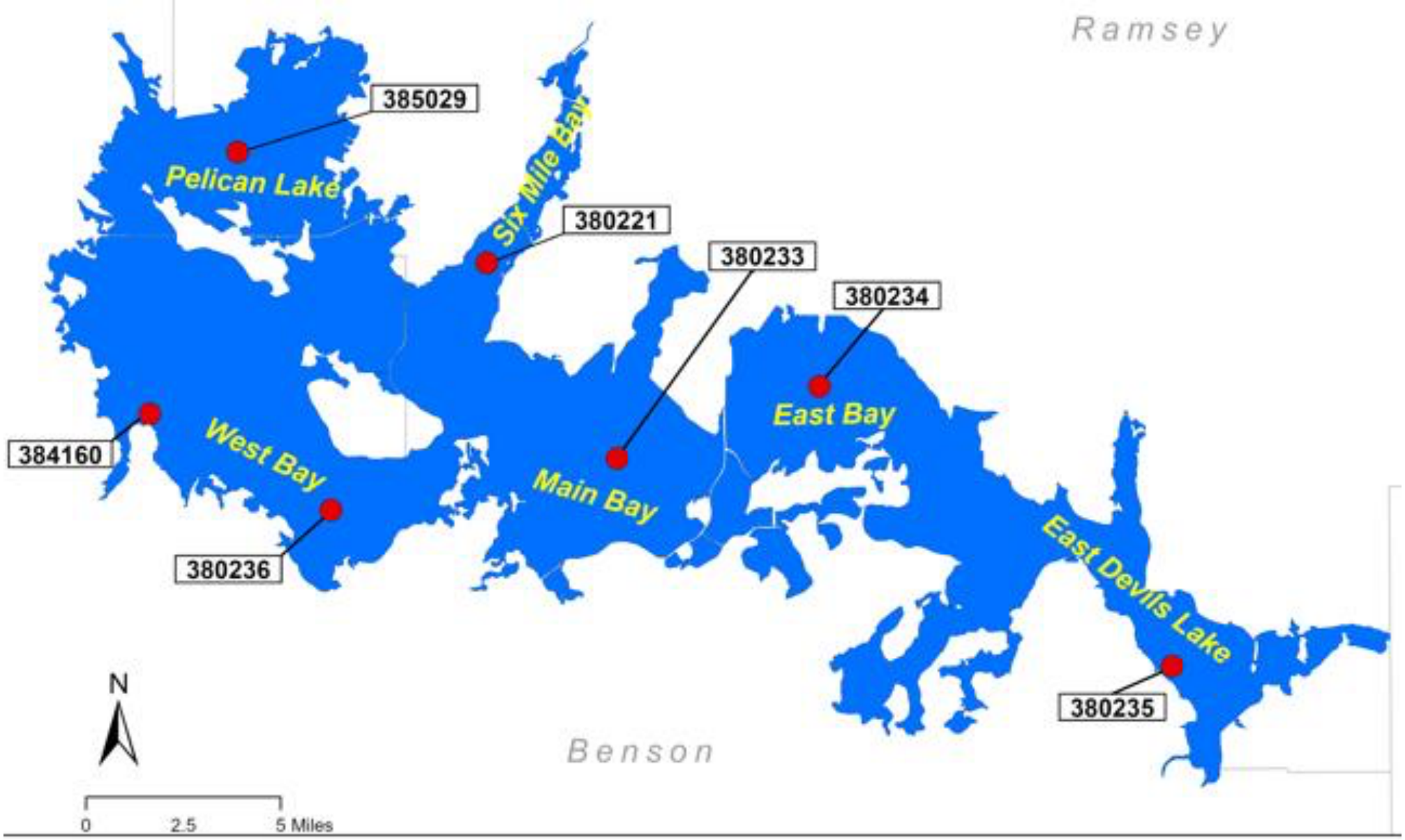
2024 WATER QUALITY REVIEW

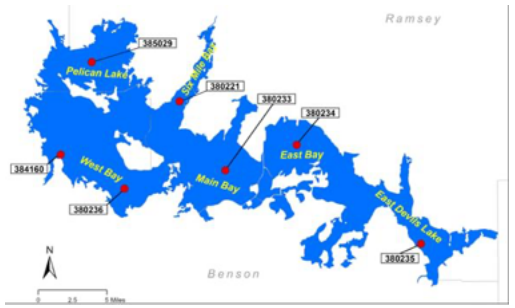
NORTH DAKOTA DEPARTMENT OF ENVIRONMENTAL QUALITY

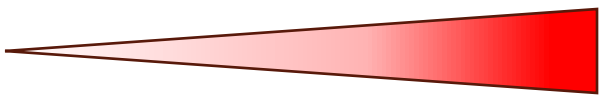


20-YEARS OF WATER QUALITY SAMPLING WITH DEVILS LAKE (1995-2014)

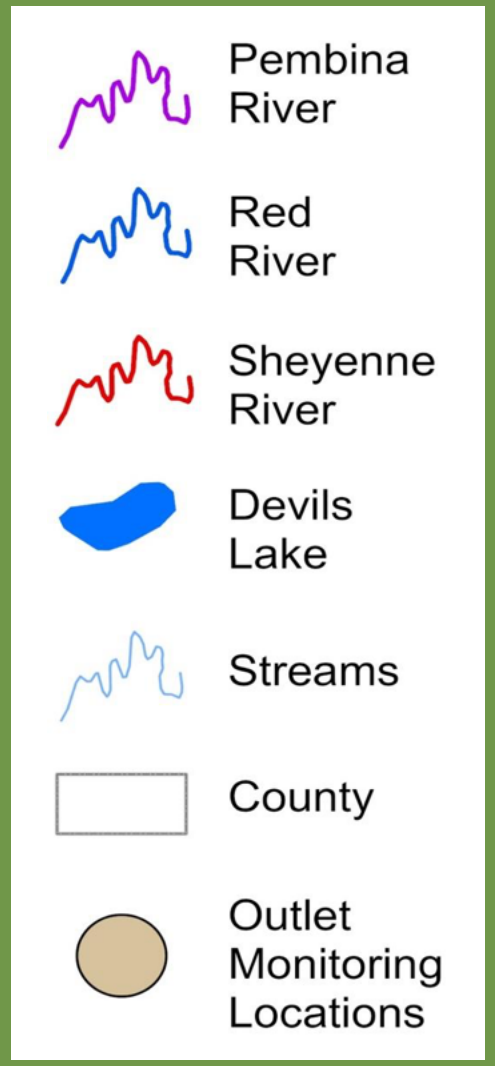
SULFATE DEVILS LAKE (1995-2025)

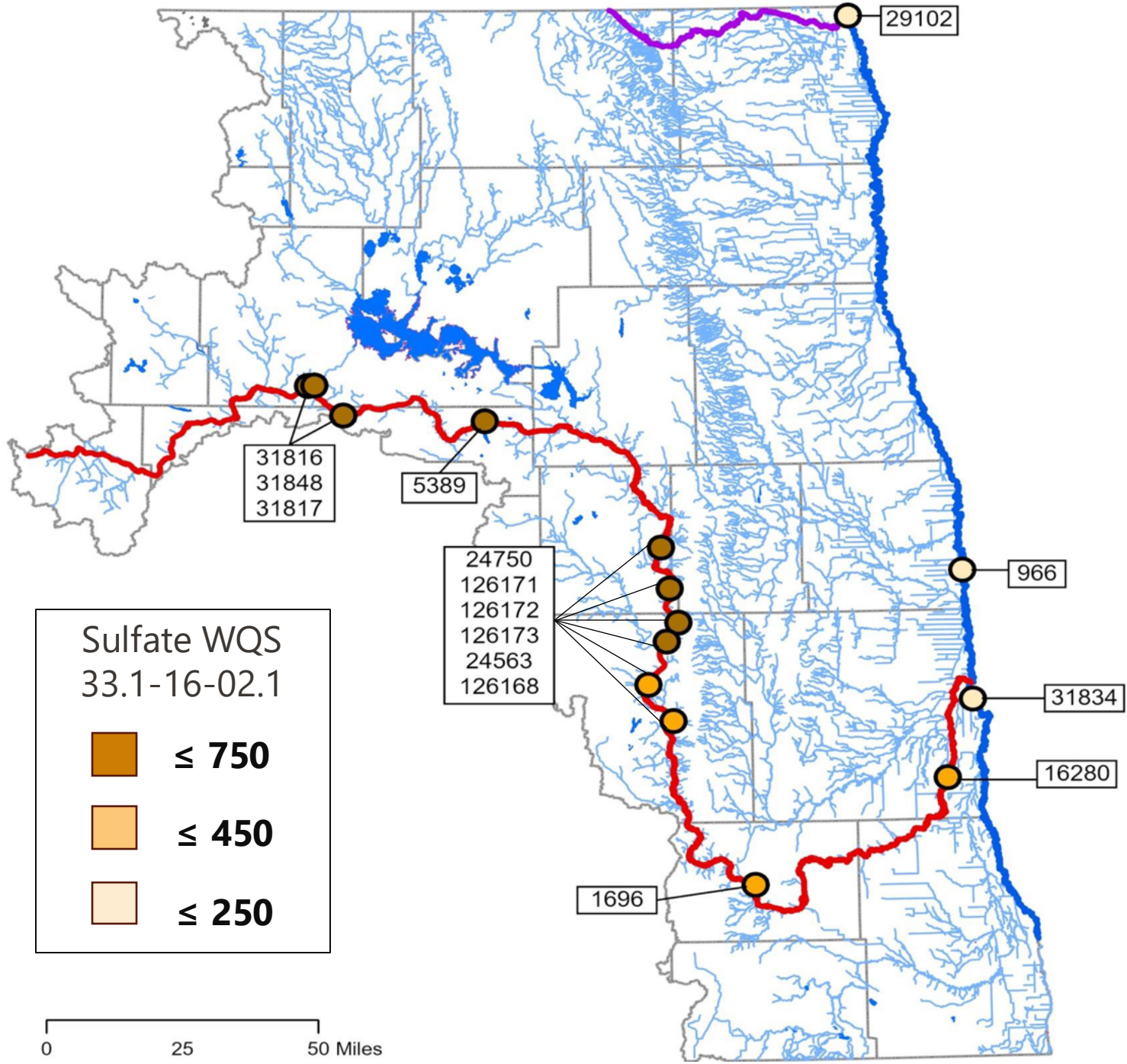
Sulfates by Location	N	Minimum	Median	Mean	Maximum	SD
1-West Bay	114	397	608.0	603.5	910	83.6
2-Main Bay	118	515	648.0	659.6	1020	70.3
3-East Bay	119	720	915.0	989.8	1780	220.7
4-East Devils Lake	113	878	1120.0	1771.6	4850	1054.7





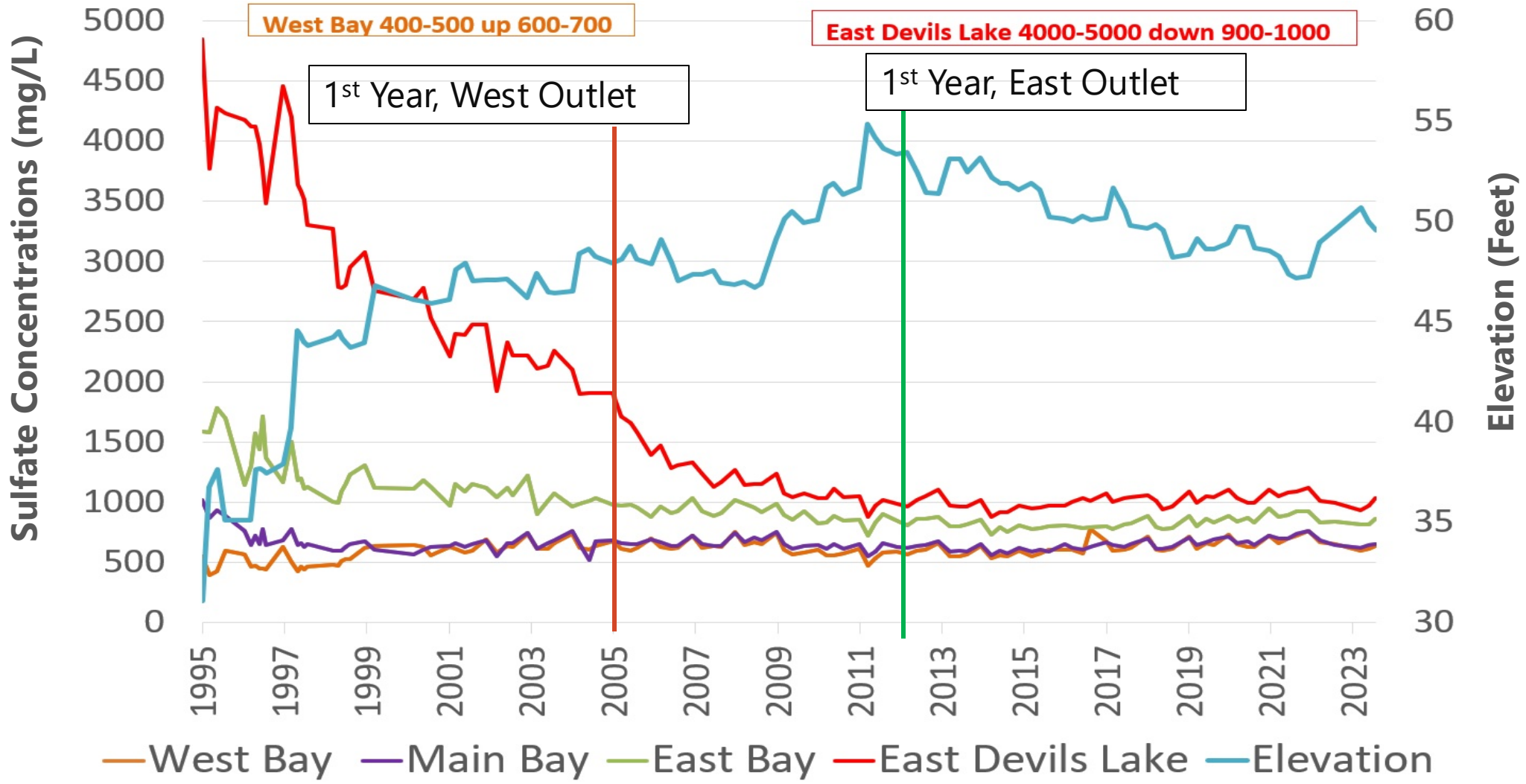
SULFATE WQS


Pembina River
Red River
Sheyenne River
Devils Lake
Streams
County
Outlet Monitoring Locations

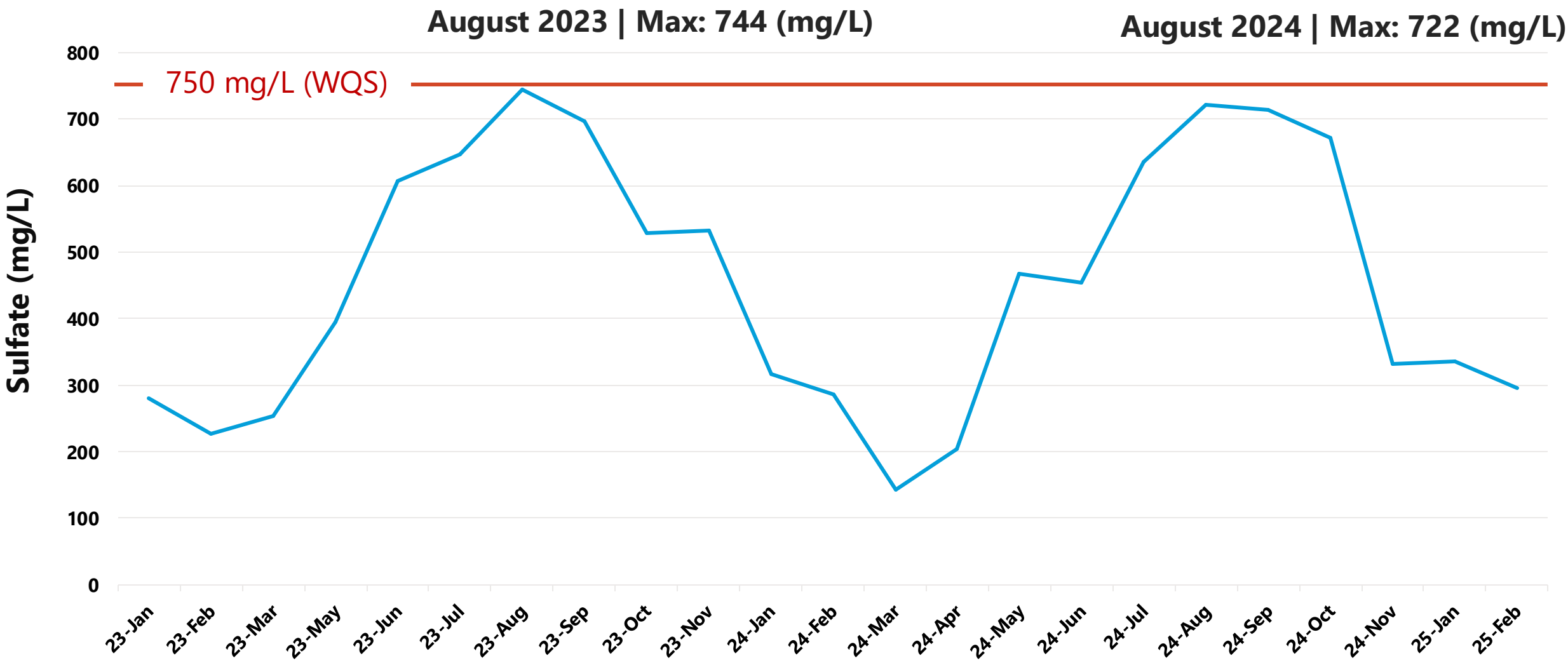

29102
31816
31848
31817
5389
24750
126171
126172
126173
24563
126168
966
31834
16280
1696
Sulfate WQS
33.1-16-02.1
≤ 750
≤ 450
≤ 250
0
25
50 Miles

ELEVATION & SULFATES DL 1995-2025

Significant Decreases In Sulfate Across All Devils Lake Locations Since Outlet Operations

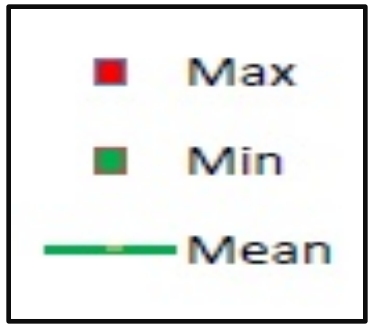


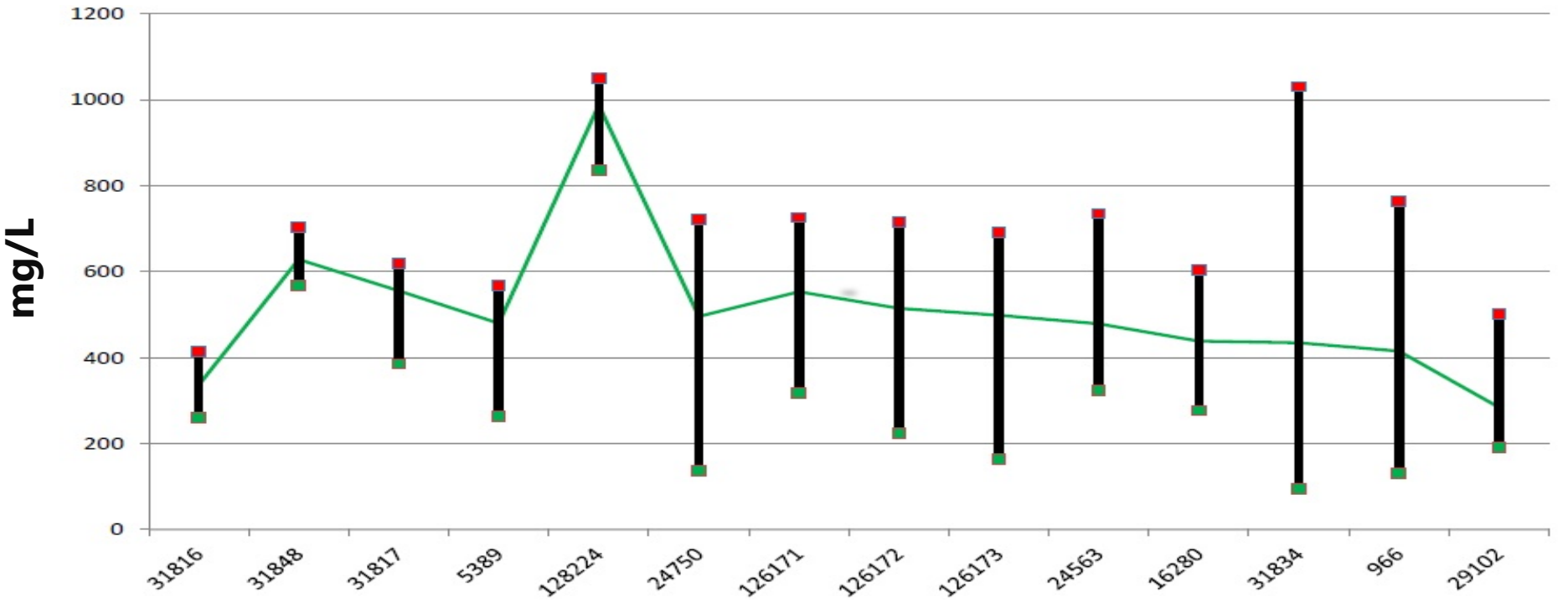
SULFATE AT COOPERSTOWN (2023-2025)



SULFATE ON THE SHEYENNE & RED RIVER

Sulfate As (SO4) Concentrations (May 2024 Thru April 2025)



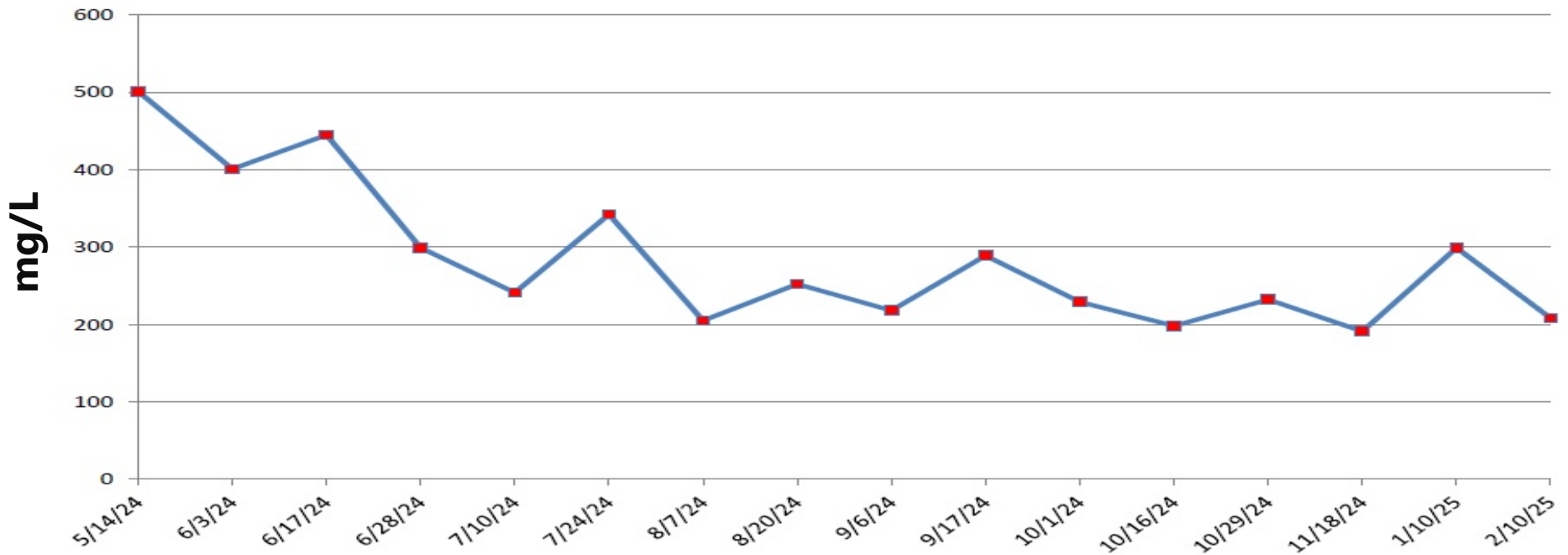


5 Stations Exceedances

StationID	Station Description	Max	Min	Mean	Median	# Of Samples	LastCollectionDate	LastResult
31816	Sheyenne River Near Flora	414	260	335.90	333	48	22-Oct-24	357
31848	Devils Lake State Outlet	703	567	628.00	630.5	48	22-Oct-24	612
31817	Sheyenne River Near Bremen	619	386	555.18	560	49	22-Oct-24	596
5389	Sheyenne River Near Warwick	567	263	479.44	488	25	22-Oct-24	561
128224	East End Outlet at County Road 4	1050	835	986.97	1000	37	17-Oct-24	971
24750	Sheyenne River Near Cooperstown	722	137	495.62	467	29	25-Mar-25	137
126171	Lake Ashtabula East Of Hannaford	726	318	553.23	610	13	22-Oct-24	615
126172	Lake Ashtabula At Sibley Crossing Bridge	716	225	514.31	532	13	22-Oct-24	668
126173	Lake Ashtabula Downstream Location At Ashtabula	691	165	498.62	485	13	22-Oct-24	667
24563	Sheyenne River Below Baldhill Dam	735	323	478.41	442	29	25-Mar-25	690
16280	Sheyenne River Near Horace	604	277	438.10	424	29	25-Mar-25	277
31834	Red River Near Harwood	1030	94.3	434.14	383.5	16	25-Mar-25	132
966	Red River Near Halstad Mn	764	130	415.13	389	16	25-Mar-25	130
29102	Red River At Pembina	501	191	284.38	246.5	16	10-Feb-25	208

SULFATE AT PEMBINA (2024-2025)

Sulfate As (SO4) Concentrations For The Red River At Pembina (May 2024-april 2025)

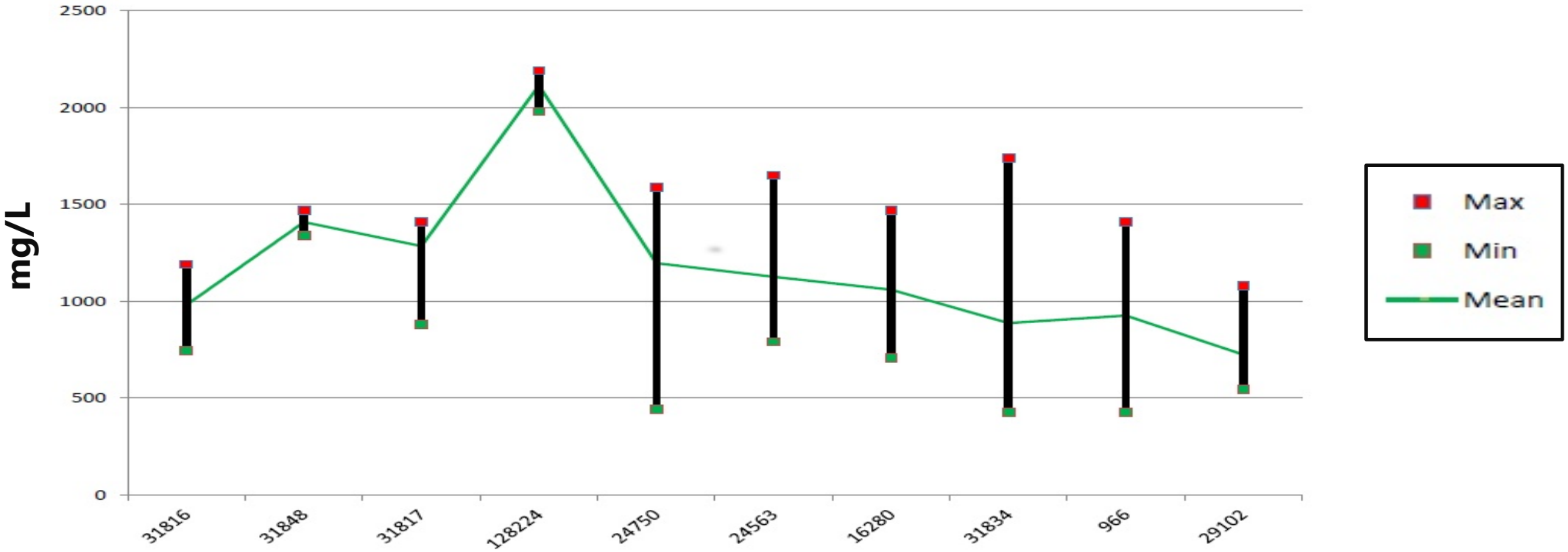


50% Of Individual Samples Exceeded The 250 (Mg/L) WQO

Date	Station Description			Result Value			
14-May-24	Red River At Pembina (Station ID 29102)			501			
3-Jun-24	Red River At Pembina (Station ID 29102)			401			
17-Jun-24	Red River At Pembina (Station ID 29102)			445			
28-Jun-24	Red River At Pembina (Station ID 29102)			299			
10-Jul-24	Red River At Pembina (Station ID 29102)			241			
24-Jul-24	Red River At Pembina (Station ID 29102)			342			
7-Aug-24	Red River At Pembina (Station ID 29102)			205			
20-Aug-24	Red River At Pembina (Station ID 29102)			252			
6-Sep-24	Red River At Pembina (Station ID 29102)			218			
17-Sep-24	Red River At Pembina (Station ID 29102)			289			
1-Oct-24	Red River At Pembina (Station ID 29102)			229			
16-Oct-24	Red River At Pembina (Station ID 29102)			198			
29-Oct-24	Red River At Pembina (Station ID 29102)			232			
18-Nov-24	Red River At Pembina (Station ID 29102)			191			
10-Jan-25	Red River At Pembina (Station ID 29102)			299			
10-Feb-25	Red River At Pembina (Station ID 29102)			208			

TDS ON THE SHEYENNE & RED RIVER

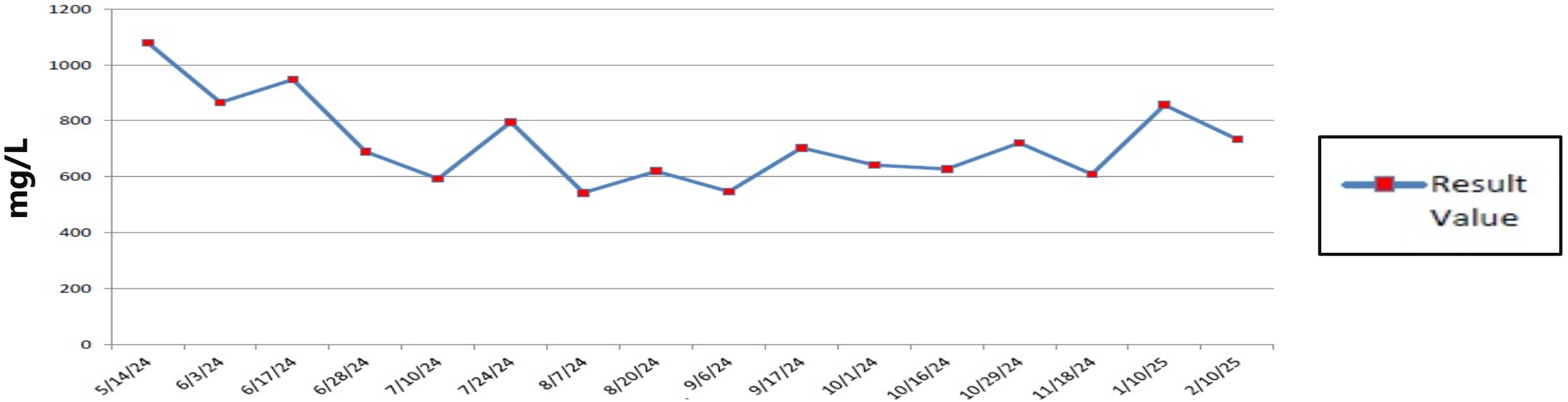
TOTAL DISSOLVED SOLIDS (TDS) (MAY 2024-APRIL 2025)



StationID	Station Description	Max	Min	Mean	Median	# Of Samples	LastCollectionDate	LastResult
31816	Sheyenne River Near Flora	1190	745	980.92	986.5	24	22-Oct-24	1190
31848	Devils Lake State Outlet	1470	1340	1408.33	1415	24	22-Oct-24	1420
31817	Sheyenne River Near Bremen	1410	880	1284.40	1300	25	22-Oct-24	1410
128224	East End Outlet at County Road 4	2190	1980	2113.68	2120	19	15-Oct-24	2110
24750	Sheyenne River Near Cooperstown	1590	441	1196.48	1160	29	25-Mar-25	441
24563	Sheyenne River Below Baldhill Dam	1650	791	1125.62	1010	29	25-Mar-25	1440
16280	Sheyenne River Near Horace	1470	707	1059.72	1020	29	25-Mar-25	707
31834	Red River Near Harwood	1740	427	886.63	792	16	25-Mar-25	438
966	Red River Near Halstad Mn	1410	424	925.88	895.5	16	25-Mar-25	424
29102	Red River At Pembina	1080	543	723.63	697	16	10-Feb-25	734

TDS AT PEMBINA (2024-2025)

TOTAL DISSOLVED SOLIDS (TDS) FOR THE RED RIVER AT PEMBINA (MAY 2024-APRIL 2025)



Date	Station Description			Result Value			
14-May-24	Red River At Pembina (Station ID 29102)			1080			
03-Jun-24	Red River At Pembina (Station ID 29102)			866			
17-Jun-24	Red River At Pembina (Station ID 29102)			948			
28-Jun-24	Red River At Pembina (Station ID 29102)			690			
10-Jul-24	Red River At Pembina (Station ID 29102)			593			
24-Jul-24	Red River At Pembina (Station ID 29102)			796			
07-Aug-24	Red River At Pembina (Station ID 29102)			543			
20-Aug-24	Red River At Pembina (Station ID 29102)			620			
06-Sep-24	Red River At Pembina (Station ID 29102)			547			
17-Sep-24	Red River At Pembina (Station ID 29102)			704			
1-Oct-24	Red River At Pembina (Station ID 29102)			642			
16-Oct-24	Red River At Pembina (Station ID 29102)			628			
29-Oct-24	Red River At Pembina (Station ID 29102)			721			
18-Nov-24	Red River At Pembina (Station ID 29102)			609			
10-Jan-25	Red River At Pembina (Station ID 29102)			857			
10-Feb-25	Red River At Pembina (Station ID 29102)			734			

QUESTIONS?

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2024 DEVILS LAKE OPERATIONAL SUMMARY

YAPING CHI, DEVILS LAKE ENGINEER

DEVILS LAKE WATER BALANCE

AVERAGE ANNUAL ESTIMATES | 2010-2024

Precipitation = 20.88 Inches
Inflow = 244,000 Acre-Feet

Lake Precipitation
+
Lake Inflow

Lake Level Rises

Evaporation = 30.80 Inches
Outlets Discharge = 104,000 Acre-Feet

Lake Evaporation
+
Outlets Discharge

Lake Level Falls

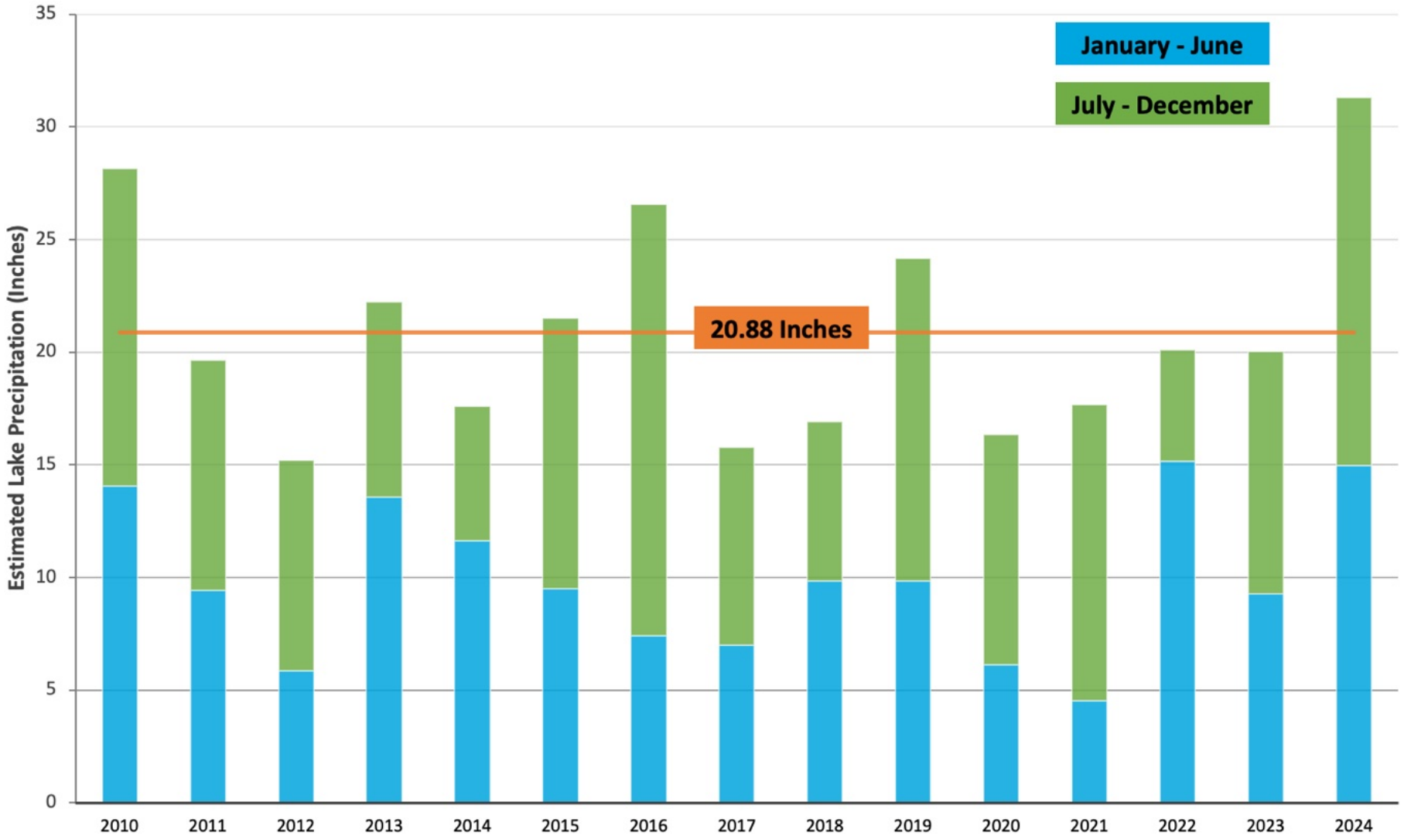
DEVILS LAKE ESTIMATED PRECIPITATION

Average Annual Precipitation
(2010-2024)

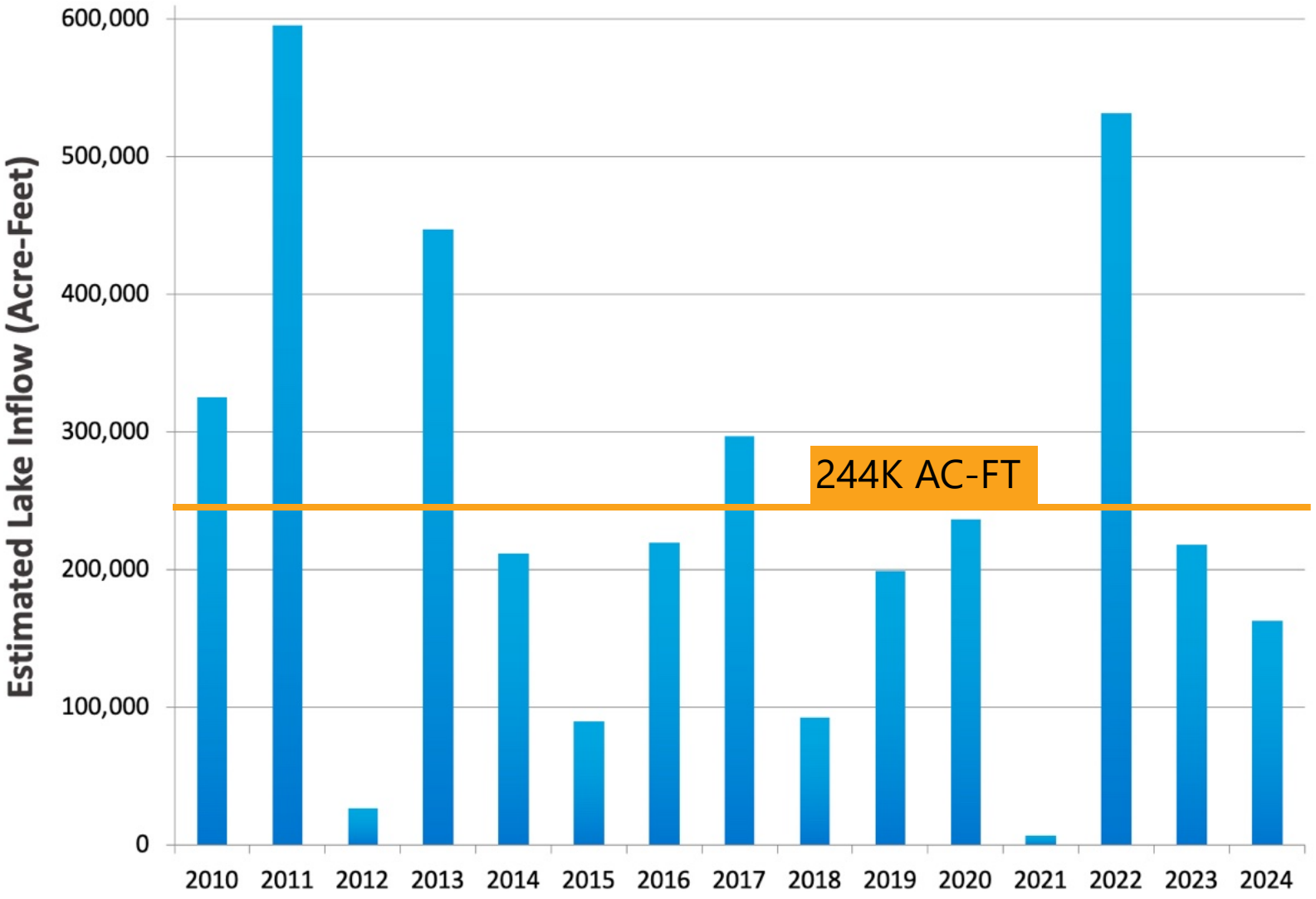
20.88 Inches

2024 Precipitation

31.29 Inches



DEVILS LAKE ESTIMATED INFLOW



Average Annual Inflow
(2010-2024)

Is Approximately

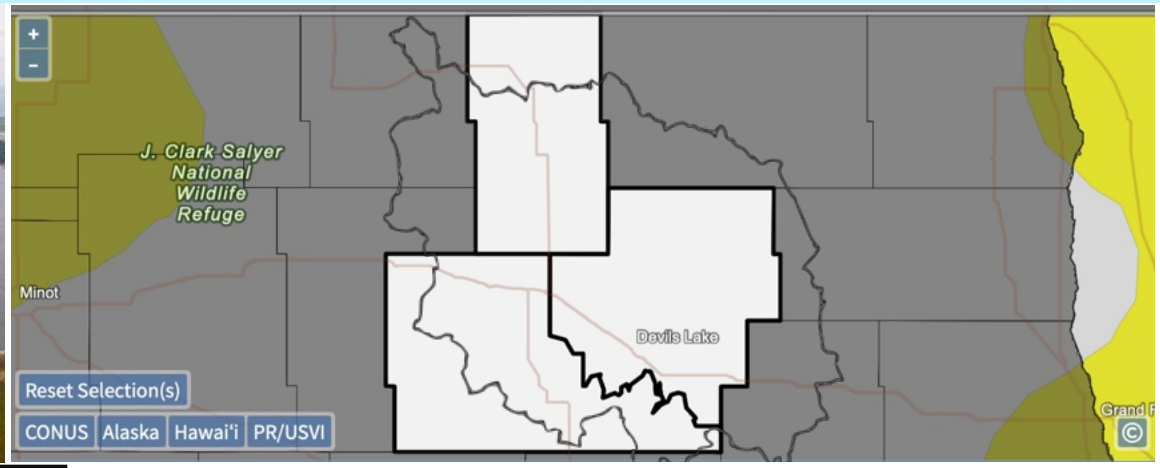
244,000 Acre-Feet

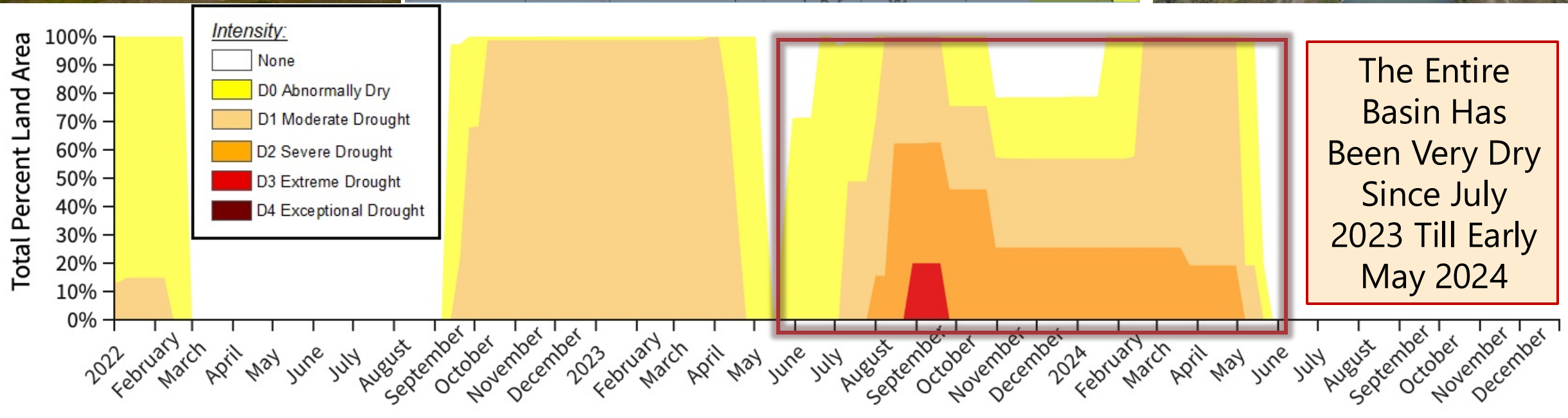
2024 Estimated Inflow

163,300 Acre-Feet

DEVILS LAKE BASIN SOIL CONDITION

DROUGHT CONDITIONS (2022-2024)

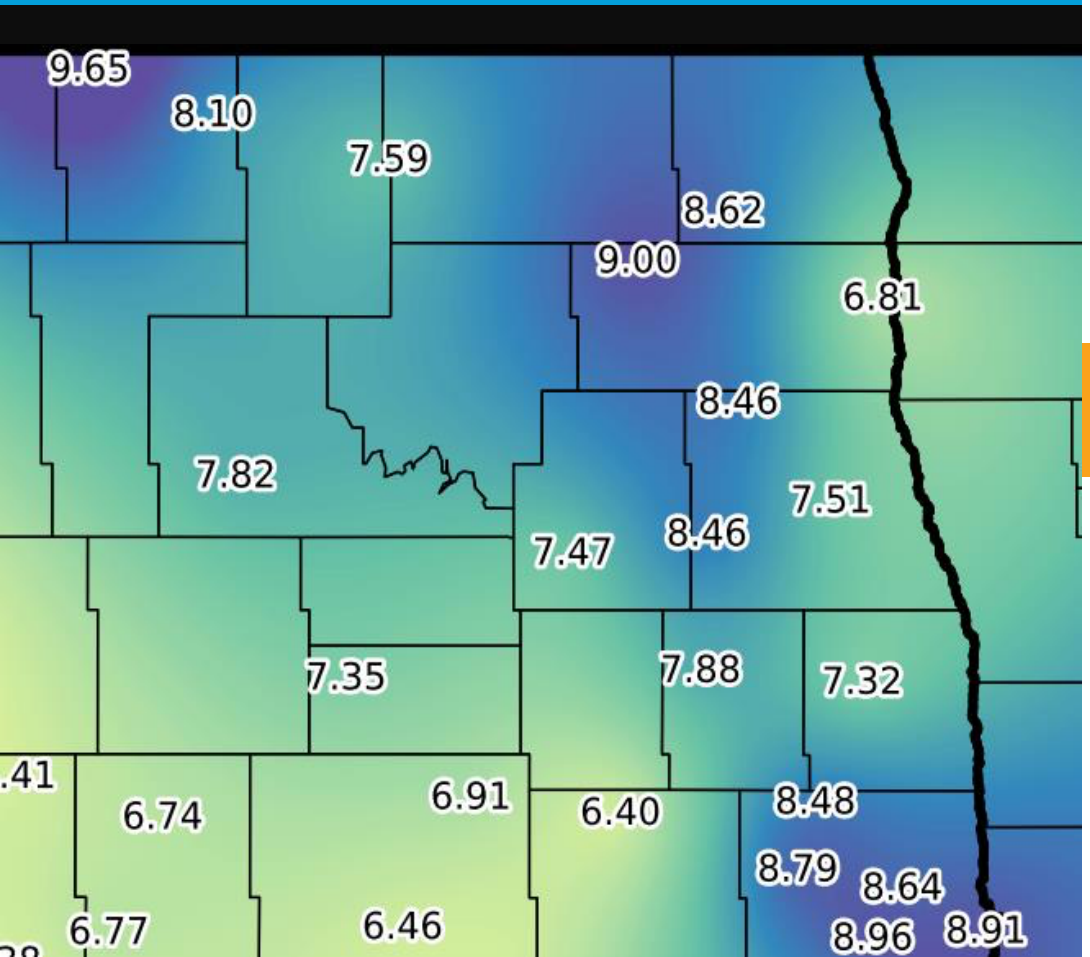




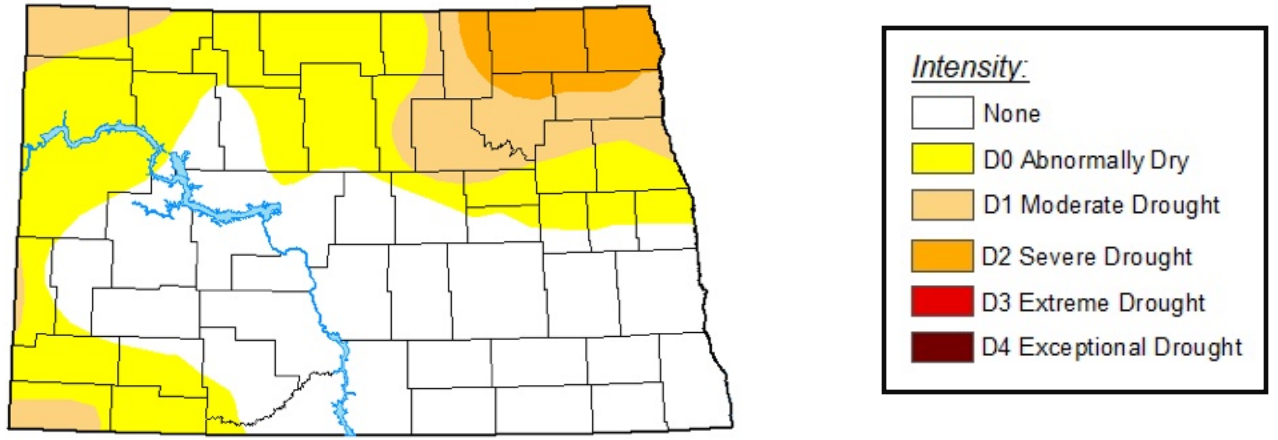
The Entire Basin Has Been Very Dry Since July 2023 Till Early May 2024

DEVILS LAKE BASIN SOIL CONDITION

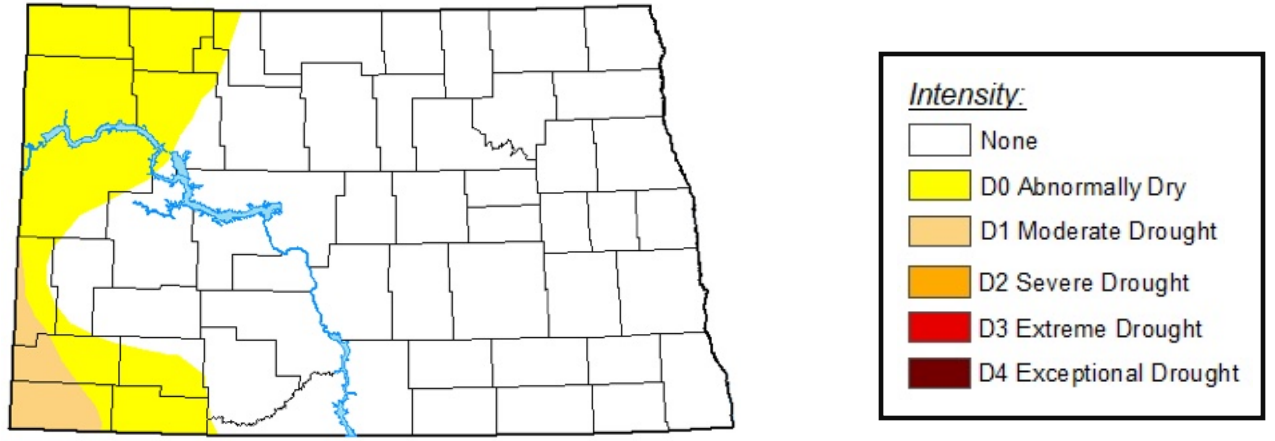
NDAWN PRECIPITATION (3/2023-5/2024)



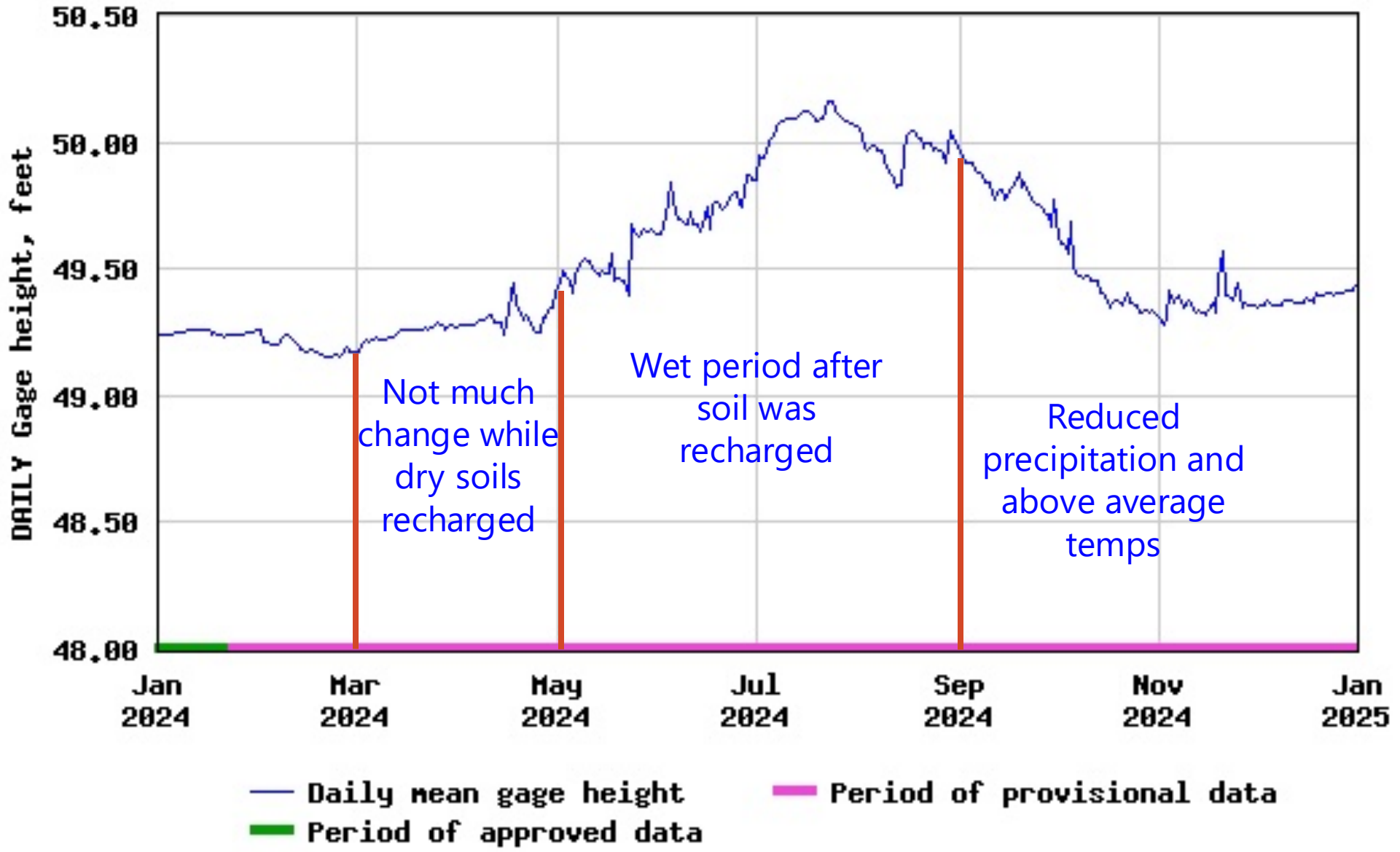
SPRING DROUGHT CONDITIONS (4/30/2024)



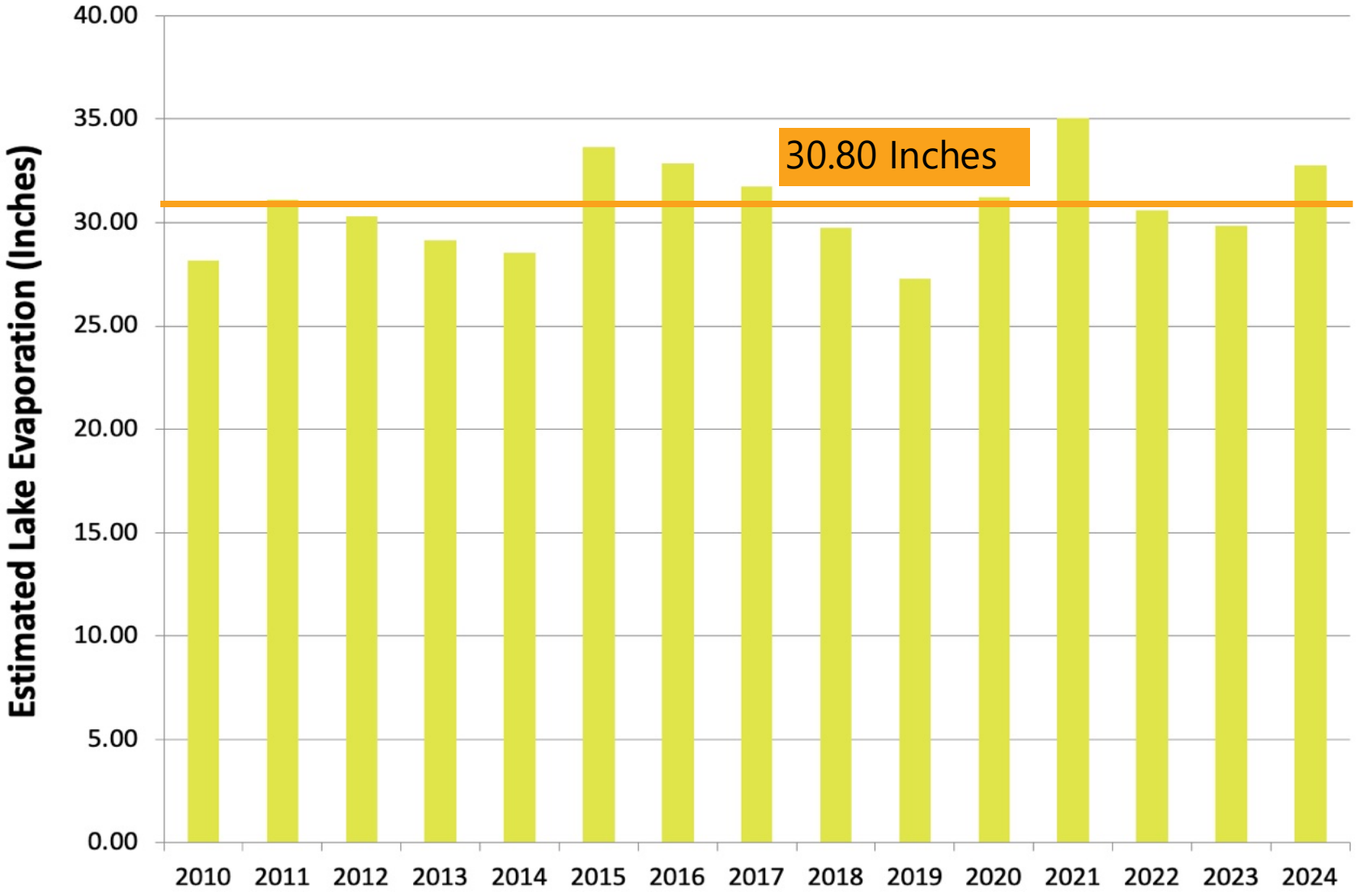
SPRING DROUGHT CONDITIONS (5/28/2024)



DEVILS LAKE BASIN SOIL CONDITION



DEVILS LAKE ESTIMATED EVAPORATION



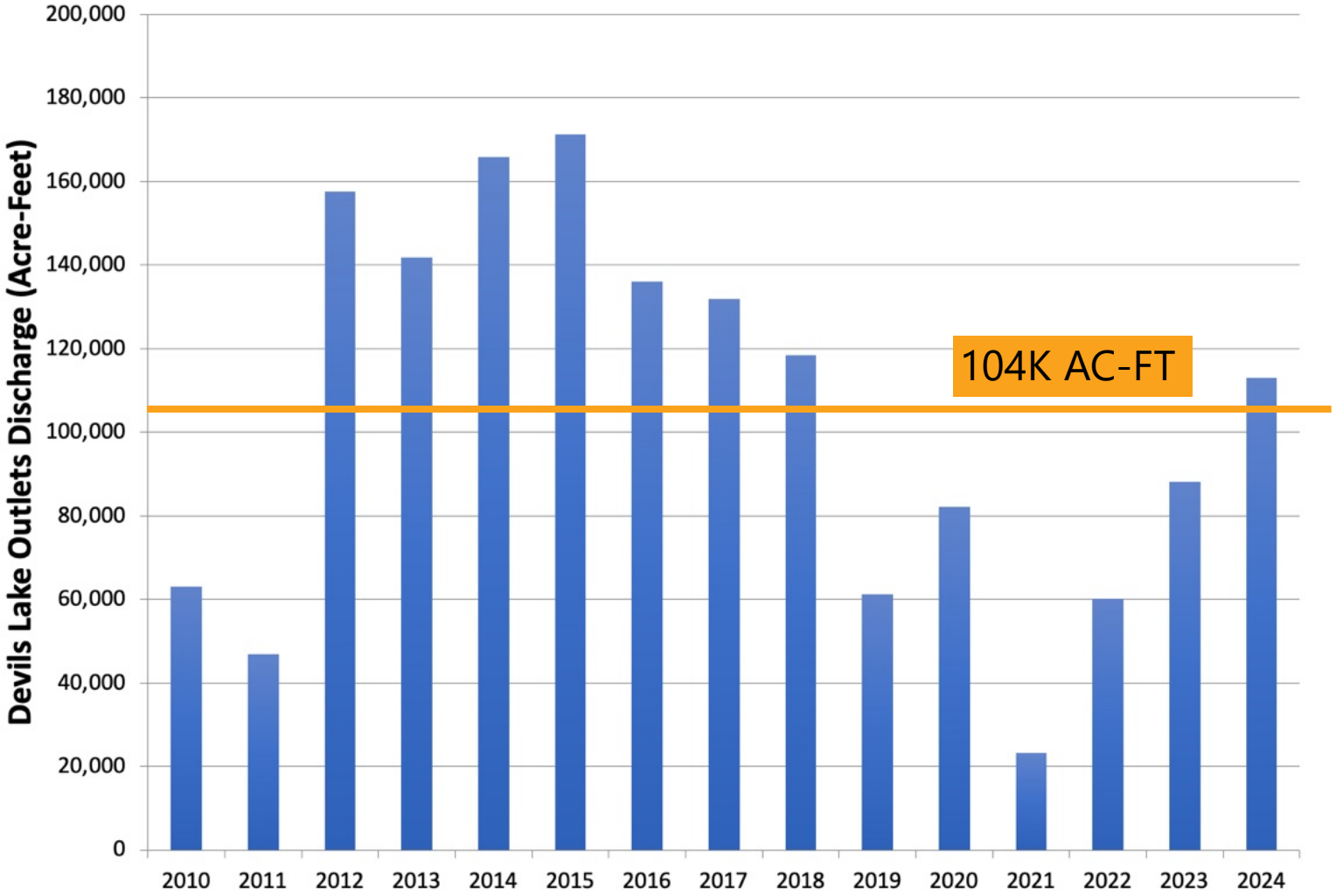
Average Annual Evaporation
(2010-2024)

30.80 Inches

2024 Evaporation

32.76 Inches

DEVILS LAKE OUTLETS DISCHARGE



Average Annual Outlets Discharge (2010-2024)

104,030 Acre-Feet

2024 Outlets Discharge

113,079 Acre-Feet

LAKE ELEVATION

1449.7 Feet May 6, 2025

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**

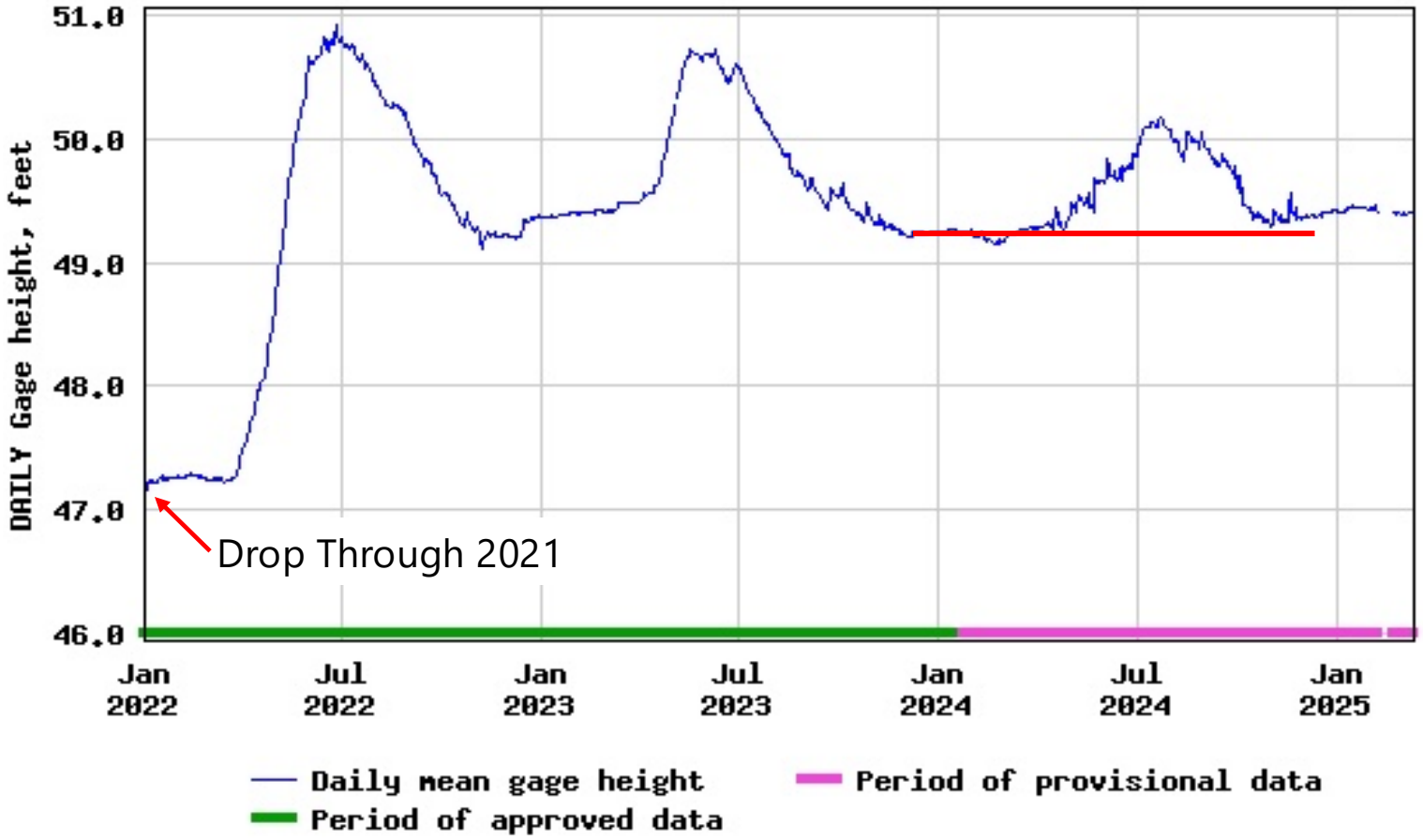
Devils Lake Has Been **Steadily Declining** Except For The **Spring Of 2022**

Currently **Down Approximately 4.6 Feet** Since Its Peak

LAKE ELEVATION

2022 - PRESENT

Data Courtesy Of USGS Gage 05056500



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

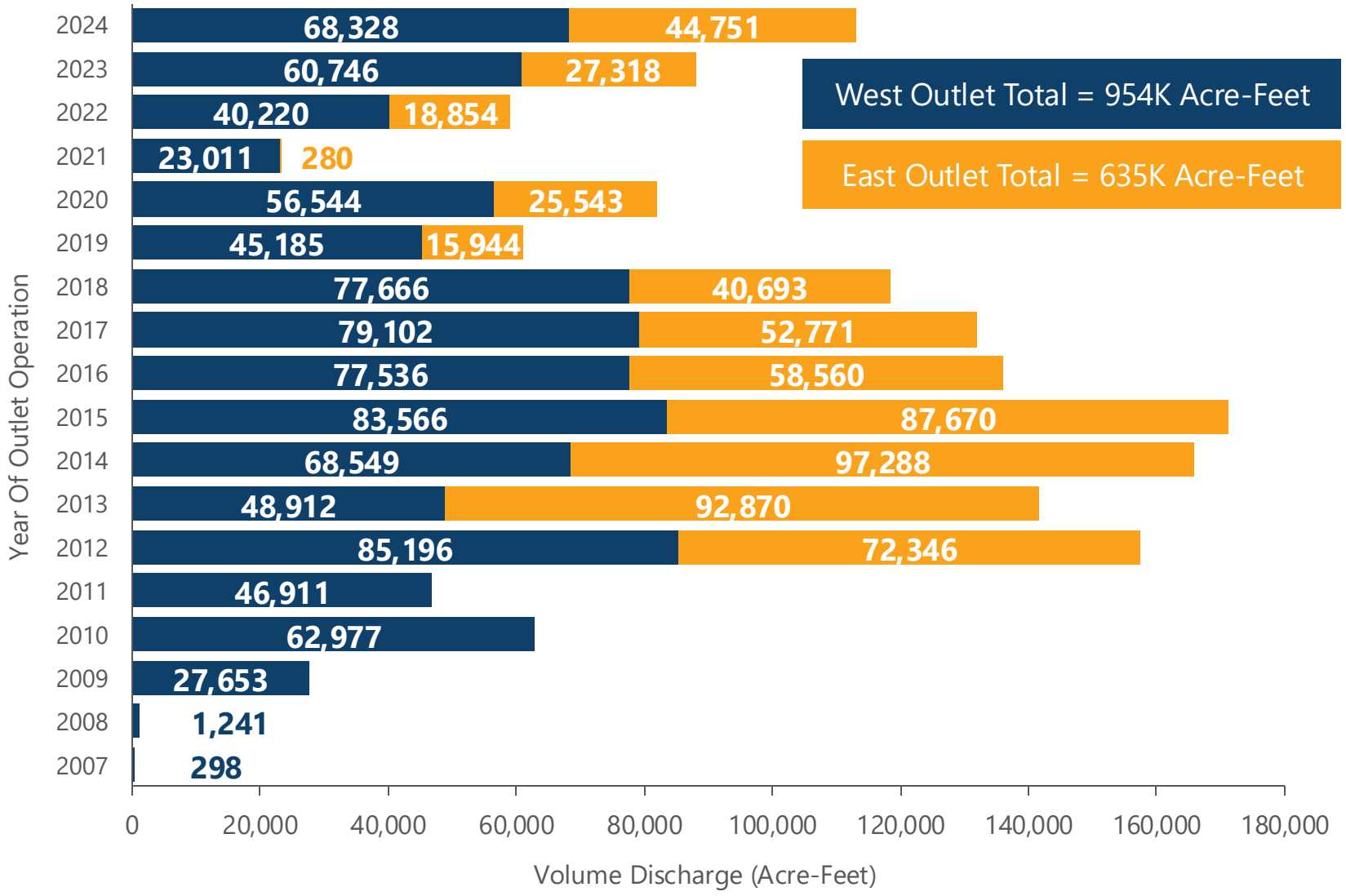
In **2024**, Devils Lake **Began** At Level **1449.2 Feet** & **Ended** At Level **1449.4 Feet**

In **2025**, Devils Lake Is **Expected** To Rise Approximately To **1450.0 Feet**

2024 OPERATIONAL SUMMARY

YAPING CHI, DEVILS LAKE ENGINEER

2007-2024 DEVILS LAKE OUTLET DISCHARGE



2024 Total Discharge
113,000 Acre-Feet

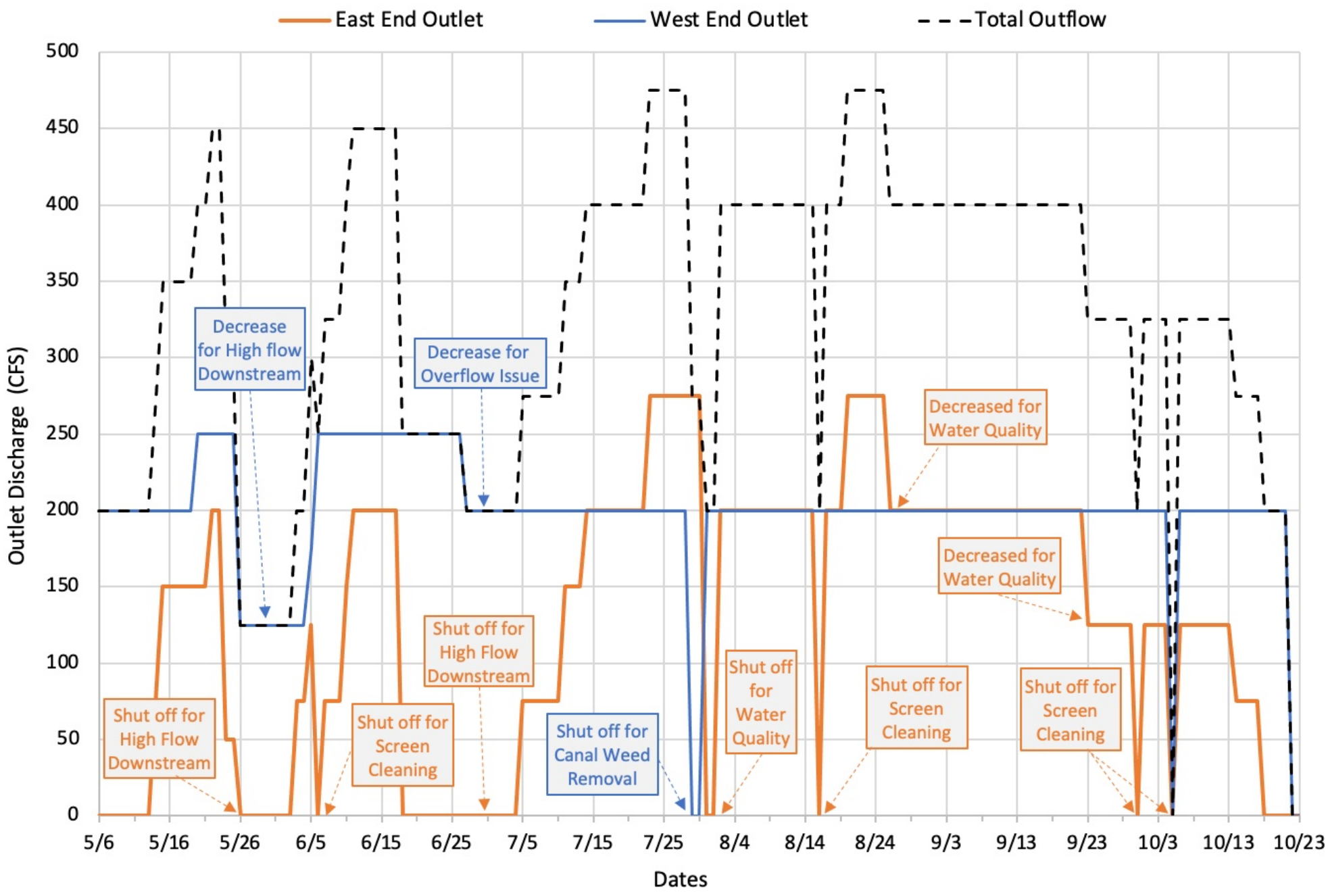
West End Outlet Operated
166 Days In 2024

East End Outlet Operated
126 Days In 2024

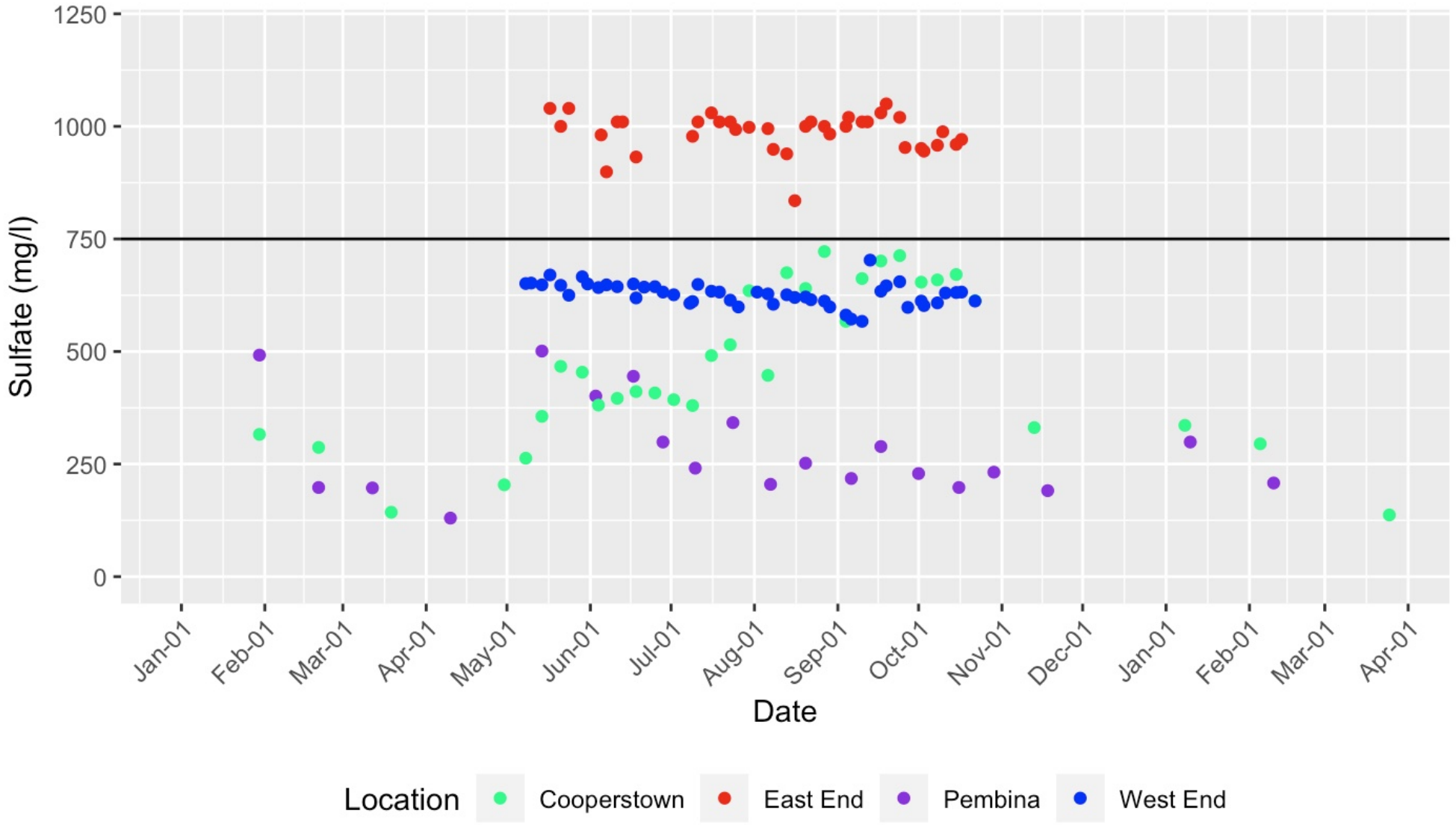
Combined Discharge Of
Over 1.5M Acre-Feet
(2007 - 2024)

The 2024 Peak Lake Level
Would Have Been 0.7 Feet
Higher Without The Outlets

2024 DEVILS LAKE OUTLETS DISCHARGE



2024 SULFATE LEVELS



DEVILS LAKE OUTLETS ENGINEERING SERVICE

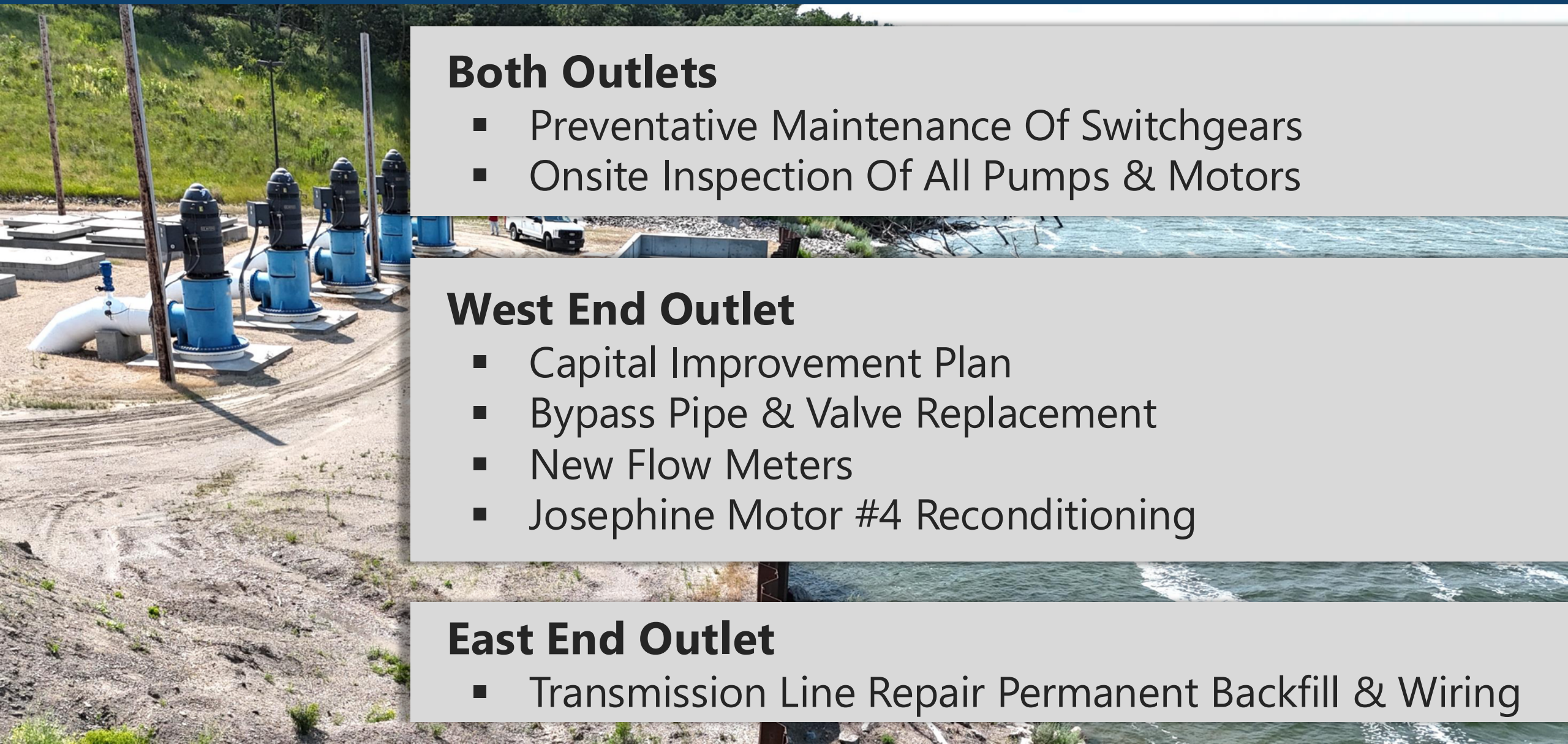
YAPING CHI, DEVILS LAKE ENGINEER

DEVILS LAKE OUTLETS ENGINEERING SERVICE

In April 2024, BW/AECOM Was Retained To Provide Engineering Services As Requested By The Department For Maintaining The Continued Operations Of The Devils Lake West End Outlet & East End Outlet

The Contract Remains In Effect Until March 1, 2029

PROJECTS COMPLETED IN 2024



Both Outlets

- Preventative Maintenance Of Switchgears
- Onsite Inspection Of All Pumps & Motors

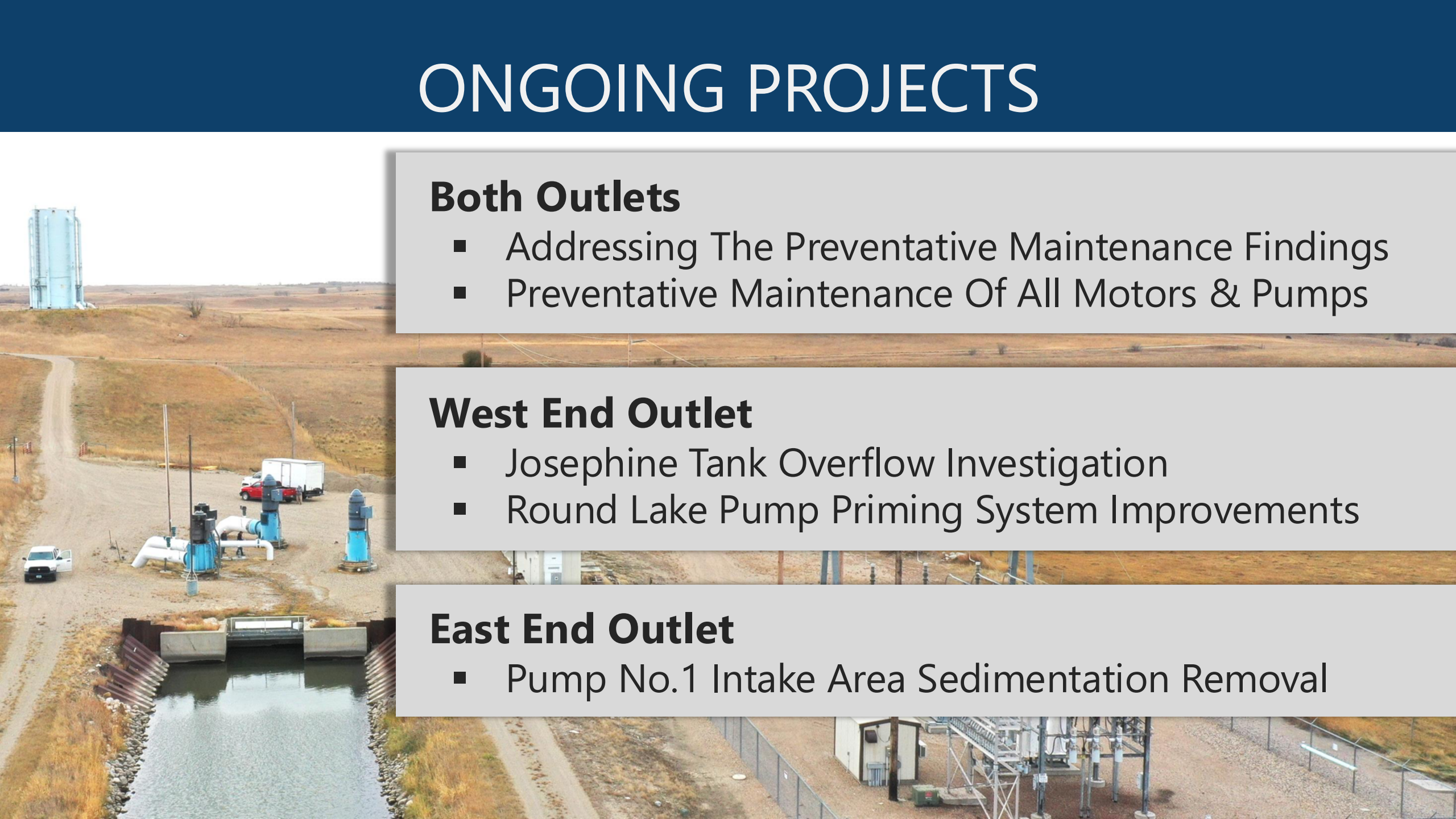
West End Outlet

- Capital Improvement Plan
- Bypass Pipe & Valve Replacement
- New Flow Meters
- Josephine Motor #4 Reconditioning

East End Outlet

- Transmission Line Repair Permanent Backfill & Wiring

ONGOING PROJECTS



Both Outlets

- Addressing The Preventative Maintenance Findings
- Preventative Maintenance Of All Motors & Pumps

West End Outlet

- Josephine Tank Overflow Investigation
- Round Lake Pump Priming System Improvements

East End Outlet

- Pump No.1 Intake Area Sedimentation Removal

2025 OUTLETS OPERATIONS OUTLOOK

YAPING CHI, Devils Lake Engineer

STATUS BY COMMITTEE MEMBERS

QUESTIONS & ANSWERS

THANK YOU

701.328.2750

dwr@nd.gov

dwr.nd.gov

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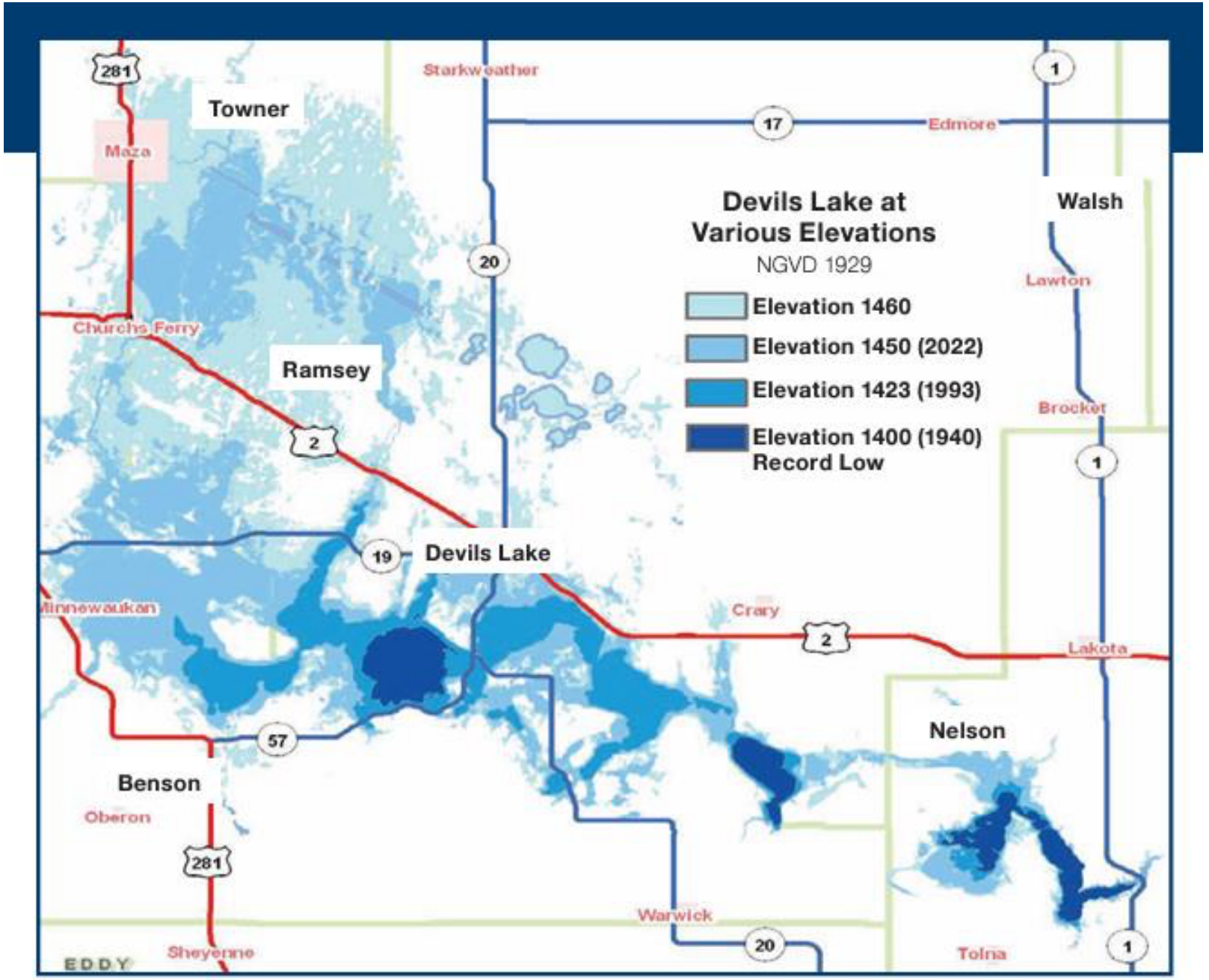
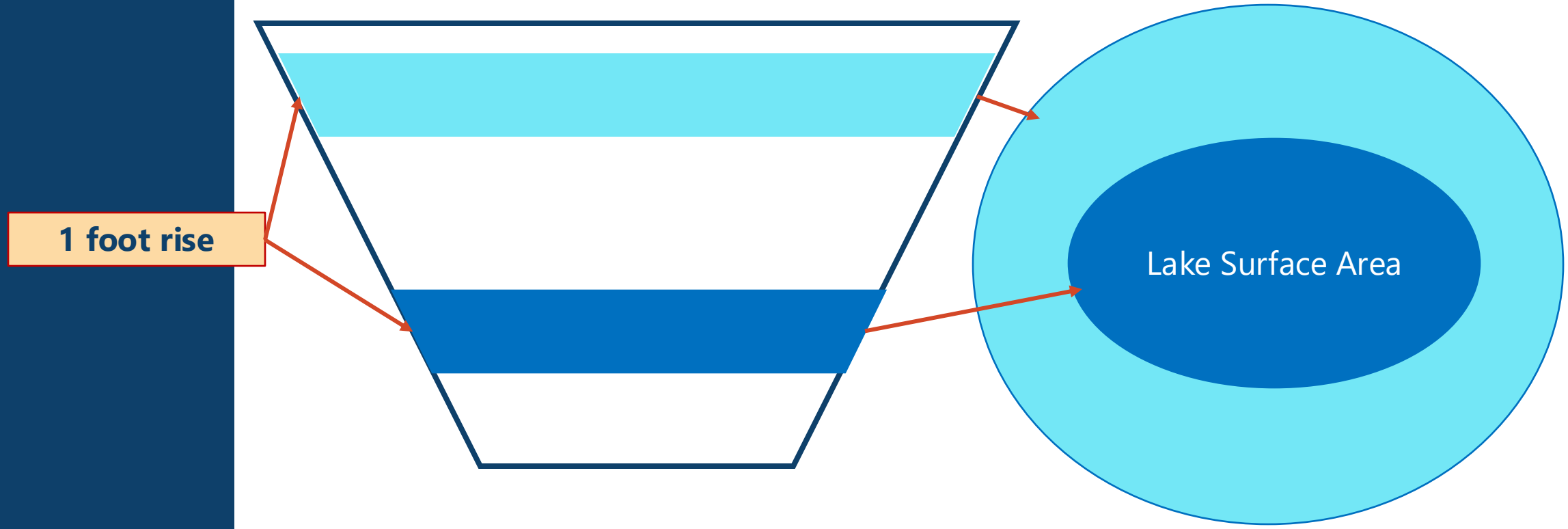
LAKE AREA AT VARIOUS ELEVATIONS



LAKE REDUCTION DUE TO OUTLET OPERATIONS

- Lake level low → covers smaller area → 1 foot depth holds less water.
- Lake level high → covers larger area → 1 foot depth holds more water.

Conceptual Sketch of Devils Lake



LAKE REDUCTION DUE TO OUTLET OPERATIONS

Example:

- The total discharged volume from both outlets is about **1.6 million ac-ft** since 2007.
- Applying the pumped volume to the **CURRENT** water surface elevation and using the elevation-volume data to estimate an approximate elevation without pumping.
- Applying the same pumped volume to a **LOWER** elevation, e.g., the March 1993 elevation to estimate an approximate elevation without pumping.
- As a reminder, this elevation doesn't account for additional losses from evaporation or other water balance factors. It's a straightforward calculation of the current elevation-volume plus the pumped volume to determine the total volume and the corresponding elevation.

Date	Lake level (ft)	Total pump volume (ac-ft)	Elev w/O pump (ft)	Elev increase (ft)
2025/2	1449.4	1590000	1457.4	8.0
1993/3	1422.6	1590000	1442.6	20.0