

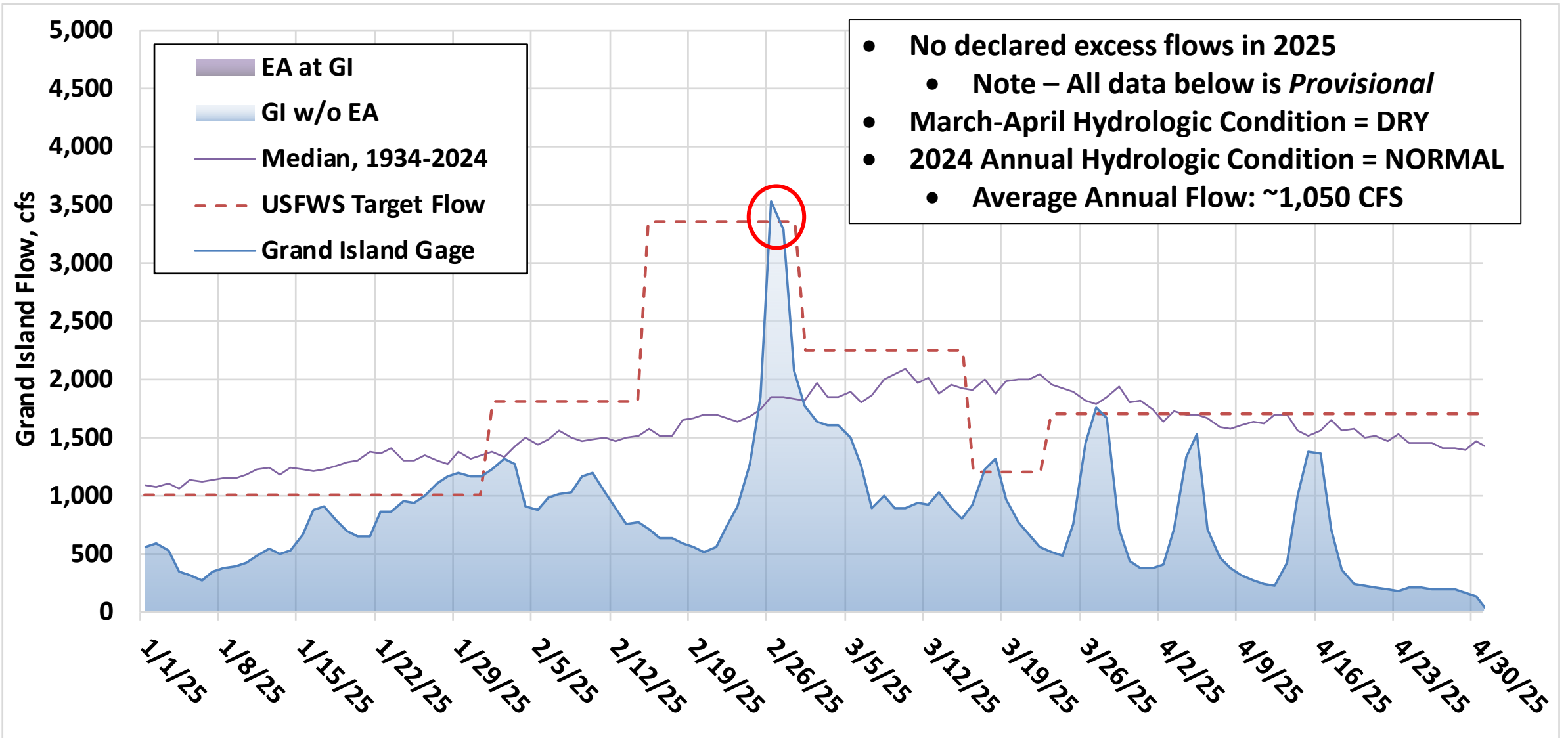
May 2025 Platte Basin Hydrology Update

Ed Weschler, E.I.

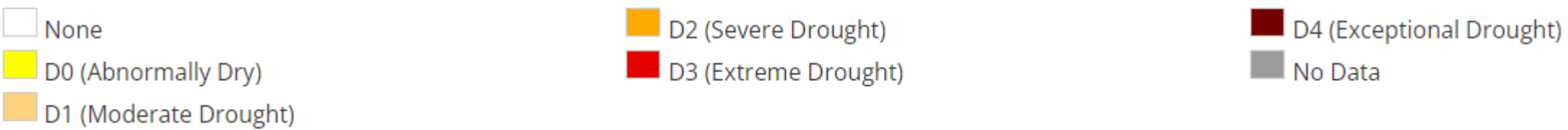
Water Advisory Committee Meeting

May 6, 2025

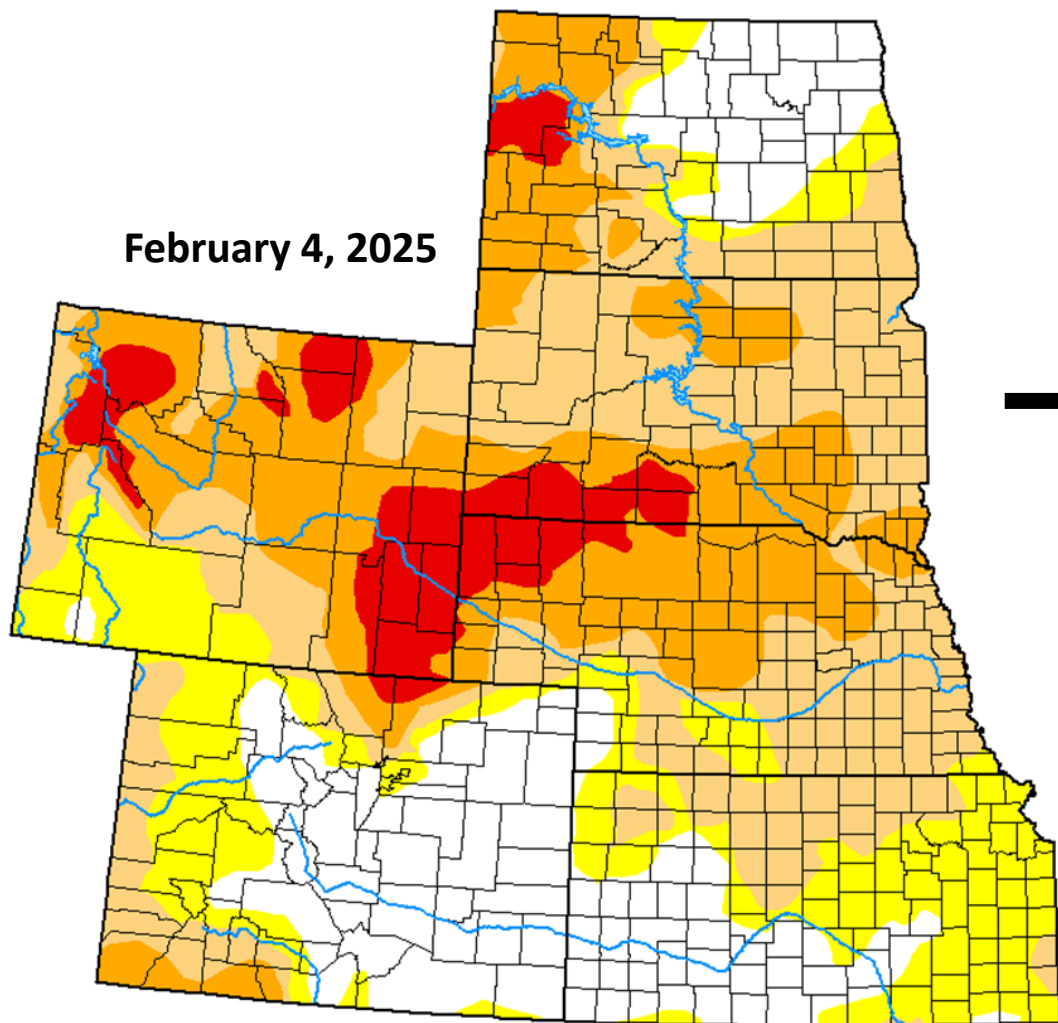
Flow updates



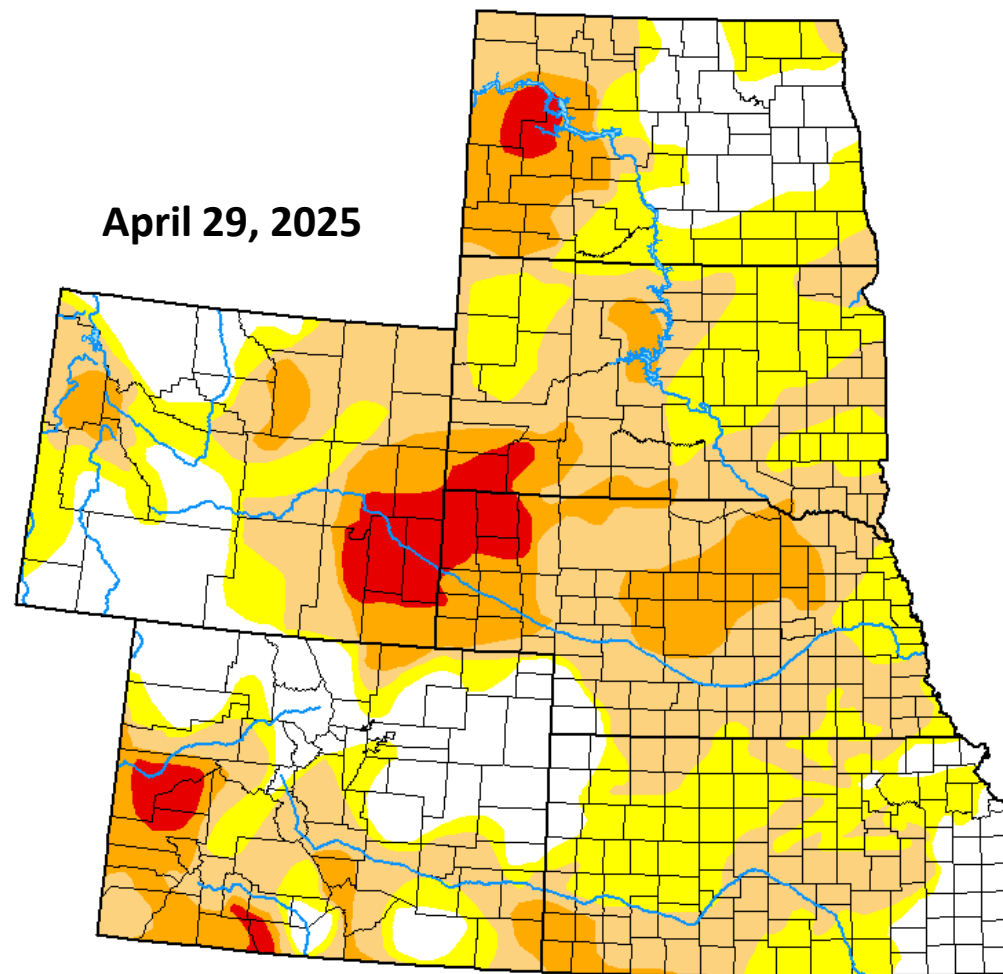
Drought Classification



February 4, 2025



April 29, 2025



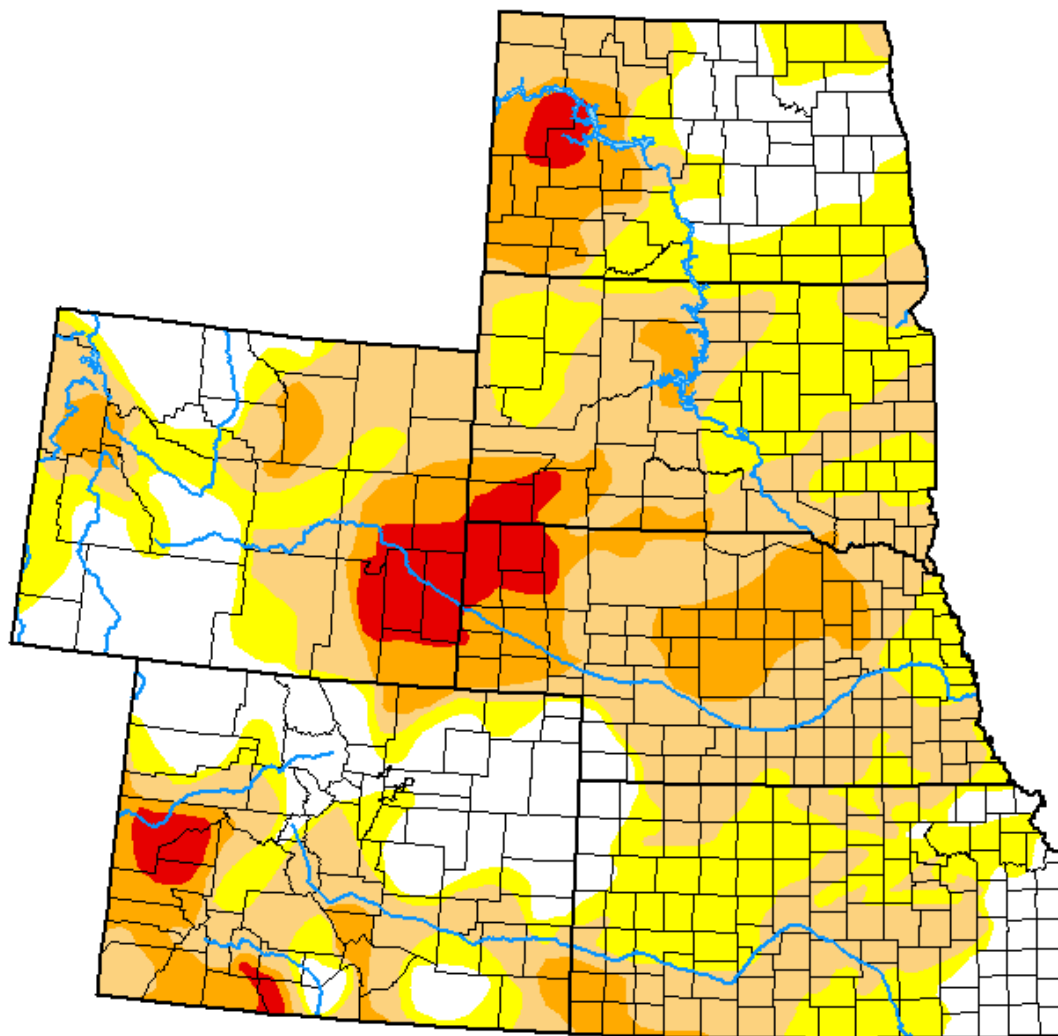
U.S. Drought Monitor

High Plains







April 29, 2025

(Released Thursday, May. 1, 2025)

Valid 8 a.m. EDT



Intensity:

-  None
-  D0 Abnormally Dry
-  D1 Moderate Drought
-  D2 Severe Drought
-  D3 Extreme Drought
-  D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Richard Tinker
CPC/NOAA/NWS/NCEP

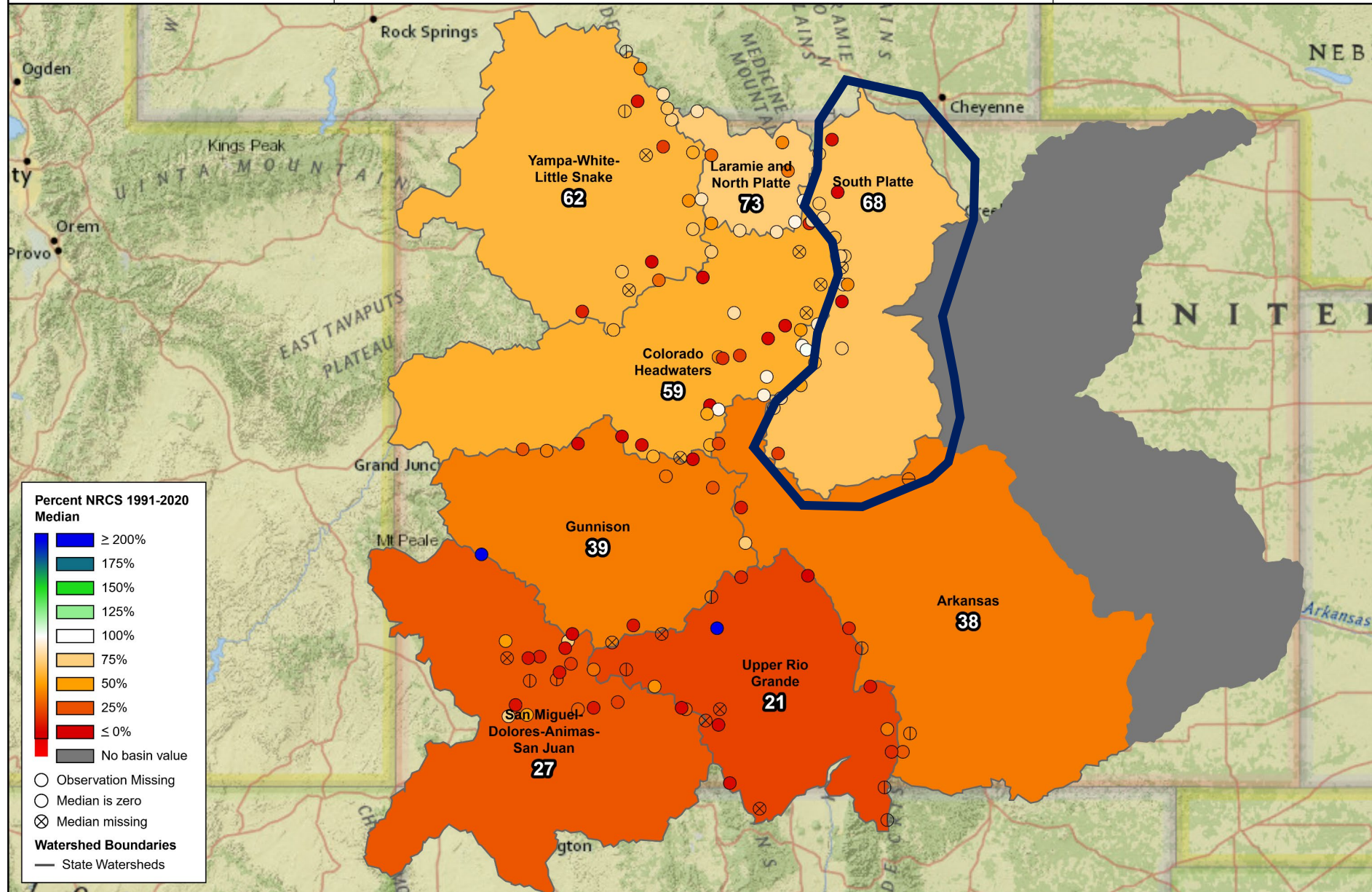


droughtmonitor.unl.edu

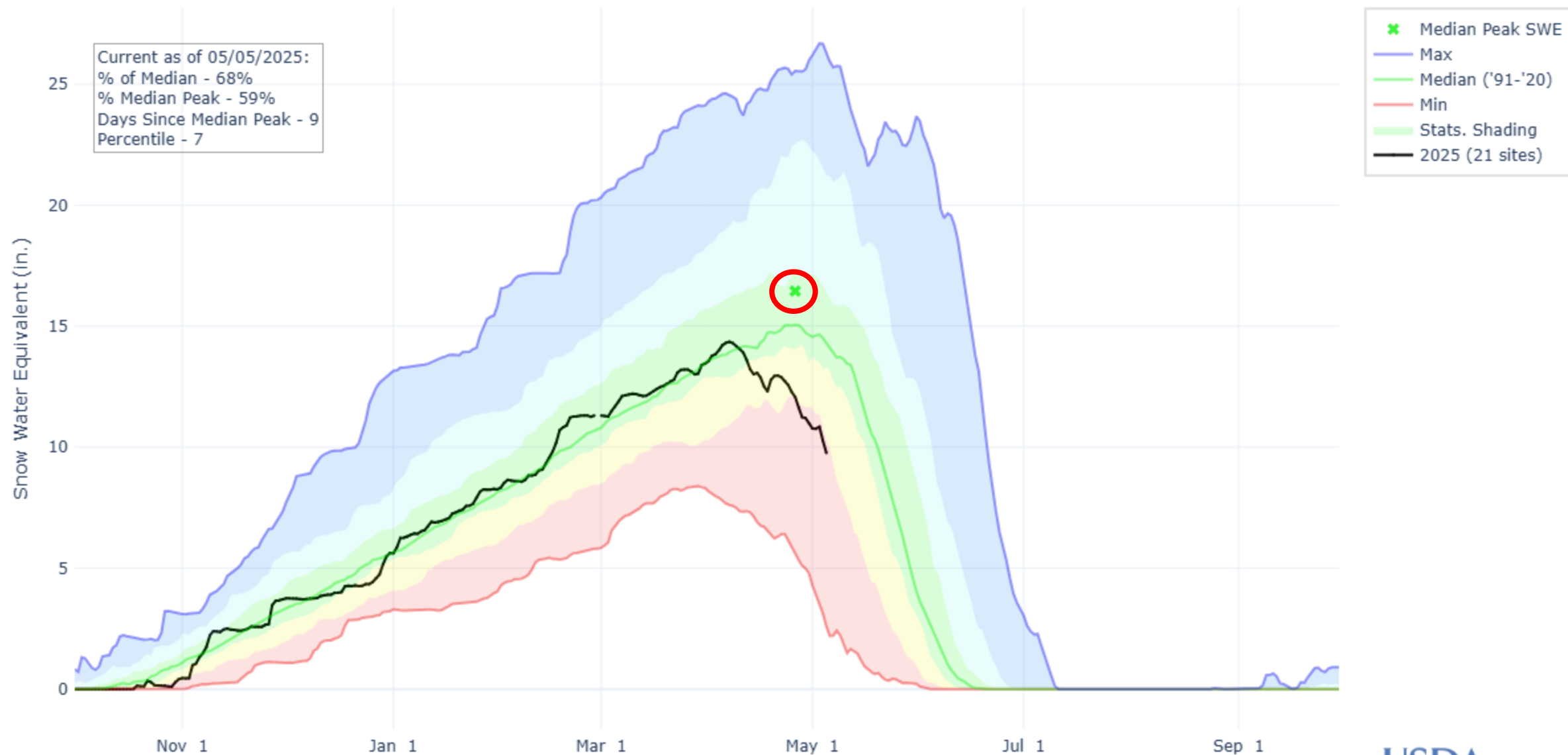
Snow Water Equivalent

Percent NRCS 1991-2020 Median

May 4, 2025, end of day



SNOW WATER EQUIVALENT IN SOUTH PLATTE

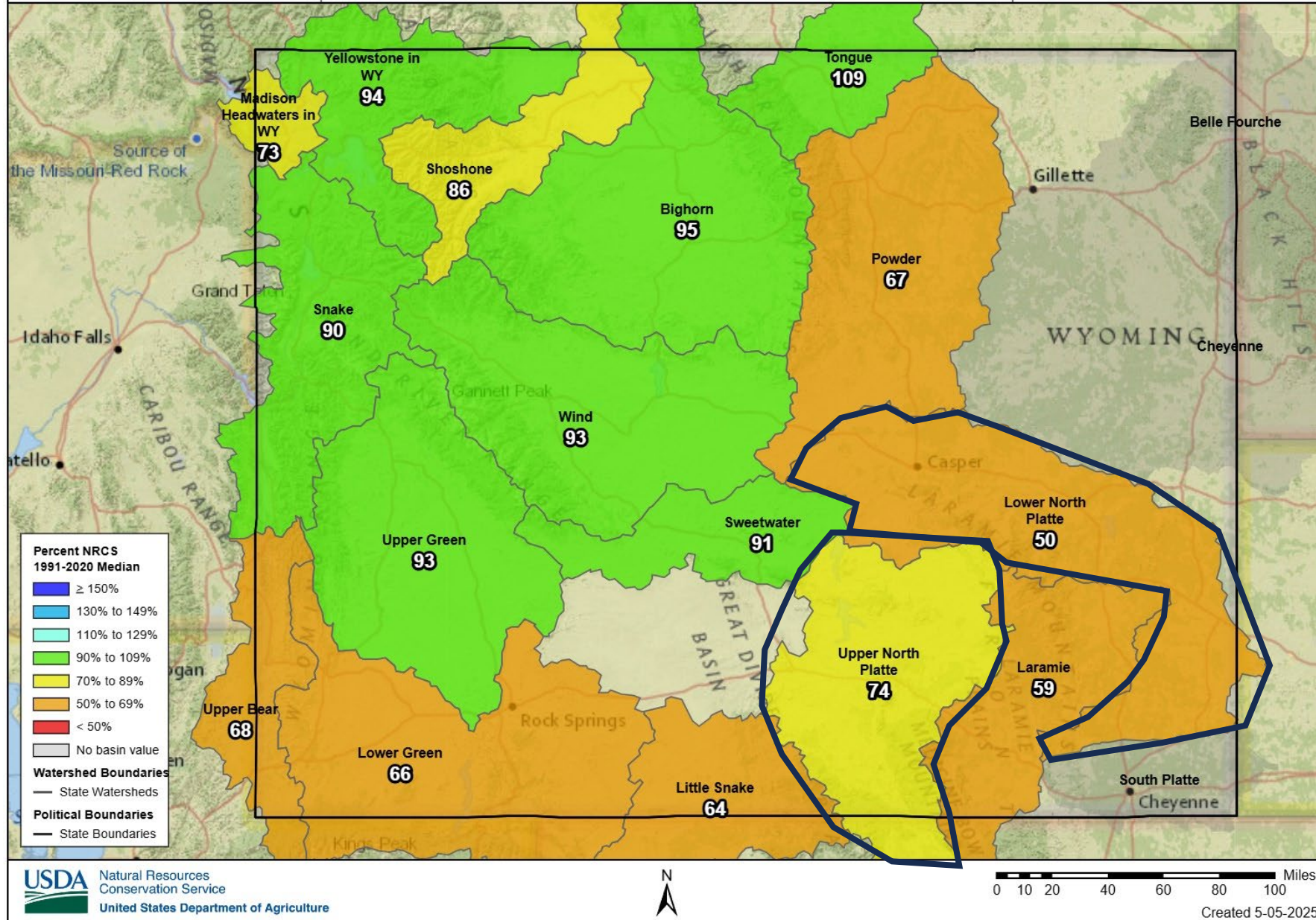


Snow Water Equivalent

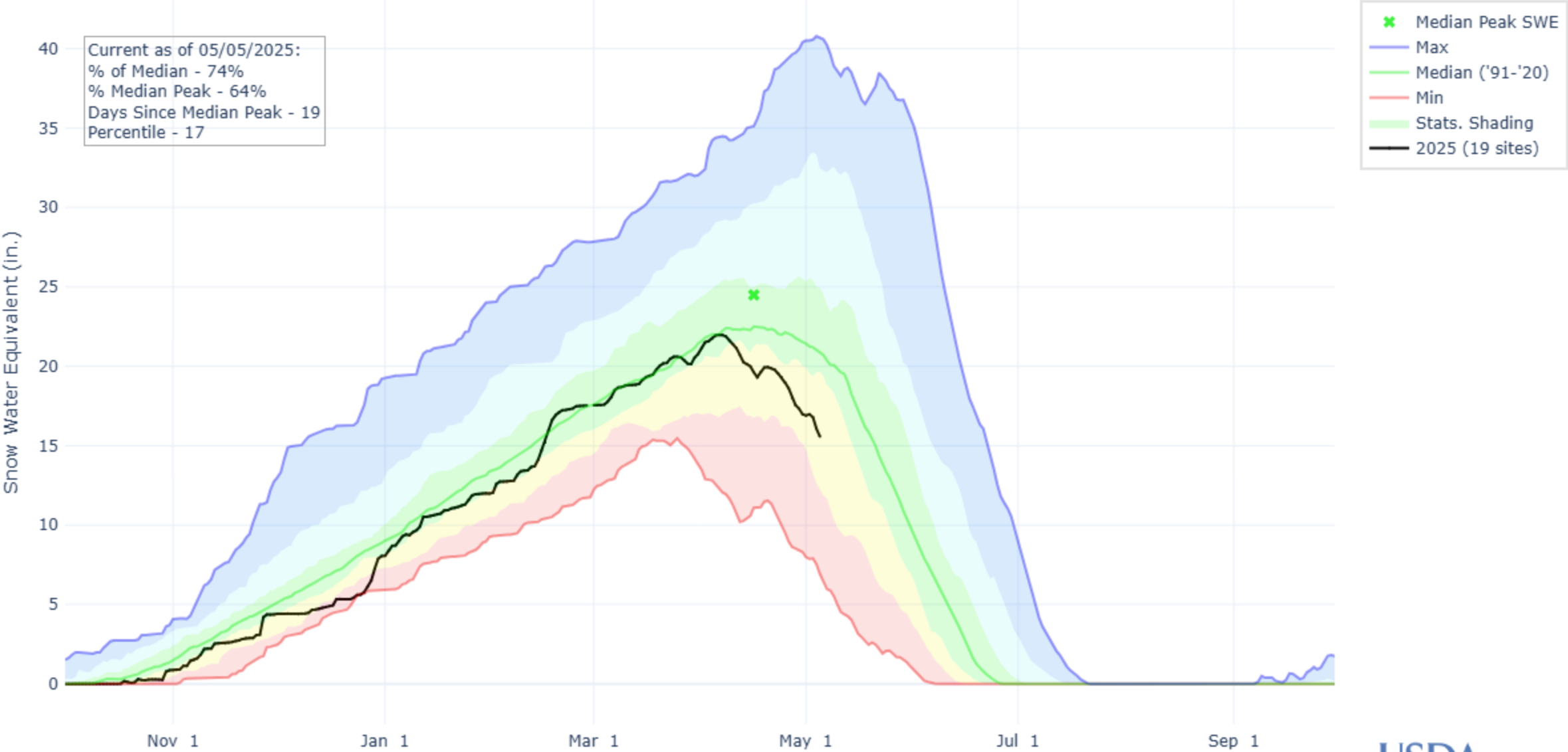
Wyoming Basins

Percent NRCS 1991-2020 Median

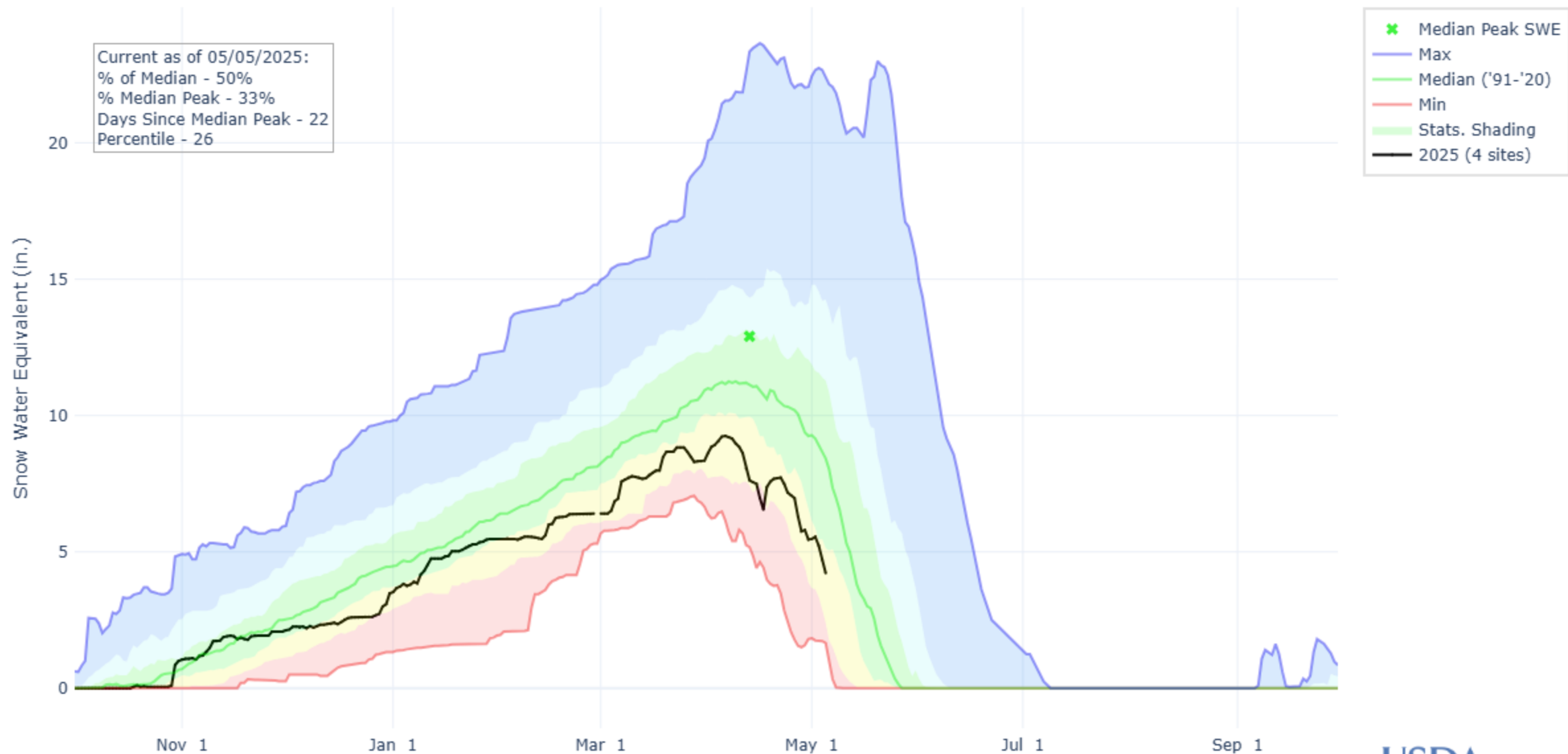
May 5, 2025, first of day



SNOW WATER EQUIVALENT IN UPPER NORTH PLATTE



SNOW WATER EQUIVALENT IN LOWER NORTH PLATTE



A photograph of a river at sunset. The water is dark with golden reflections from the low sun. A single bird stands in the shallow water on the left side of the frame. A white rectangular box is centered on the right side of the image.

Thank You!

May 2025 Water Plan Updates

Seth M Turner, PE
PRRIP Water Plan Coordinator
Water Advisory Committee Meeting
May 6, 2025

Recharge and Recapture Projects

- Recharge
 - No divertible excess flows in first 4 months of 2025
- Recapture
 - Wells #1-7 on since March 10
 - Ongoing maintenance issues with Cook well
 - Cumulative pumping = 751.7 AF as of April 18
 - 19.27 AF/day
 - 9.72 cfs
 - Likely ~325 AF April 19-May 5

Surface Water Leases

- CNPPID Irrigator Lease
 - Increased price paid from \$100/acre to \$160/acre
 - 1,129 acres enrolled (increase of 76 acres over 2024)
 - At 9"/acre, 846.75 AF to be credited to EA in October
 - Perspective:
 - Average credit to EA, 2021-2025 = 854 AF
 - Average EA evap + seepage losses, Oct '24-Mar '25 = 1,650 AF
 - Oct '24 EA credit = 790 AF, EA evap + seep losses = 1,797 AF
- CPNRD and NPPD Leases
 - Negotiations for longer-term leases (through Extension) still ongoing
 - Discussion expected at June GC meeting

Cottonwood Ranch Recharge Project

- Ongoing maintenance/repair activities
 - February 25: North outlet valve actuator replaced
 - May 28-29: Digital pressure gage calibration and outlet cavitation testing
 - Next: 2 new monitoring wells on east side of Cell 8
- Modified agreement with CNPPID
 - Expecting SCADA integration to be complete late May
 - EDO working on user manual for CNPPID

Monitoring Wells

- 10 Program project sites reviewed by TAC/WAC in February 2025
- EDO removing instruments from more than 50 monitoring wells
 - 8 of 10 sites completed
 - Only Fox/Spiedel and Binfield wet meadows sites left to remove
- Ownership transfers
 - One well (GW-1) at North Platte Chokepoint to Twin Platte NRD
 - Two wells (MW-3 and MW-5) between Phelps County Canal and Platte River to Tri-Basin NRD
- Next steps: Begin process of decommissioning about 25 wells

Lake McConaughy EA Release for Germination Suppression

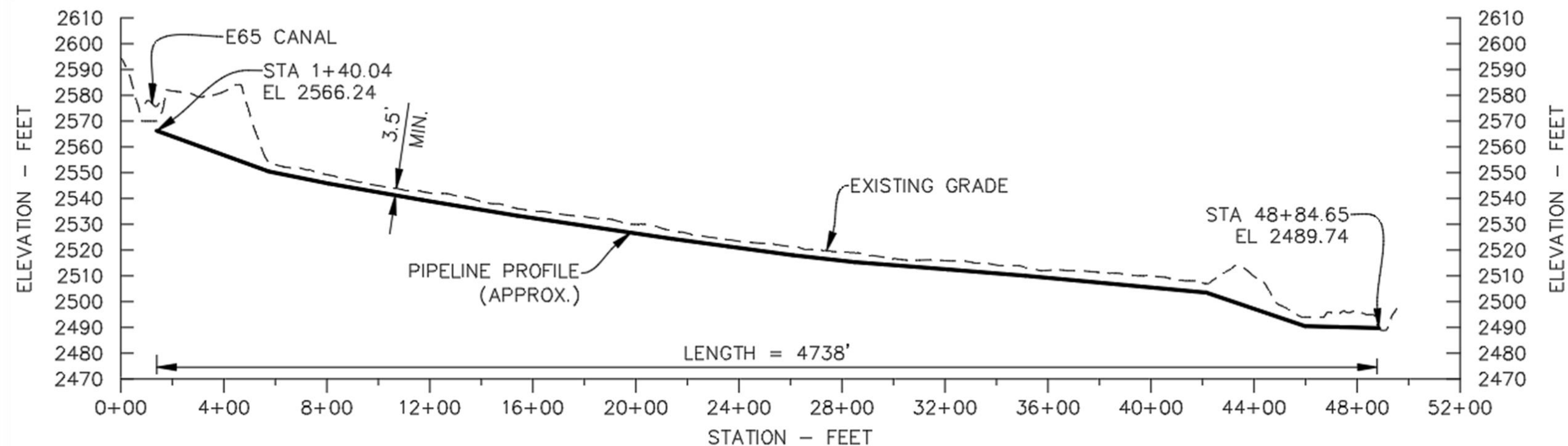
- 6th year for this test
 - EBQ #1: Can Program water maintain suitable whooping crane habitat?
 - EBQ #2: Can Program water help to control phragmites (with continued herbicide spraying) to maintain suitable whooping crane habitat
- 1,500 cfs at Grand Island from June 1-30
- Anticipate release start around May 23
 - Twice weekly coordination meetings
 - Current dry river conditions may require high rate of release
- Releasing up to 150 AF to be used for testing at Cottonwood Ranch

Wet Meadows Peer Review

- Hired Calvin Miller, P.E., Ph.D as Special Advisor
- Working on response to peer review
- Rewriting one of the document chapters
- Expect completion by next WAC meeting

Elwood Outlet Feasibility Study

- Phase 1 proceeding from Expanded Recapture Reconnaissance Study completed in 2024
- 100 cfs capacity, buried pipeline options only (no open channel)
- Consultant team (LRE Water and RJH) developed 9 possible alignments on both sides of Hwy 283
 - Reviewed by EDO and CNPPID
 - CNPPID identified preferences for access and operations
 - Investigated feasibility of using Hwy 283 ROW (50'+ cuts or tunneling)
- May 1 meeting
 - Selected preferred alignment for 30% design
 - Discussed pipeline intake options
 - Ongoing discussions with NDOT, RE: use of existing box culvert for conveyance under Hwy 283
- CNPPID developing easement option for primary affected landowner
- Anticipate presentation of 30% design at August WAC, September GC



JANE JACK PROFILE

0 250 500 1000

HORIZ. SCALE: 1" = 500'

VERT. SCALE: 1" = 50'



- Phelps County Canal intake for Cottonwood Ranch delivery pipeline
- Similar proposed for Elwood outlet pipeline intake from E-65 Canal



Scoring vs Accounting for Program Water Projects

SCORING
≠
ACCOUNTING

Yes, SCORING and ACCOUNTING both calculate the same thing:

REDUCTIONS to TARGET FLOW DEFICITS at GRAND ISLAND

But,

The PURPOSES are different

and

The METHODS are different

Scoring vs Accounting PURPOSES

- Scoring
 - Theoretical estimate of water project performance
 - Metric that counts towards achieving the Water Objective of reducing deficits by 130,000-150,000 AFY
- Accounting
 - Actual operational water project performance
 - Provides insights into the ongoing validity of the assumptions made in the score analysis
 - Can inform the need to revise the score, e.g., Pathfinder Municipal Account Lease and CNPPID irrigator lease

Scoring METHODS

- 1947-1994 analysis period
- Daily or monthly time step
- OPSTUDY hydrology (“present” conditions with three state projects)
- USFWS target flows from Program Doc Water Plan Reference Materials (Appendix A-5, Col 4 or 8)
 - ANNUAL hydrologic condition (wet, avg/normal, dry)
 - Retroactive designation based on annual average flow at GI
- EA water included in shortage calcs, excluded from excess flow calcs
- Program water routed to GI using loss factors from WMC Loss Model
- Return flows below Overton discounted

Scoring METHODS

- EDO develops score analysis
- Multiple operational or water availability scenarios tested
 - “Score” = 48-year average annual deficit reduction
 - Based on 1947-1994 analysis period
- Scoring Subcommittee
 - Reviews score analysis, can recommend changes
 - Recommends score value for GC approval
 - Often involves NEGOTIATION

Approved WAP Project Scores

Project	Year Scored	Approved Score (AF)
Phelps County Canal Groundwater Recharge	2013	2,700
No-Cost Net Controllable Conserved Water (NCCW)	2016	260
Cook Recapture Well	2016	160
Pathfinder Municipal Account Lease (Revised)	2018	6,350
Elwood Reservoir Groundwater Recharge	2019	2,800
CNPPID Irrigator Lease	2019	1,900
TOTAL =		14,170

- J2 Regulating Reservoirs: Originally scored in 2010 case study, revised 2012, eliminated after 2015
- Pathfinder Municipal Account Lease: Originally scored in 2014, revised 2018
- CNPPID Irrigator Lease: Assumed revised score ~710 AF based on reduced enrollment since 2021

Accounting METHODS

- Calendar years starting 2007 (most recent 2022 and 2023)
- Approved USGS flow data for Platte River nr Grand Island (06770500)
- USFWS target flows from Program Doc Water Plan Reference Materials (Appendix A-5, Col 4 or 8)
 - REAL-TIME hydrologic condition
 - Updated by EDO 7 times each year
 - Lagging indicator developed by USGS (Anderson and Rodney 2006)
 - Equations use various combinations of 7 factors
 - Typically intra-year variability
- Deficits calculated from actual USFWS target flows and Grand Island flows
- Excess flows only available if declared by Nebraska DNR

Scoring vs Accounting

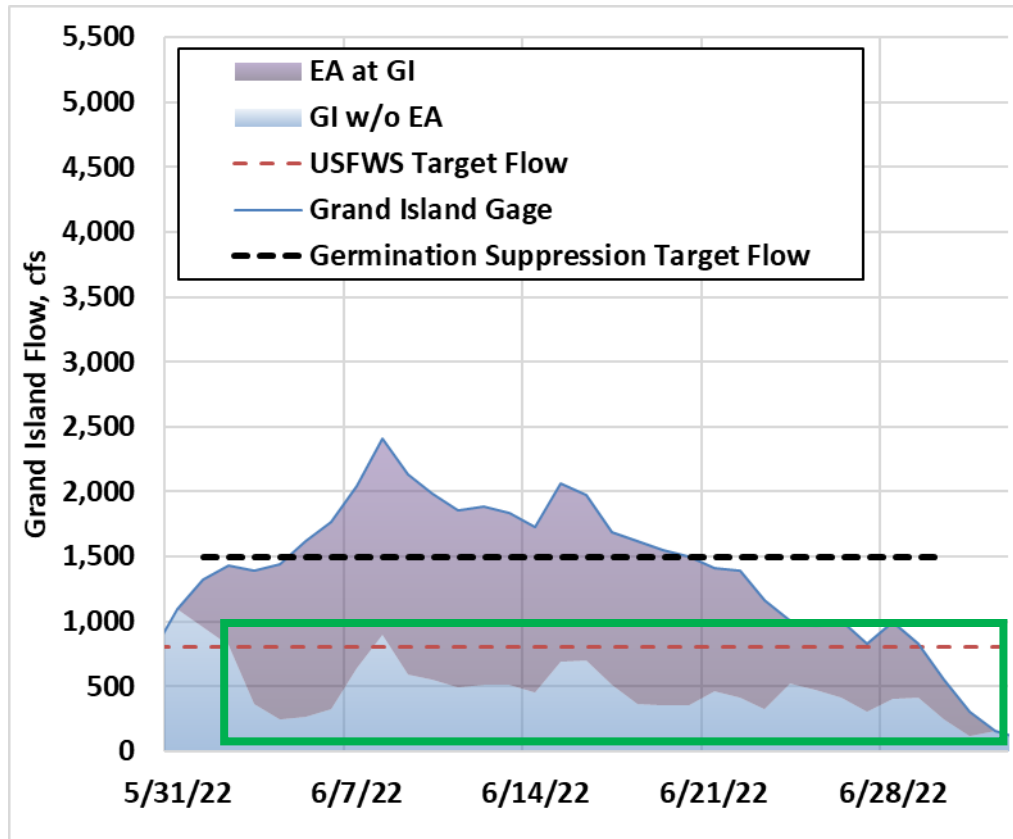
- In general, accounting results < project scores
- WHY???
 - Time
 - Project scores are 48-year averages
 - Most WAP projects online 2012 or after, operations data for 13 years or less
 - Also long, slow process for return flows from recharge
 - Reduced availability of excess flows
 - 1947-1994 vs 2007-present
 - EDO analysis in 2015, needs updated

Scoring vs Accounting: EA Releases

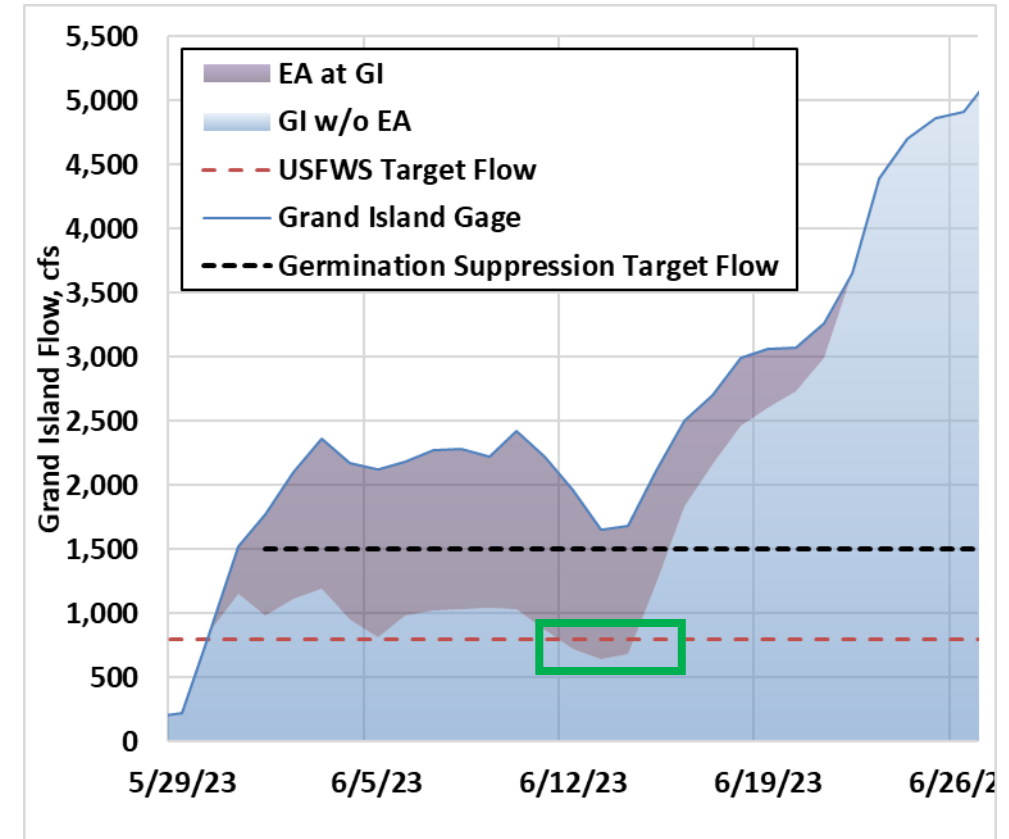
- Scoring
 - EA water released only to reduce deficits
 - Starts in March each year (or first subsequent month with deficit)
- Accounting
 - EA water released for specific species/habitat benefit or scientific purpose
 - Deficit reductions are incidental

Scoring vs Accounting: EA Releases

Purple shaded area below red dashed line counts as deficit reduction

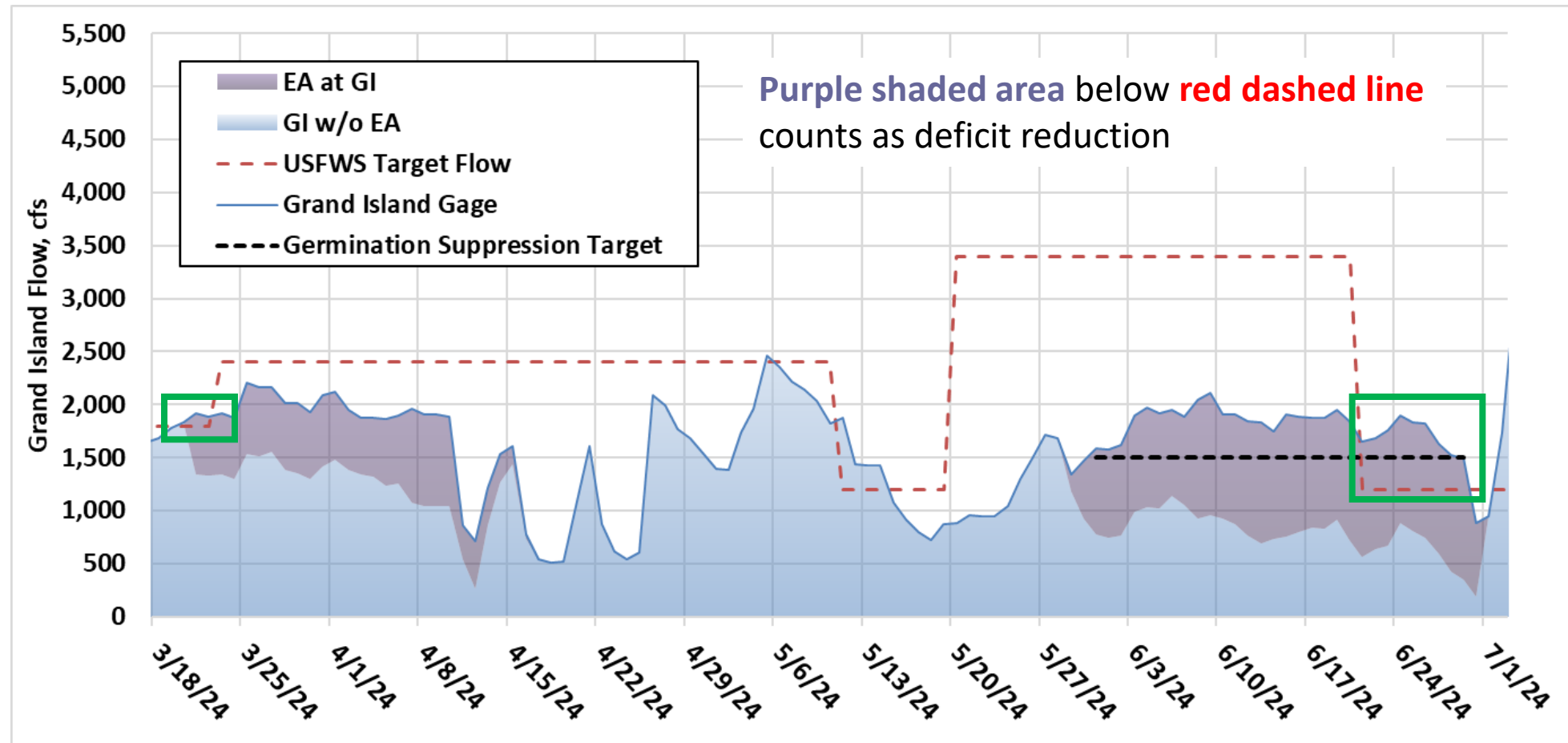


- 61,500 AF EA water at Grand Island
- 19,100 AF (31%) counted as deficit reduction



- 40,300 AF EA water at Grand Island
- 700 AF (1.7%) counted as deficit reduction

Scoring vs Accounting: EA Releases



- 30,600 AF EA water at Grand Island
- 30,200 (98.7%) counted as deficit reduction

- 63,250 AF EA water at Grand Island
- 54,350 (86%) likely counts as deficit reduction

Scoring vs Accounting Memo

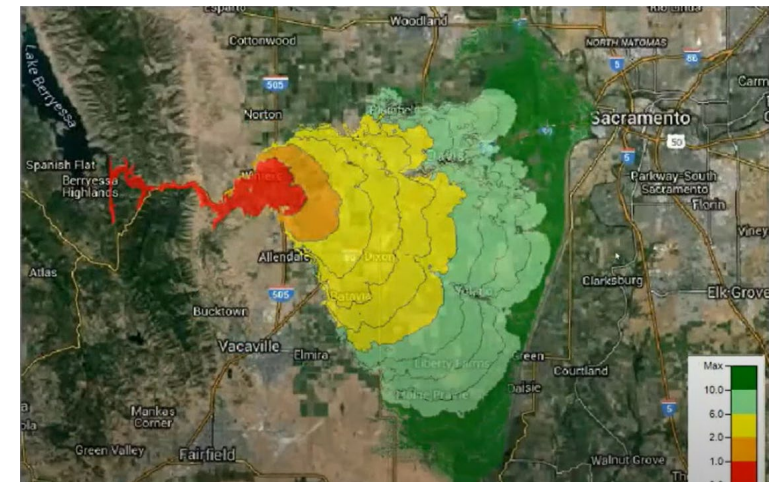
- Memo is draft, WAC provide questions/comments/feedback
- Includes links to scoring documentation
 - 2010 scoring case study
 - Approved project scores (Table 1)
- Includes links to accounting documentation
 - Phelps recharge reports, 2013-2017
 - Accounting 2007-2018 (2019 doc)
 - Updated with 2019-2020 (2021 doc)
 - Updated with 2021 (2023 presentation)
 - Updated with 2022-2023 (2024 presentation)
- Most links to WAC doc library, need login credentials for access

2-D HEC-RAS for the Central Platte AHR

May 2025 WAC Meeting

2-D HEC-RAS Overview

- Uses a Sub-Grid Mesh Technology
- Can be used to get fast answers provided a LiDAR surface
- Ideal for highly braided systems such as the Central Platte



Courtesy Alex Kennedy, HEC

AHR Example

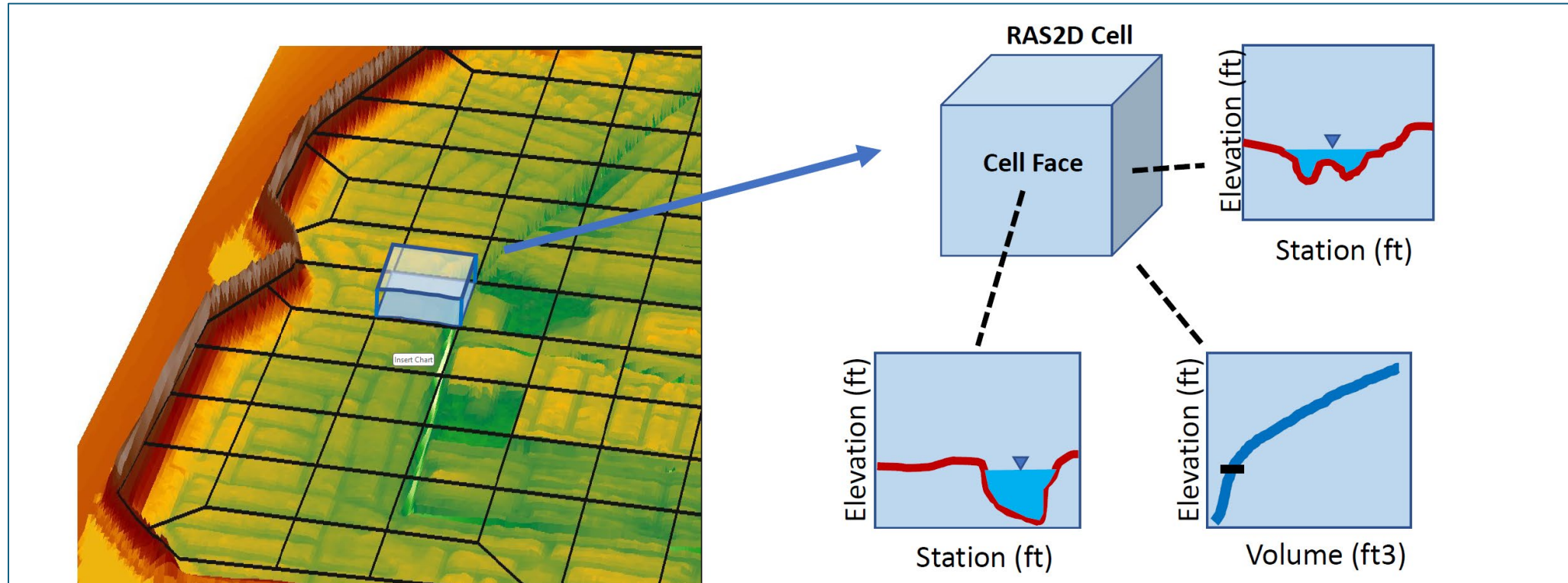


Cell Details

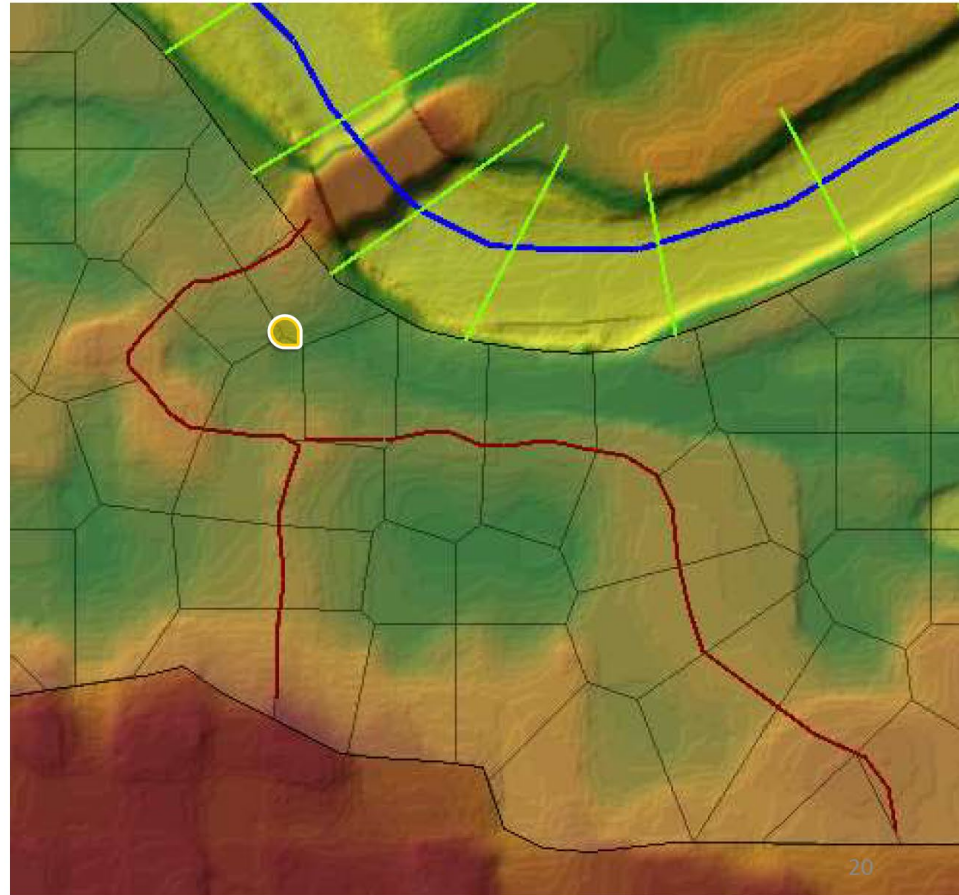
- Each cell can have up to 8 faces
- Hydraulic Properties are calculated for each face (e.g. wetted perimeter, hydraulic radius, flow area, ect.)
- Elevation-Volume relationship developed
- Momentum equation passes water from cell to cell

$$\frac{\partial v}{\partial t} + v \frac{\partial v}{\partial x} = -g \frac{\partial z_s}{\partial x} - \frac{\tau_b}{\rho R}$$

Cell Details Cont.



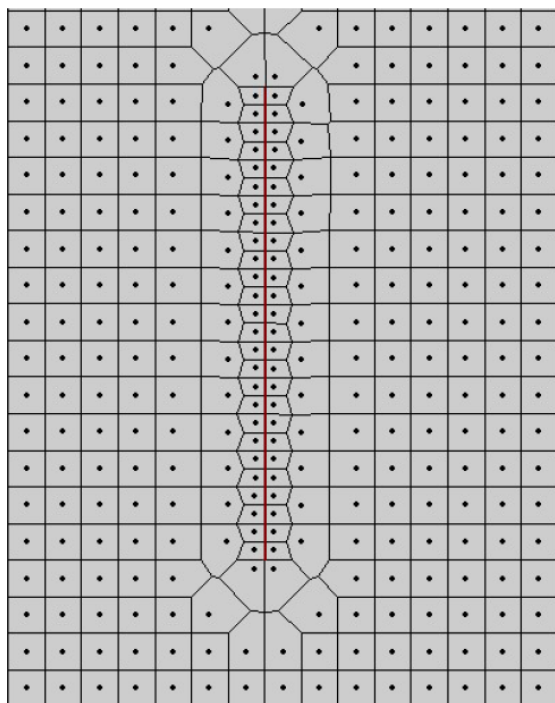
Breaklines



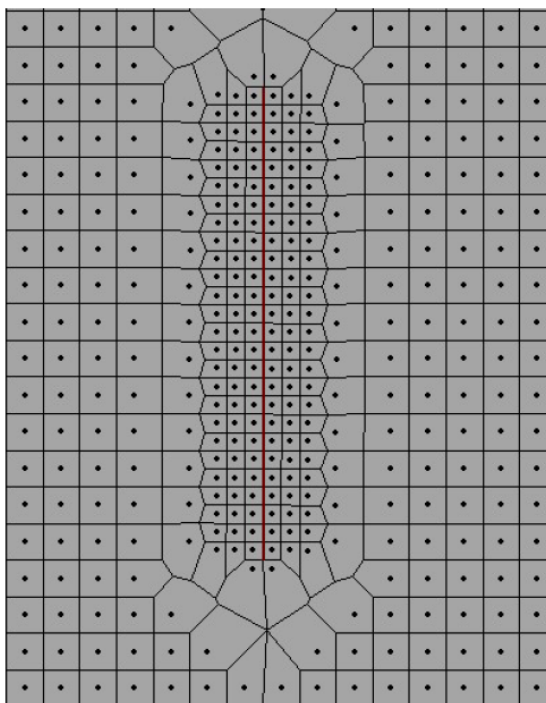
Courtesy Cam Ackerman and Chris Nygaard, HEC

Breaklines Cont.

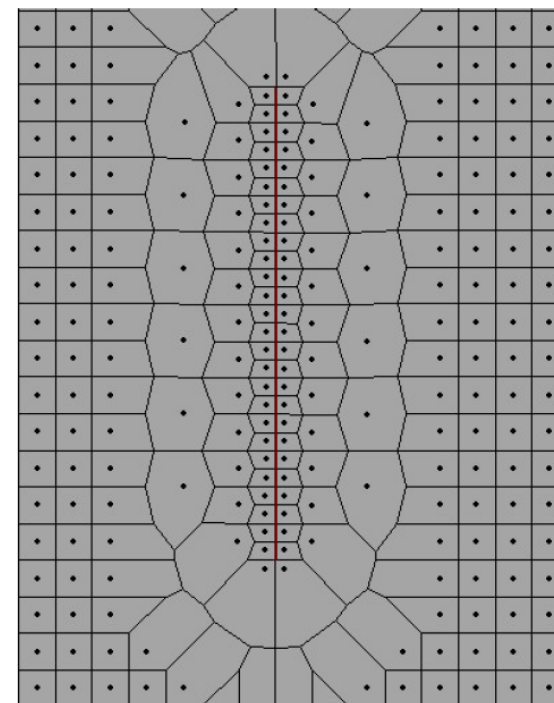
Near Spacing	Near Repeats	Far Spacing
50		



Near Spacing	Near Repeats	Far Spacing
50	2	



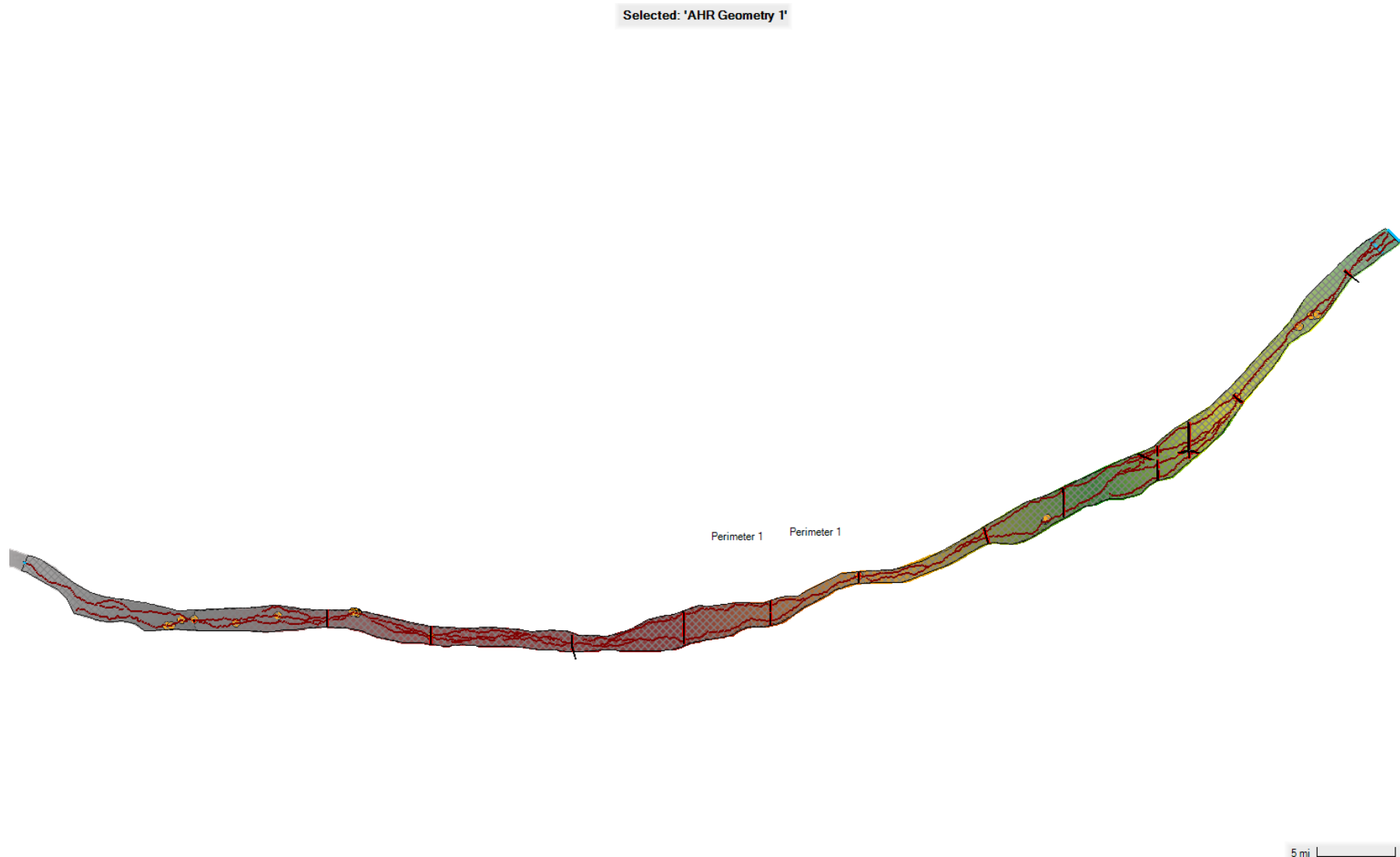
Near Spacing	Near Repeats	Far Spacing
50		200



USFWS Platte River AHR Model

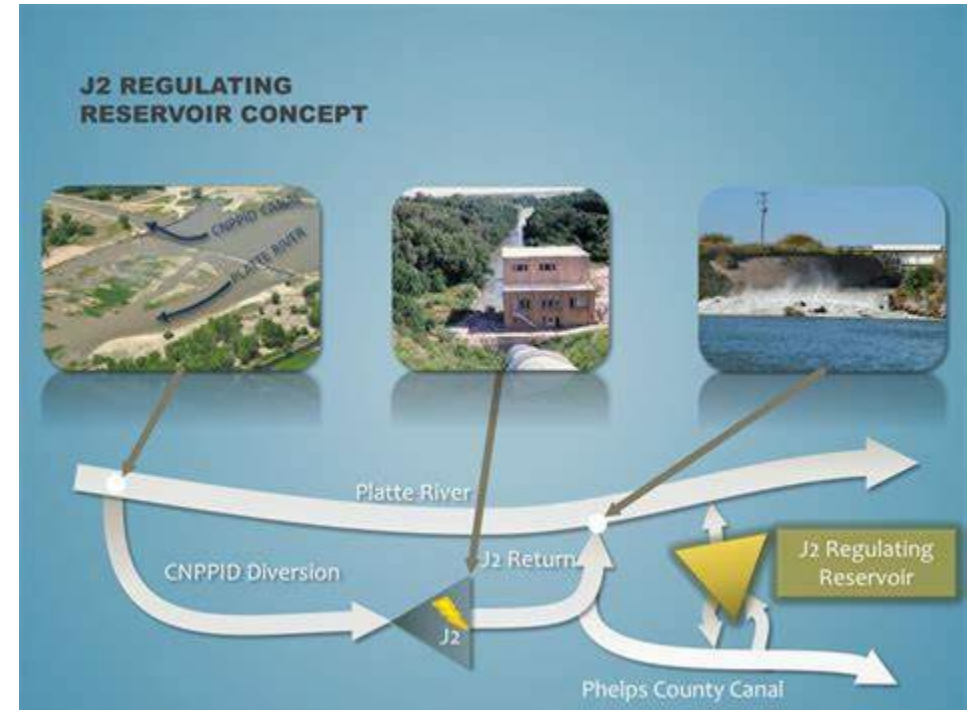
- Lexington to Bader Park Bridge (roughly 100 mi run-of-river)
- 2024 LiDAR
- 100 ft x 100 ft cell size, 25 ft x 25 ft in channel
- 15 s time step
- Shallow Water Equation (original)
- Bridge Shapefiles, Skew, Low Cord, Pier width, Pier Spacing obtained from Tetra Tech (2015) 1D HEC-RAS model

USFWS Platte River AHR Model



Potential Applications

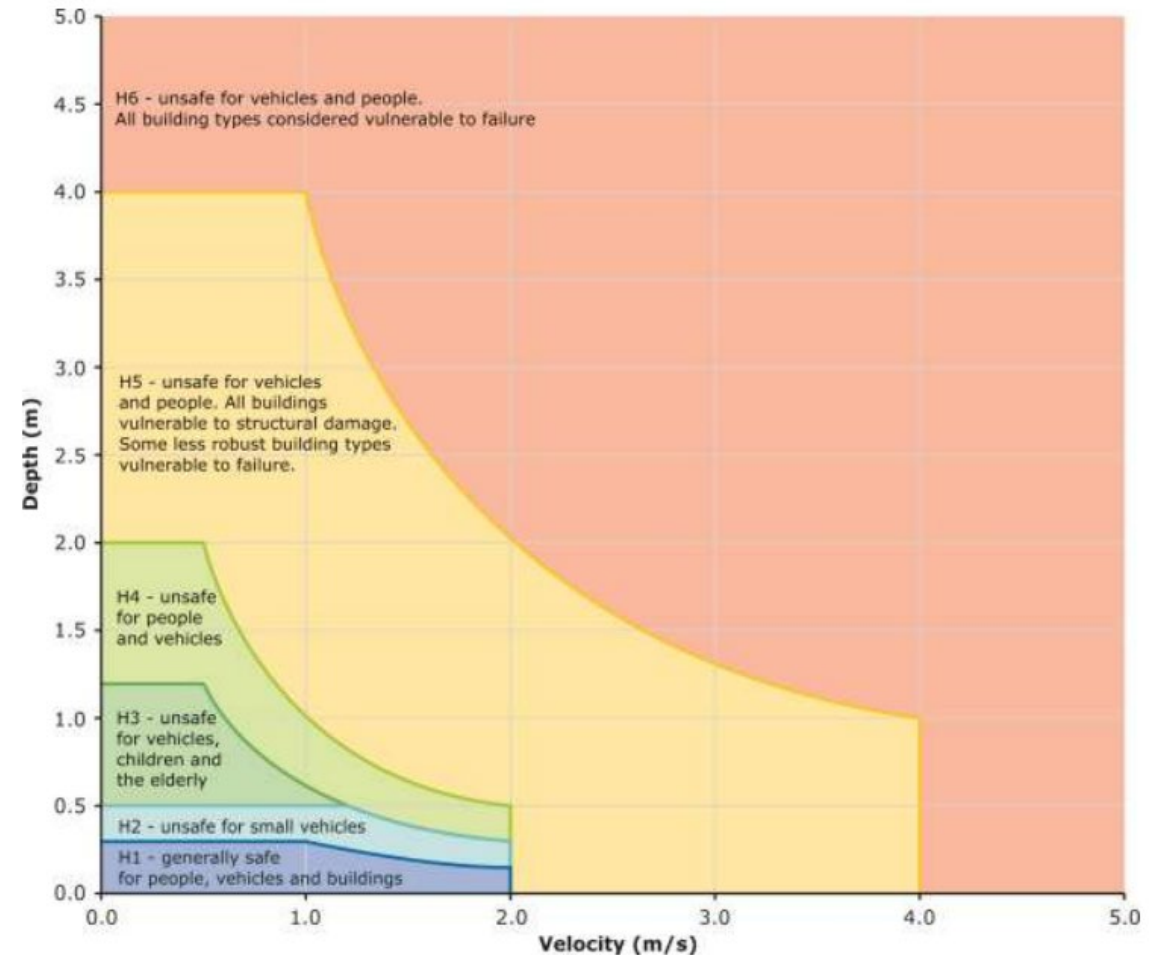
- Evaluate Hydrocycling Effects below J2
- Generate SWE and Velocity Rasters
- Sediment Transport
- Rain on Grid Modeling
- Operational Assistance



<https://www.slideserve.com/tien/j2-regulating-reservoir-project>

Demonstration

- April 10th to April 18th at Odessa
 - Evaluate Depth
 - Evaluate Velocity
 - Evaluate WSE
 - Evaluate Hazard Parameter
Depth x Velocity



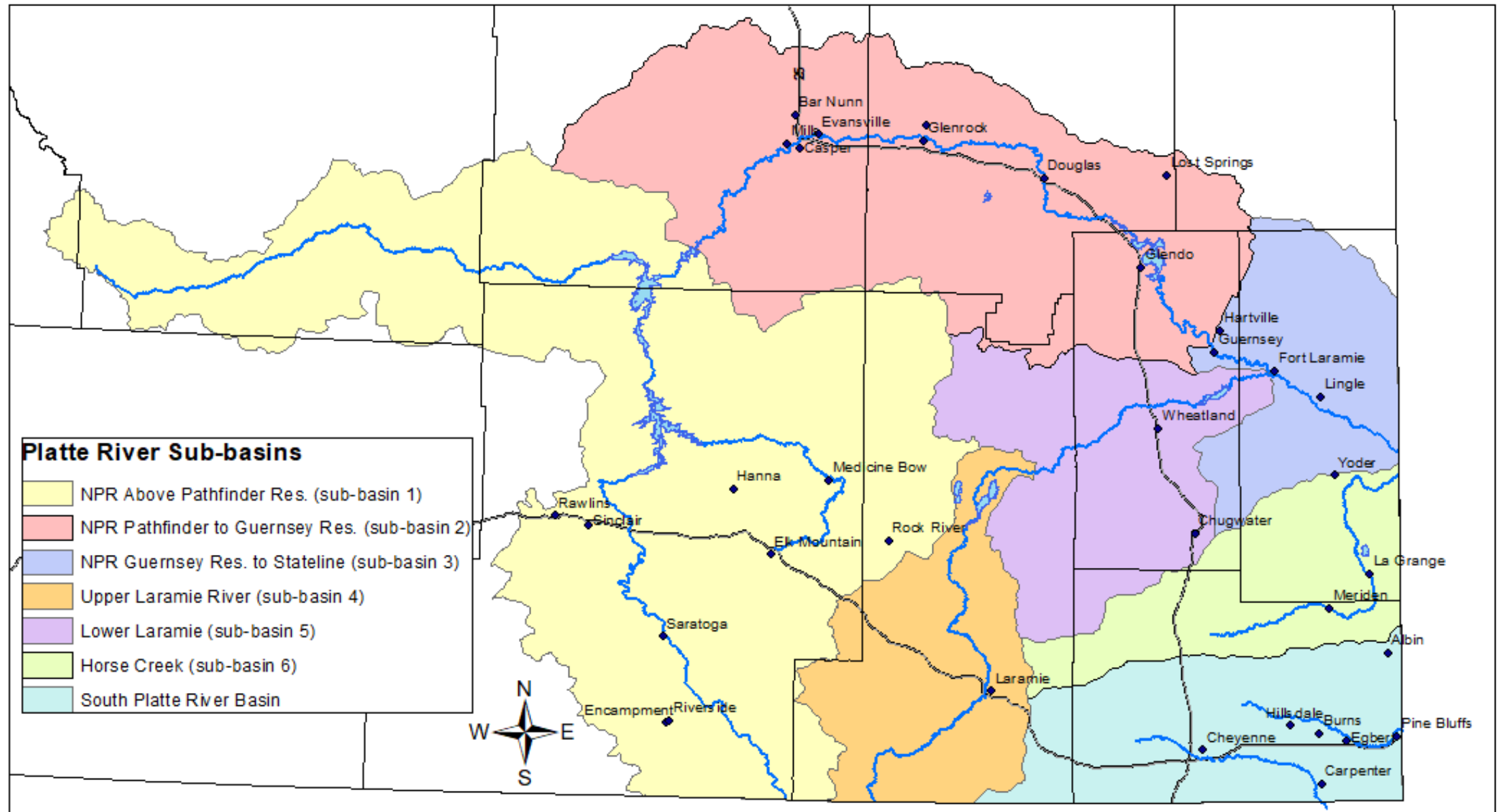
Wyoming Depletions Water Year 2024

PRRIP WAC Meeting

May 6, 2025

Michelle Hubbard

Sub-basins Defined by the Depletions Plan



Baseline No. 1: Irrigation Above Guernsey Reservoir

1. Compliance with the Modified North Platte Decree

- Benchmark: 226,000 acres of intentional irrigation
- Annually, Wyoming reports the number of intentionally irrigated acreage Above Guernsey Reservoir to the GC.
- In 2024, the intentionally irrigated acreage was 202,228 acres above Guernsey Reservoir.

2. Kendrick Project (Casper Alcova Irrigation District; CAID)

- Benchmark: 24,249 acres
- Each year the Bureau of Reclamation (BOR) reports the number of acres irrigated.
- In Water Year 2024, the BOR reported 24,249 acres of irrigation under the Kendrick Project.

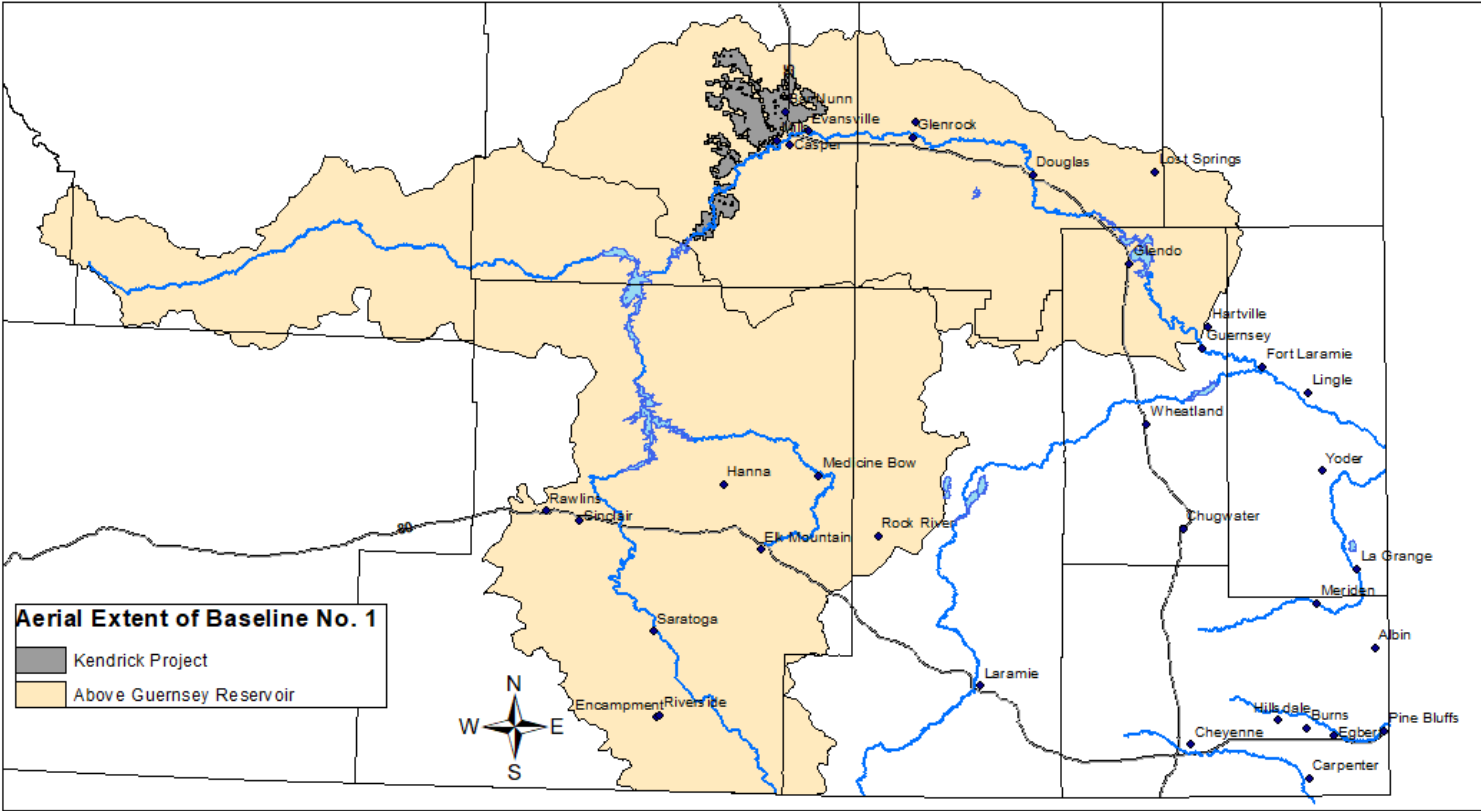


Table I. Existing Water Related Baseline No. 1

Decree Category	Benchmark Acreage	2024	Difference Acreage
Irrigated Acreage – Above Guernsey	226,000	202,228	23,772
Irrigated Acreage - Kendrick	24,249	24,249	0

Baseline No. 2 Water Use Categories

- Existing Water Use:
 - Irrigation
 - Municipal
 - Industrial
 - Rural Domestic
- Retired/Mitigation
- Post-1997 Water Related Activities

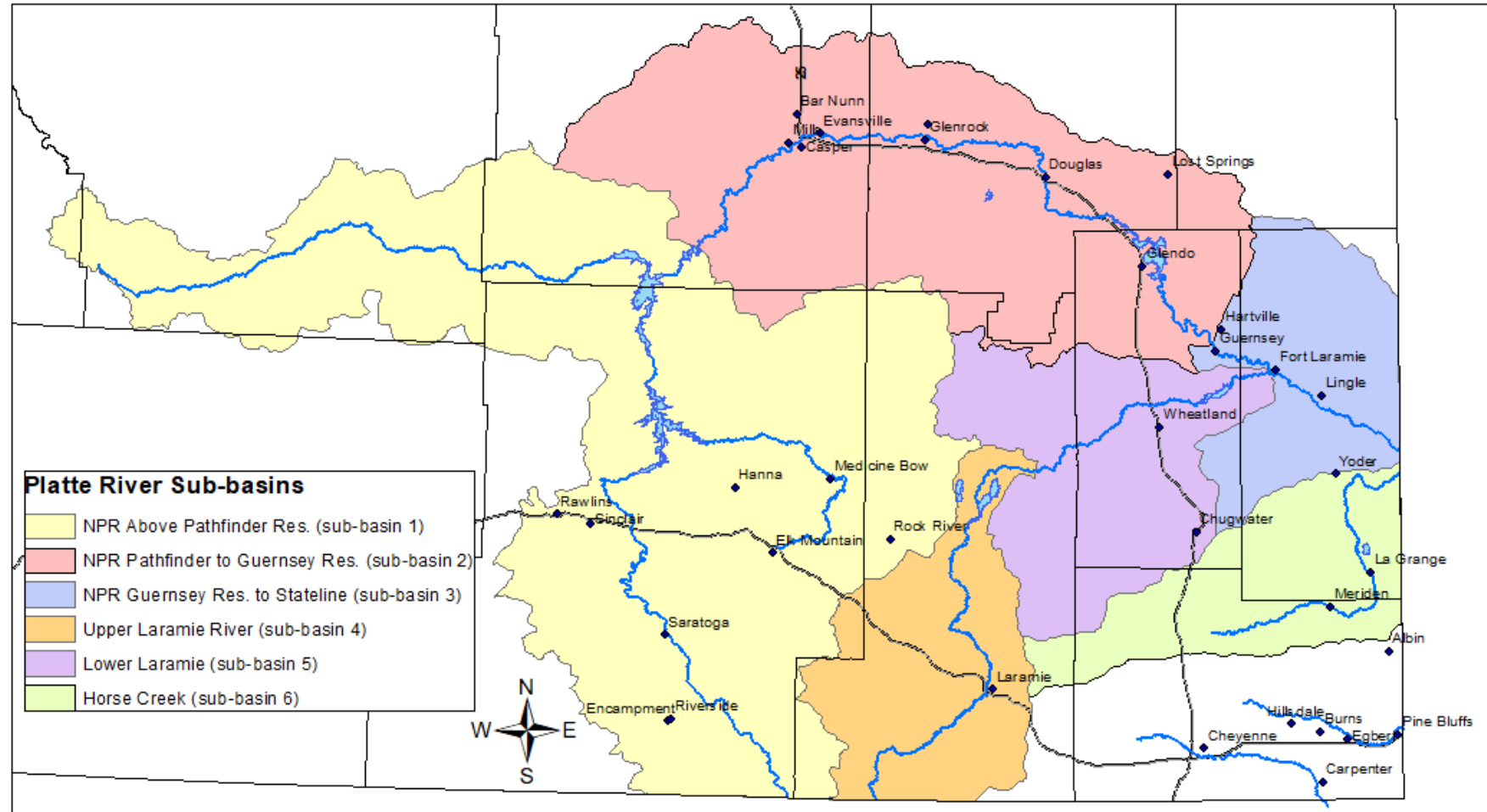


Table 2.4 summarizes the water uses described under Baseline No. 2 of the Wyoming Depletions Plan for the irrigation and non-irrigation season.

Table 2.4

Water Year 2024 Overruns / Underruns

Sub-basin	Table 2.4 - Irrigation Season - Overruns / Underruns AF							Tracking Factors Table I	Effects State Line (AF)
	Irrigation Use	Municipal Use	Industrial Use	Rural Domestic	Retired / Mitigation	Post 1997 Activities	Total		
	1	2	3	4	5	6	7	8	9
Above Pathfinder	----	-848.88	275.16	-98.60	-1.29	160.32	-513.29	0.90	-461.96
Pathfinder to Guernsey	----	530.41	-3,280.67	51.67	-40.90	301.55	-2,437.94	0.98	-2,377.00
Guernsey to State Line	-31,598.16	-480.57	-29.01	7.40	881.62	58.67	-31,160.05	1.00	-31,160.05
Horse Creek	----	32.65	0.00	32.47	-1.95	40.12	103.29	0.00	0.00
Upper Laramie	-8,104.61	-688.42	0.00	122.93	-0.79	66.73	-8,604.16	0.25	-2,151.04
Lower Laramie	-36,521.49	-97.29	0.00	-27.53	-1.08	119.51	-36,527.88	0.50	-18,263.94
WY 2024 Total	-76,224.26	-1,552.10	-3,034.52	88.33	835.61	746.90	-79,140.03		-54,413.98

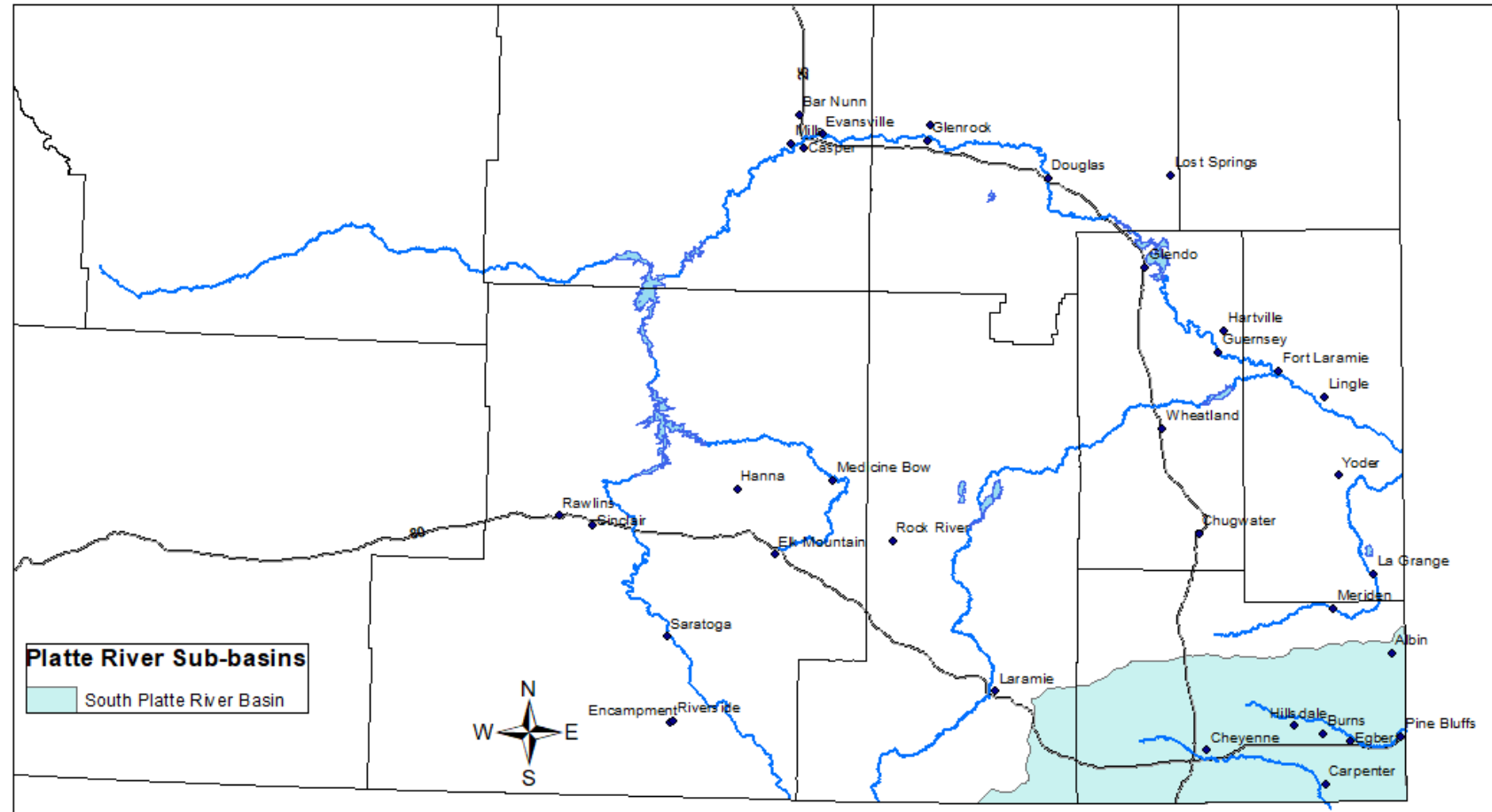
Sub-basin	Table 2.4 - Non-Irrigation Season - Overruns / Underruns AF							Tracking Factors Table II	Effects State Line (AF)
	Irrigation Use	Municipal Use	Industrial Use	Rural Domestic	Retired / Mitigation	Post 1997 Activities	Total		
	1	2	3	4	5	6	7	8	9
Above Pathfinder	----	93.98	466.09	-49.30	-1,022.43	73.52	-438.14	0.93	-407.47
Pathfinder to Guernsey	----	-158.27	-3,406.53	25.83	-26.23	256.06	-3,309.14	1.00	-3,309.14
Guernsey to State Line	----	-352.21	-1,136.32	8.70	0.00	42.24	-1,437.59	1.00	-1,437.59
Horse Creek	----	-31.38	0.00	16.23	0.00	34.91	19.76	1.00	19.76
Upper Laramie	----	-246.61	0.00	66.47	0.00	46.75	-133.39	0.50	-66.70
Lower Laramie	----	-132.24	0.00	-13.77	0.00	56.22	-89.79	1.00	-89.79
WY 2024 Total	----	-826.73	-4,076.76	54.17	-1,048.66	509.70	-5,388.28		-5,290.91

The volumetric effects of “overruns/underruns” in AF at the state line are reported to the GC annually each year as described by the Wyoming Depletions Plan. Overruns/Underruns = Benchmark - Annual reported use.

The overall underrun during the Irrigation season was ~54,000 AF and ~5,300 AF during the Non-Irrigation season.

Existing Baseline No. 3: On-Channel Storage in the South Platte River Basin (SPRB)

- In Wyoming, water rarely passes the Colorado and Nebraska state lines.
- Wyoming reports new on-channel storage reservoirs that were completed that water year.
- In Water Year 2024, the reported acre-feet of post-1997 storage in the SPRB was 100.82 AF.



Questions?

For comments, questions, or additional information please contact

Michelle Hubbard

michelle.hubbard@wyo.gov

307-777-7641

Nebraska New Depletion Plan Update

PRRIP Water Advisory Committee Meeting
May 6, 2025

Kari Burgert,
Environmental Coordinator



Update on Nebraska's New Depletion Plan

- 2023 Permitted Activities
- Estimated Depletions
- Offsets and Accretions
- Update on other activities



2023 Permitted Water Uses

- Permits issued by the NRDs and the Department

Type	Total
Groundwater Transfers	30
Groundwater Wells	48
Groundwater Variances	2
Surface Water Permits	10

2023 Groundwater Transfer Permits

	Upstream of AHR	Within AHR	Total
Groundwater Transfers	9	21	30

2023 Groundwater Well Permits

Type	Upstream of AHR	Within AHR	Total
Replacement	13	13	26
Supplemental Groundwater	9	9	18
Industrial	1	3	4
Total	23	25	48

2023 Groundwater Variance Permits

Type	Upstream of AHR	Within AHR	Total
Exemption to Allocation	2	0	2

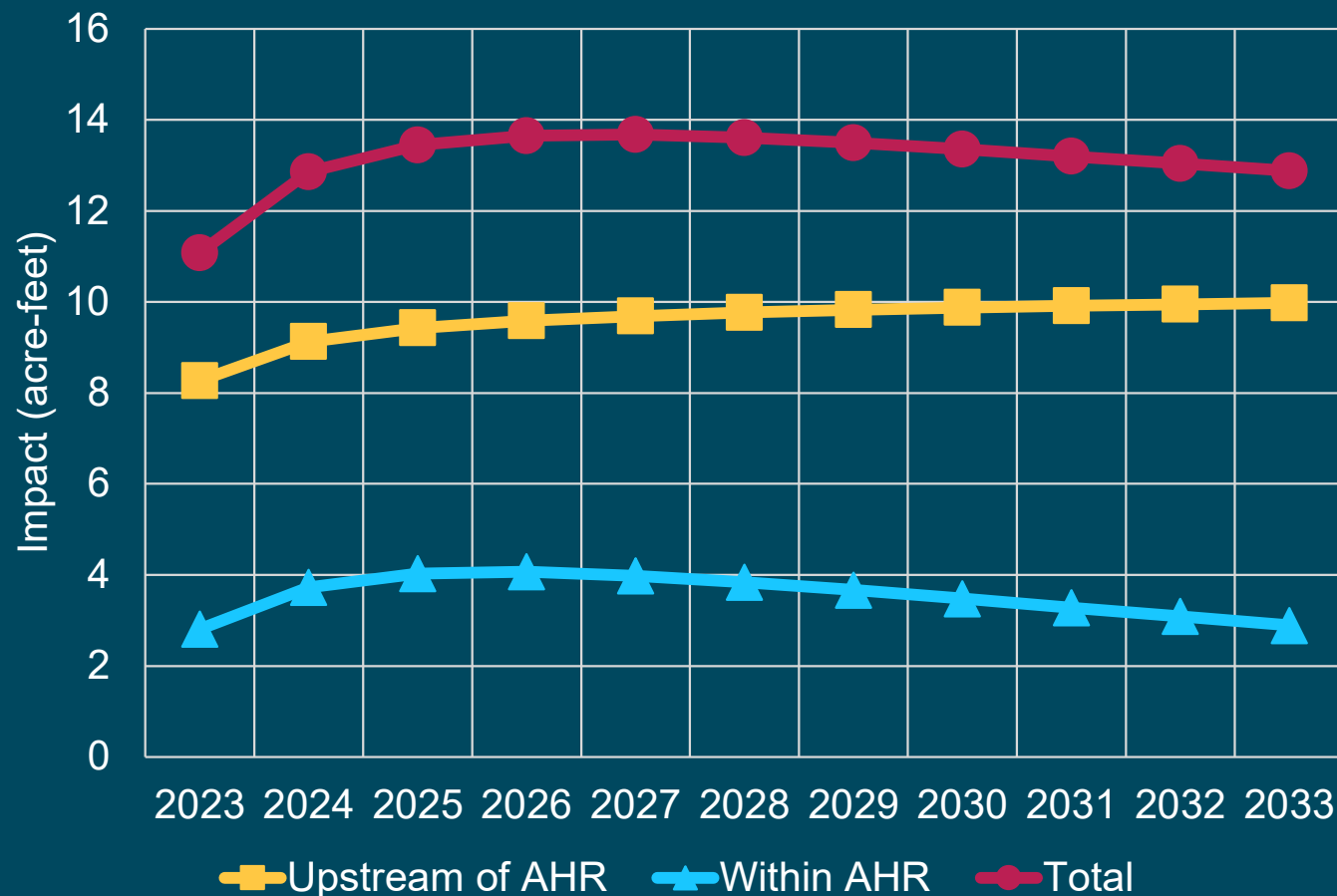
2023 Surface Water Permits

Type	Upstream of AHR	Within AHR	Total
Temporary Recharge	8	-	8
Temporary Manufacturing	2	-	2
Total	10	--	10

Effects to Streamflow from 2023 Permitted Activities

Year	Upstream of AHR			Within AHR			Both Reaches
	Mitigations	New Uses	Net Effect	Mitigations	New Uses	Net Effect	Net Effect
2023	31.23	-22.96	8.27	5.73	-2.92	2.81	11.08
2024	41.48	-32.35	9.13	11.04	-7.31	3.73	12.86
2025	47.96	-38.53	9.43	15.09	-11.07	4.03	13.45
2026	52.57	-42.98	9.59	18.21	-14.15	4.07	13.65
2027	56.08	-46.38	9.69	20.69	-16.70	3.98	13.68
2028	58.87	-49.10	9.77	22.71	-18.87	3.84	13.61
2029	61.16	-51.33	9.83	24.40	-20.73	3.67	13.50
2030	63.08	-53.20	9.88	25.83	-22.36	3.48	13.36
2031	64.73	-54.81	9.92	27.08	-23.79	3.28	13.20
2032	66.16	-56.20	9.95	28.16	-25.08	3.09	13.04
2033	67.41	-57.43	9.98	29.13	-26.23	2.89	12.88

Net Effect to Streamflow from 2023 Permitted Activities



Other Basin-Wide Activities

- Nebraska remains in full compliance with NNDP and achieving Milestone 9 of the Extension document
- Upper Platte River Drought Contingency Plan anticipated completion on or before December 31, 2025.
- Multiple NRDs will be pursuing IMP updates
- 3rd Increment of BW plan anticipated to start in 2029.
- Next Robust Review planned for completion in 2027

NEBRASKA

Good Life. Great Water.

DEPT. OF NATURAL RESOURCES

Questions?

Kari Burgert
kari.burgert@nebraska.gov
Office: 402-471-5277