May 7, 2024

NORTH PLATTE RIVER CHOKEPOINT

ANDERSON CONSULTING ENGINEERS, INC.
RIVER WORKS, LTD

NORTH PLATTE CHOKEPOINT
MAY 7, 2024

- Chokepoint Study Update
- Summary Results of North Platte Geomorphology and Sediment Transport Study
- Q&A, Feedback from WAC

CHOKEPOINT PROJECT APPROACH

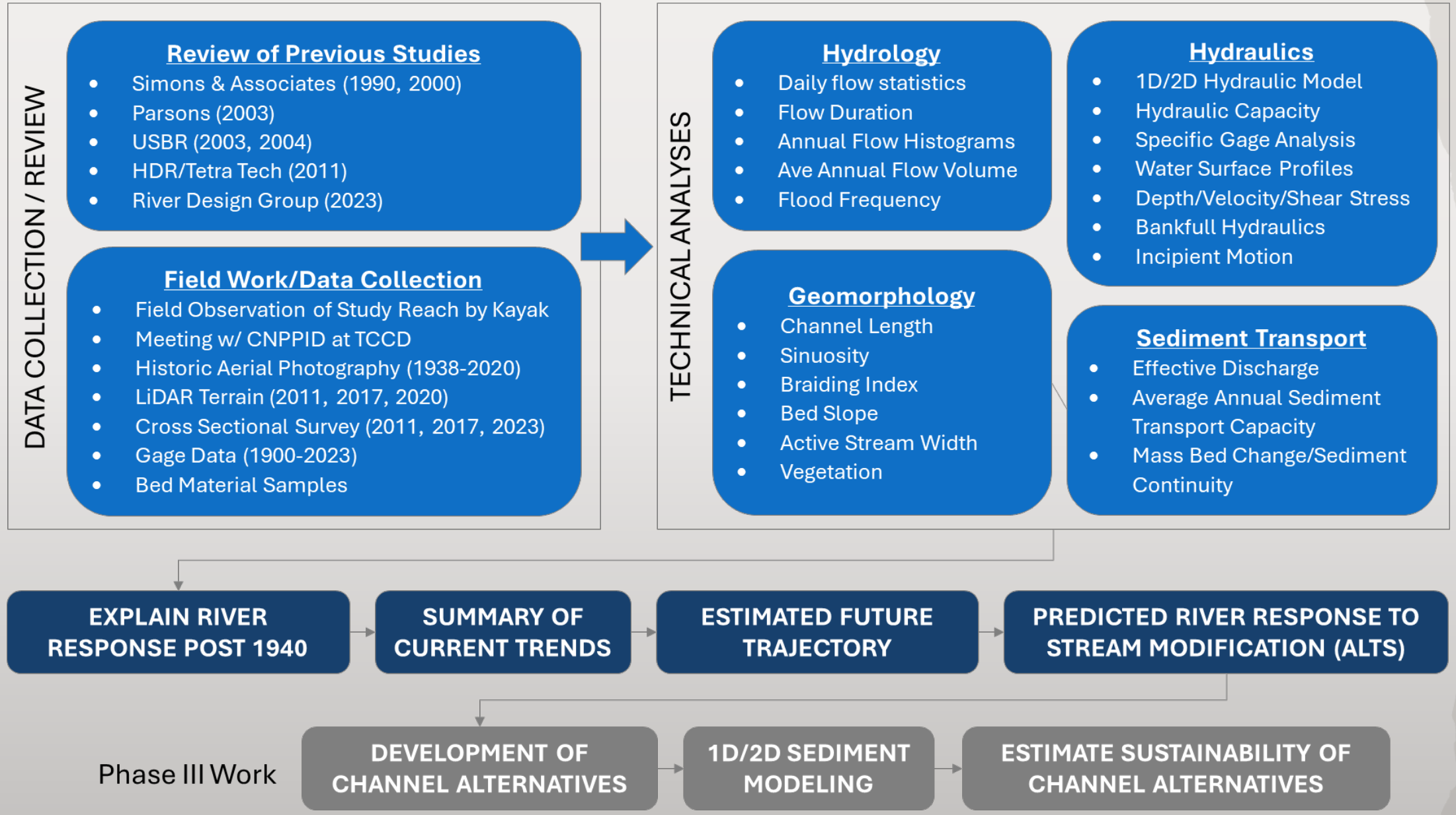
EDO and Chokepoint Planning Workgroup

Phase I	Phase II	Phase III
Project Kickoff ✓	**Geomorphic Investigation, Field Work, and Existing Modeling** ✓	**Detailed Alternative Development**
Review of Previous Studies/Alternatives ✓	**Evaluation of Short List** Bring Short List to Equal Level of Eval Leverage Previous Alts Info Develop Evaluation of New Alts ✓	**Technical Analysis/Conc Design** 2D Hydraulic and Sediment Transport / Morphodynamic Modeling
Alternative Full List 2005-2023 Initial Screening ✓	**Multi Criterion Decision Analysis** ✓	**Multi Criterion Decision Analysis**
Alternatives Short List Selected for Phase II ✓	**Alternatives Selection for Phase III** ✓	**Alternative Selection**

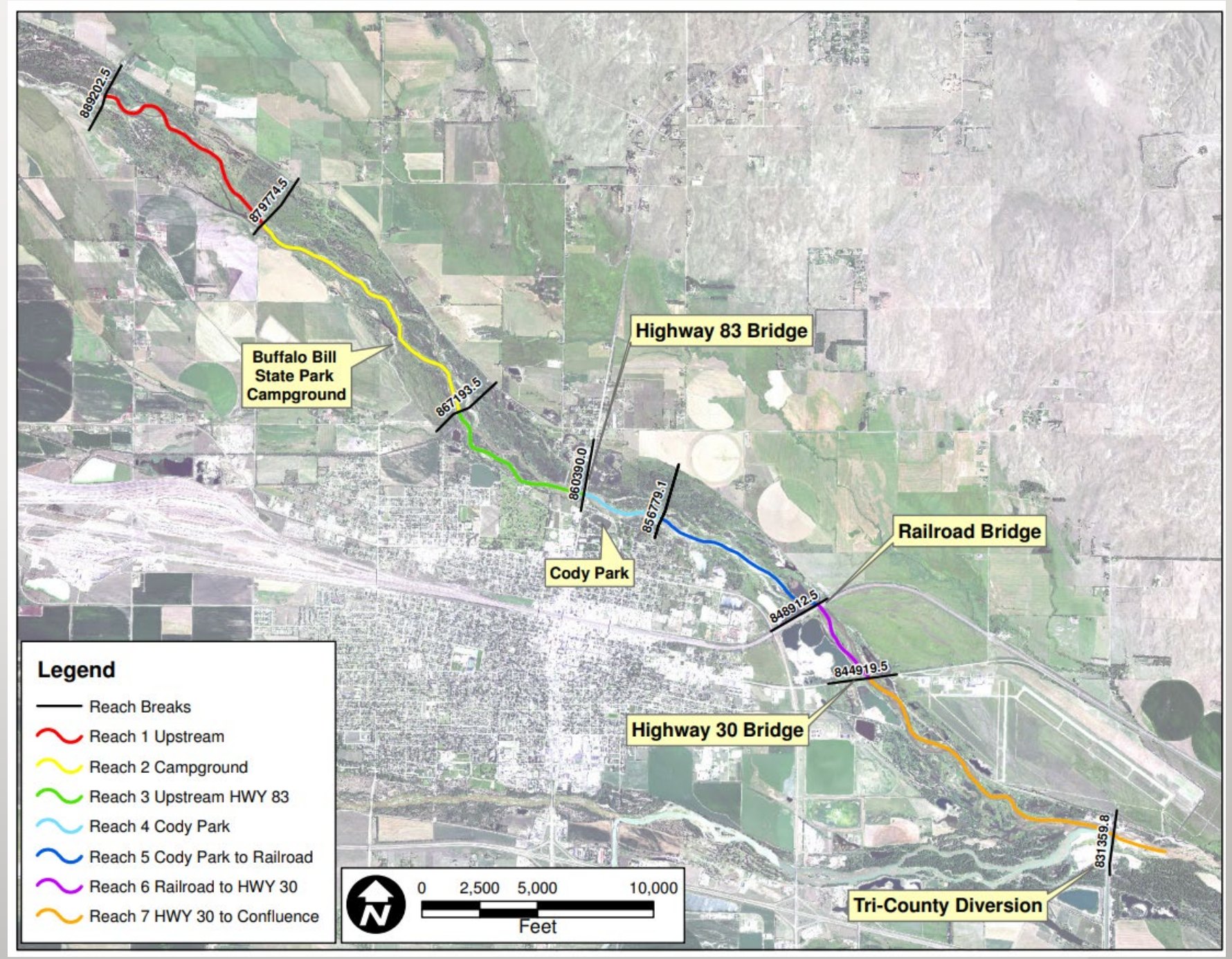
GEOMORPHOLOGY AND SEDIMENT TRANSPORT STUDY APPROACH

- Detailed, quantitative **engineering and geomorphic analysis**
  - Hydrologic analyses
  - Numerical hydraulic and sediment transport modeling.
- Considered three fluvial geomorphic characteristics – **pattern, geometry, and profile** – to understand and explain the North Platte River's evolution.
- The study also investigates the **relationship between those characteristics, sediment transport continuity, vegetation, and hydraulic conveyance**.
- The assessment included a **field visit in October 2023** and desktop-based analyses leveraging historical aerial imagery and LiDAR and ground-based survey topography.
- Results will be used to **predict river response to stream modification alternatives and inform numerical modeling**.

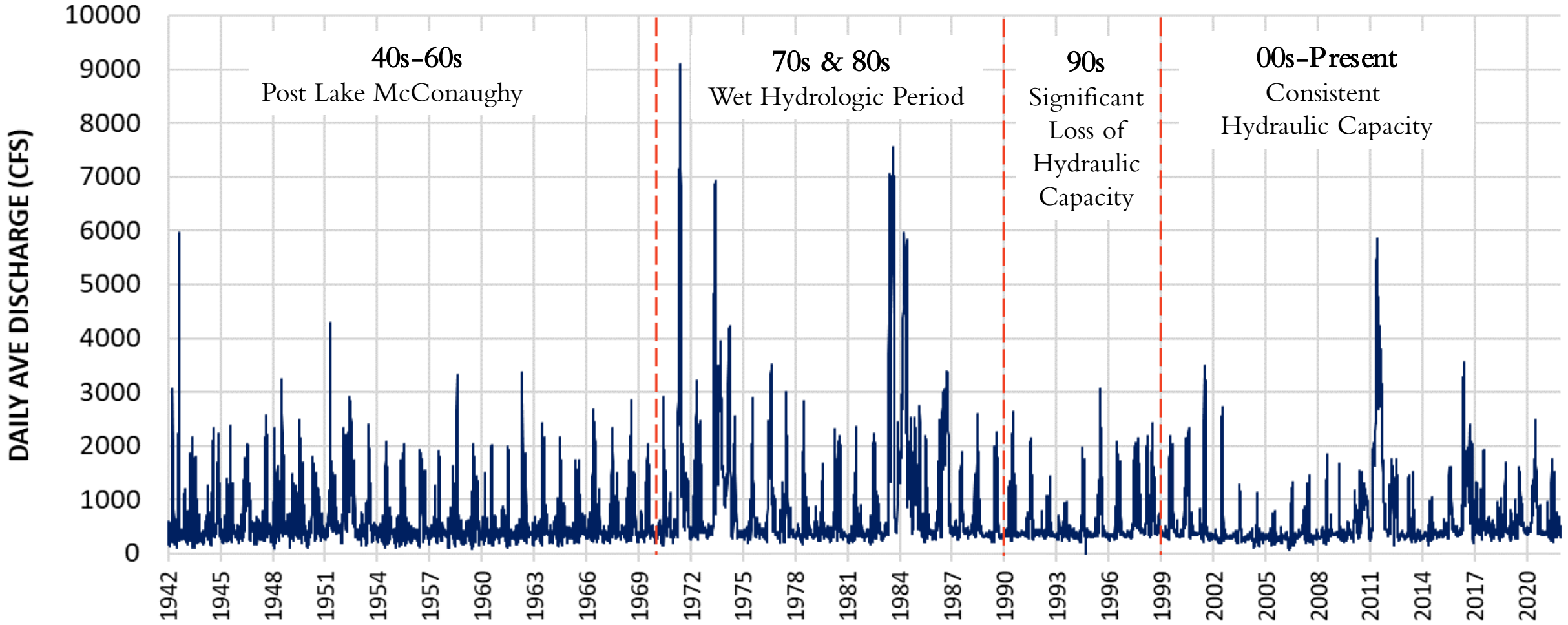
STUDY PROCESS AND OUTCOMES



STUDY AREA

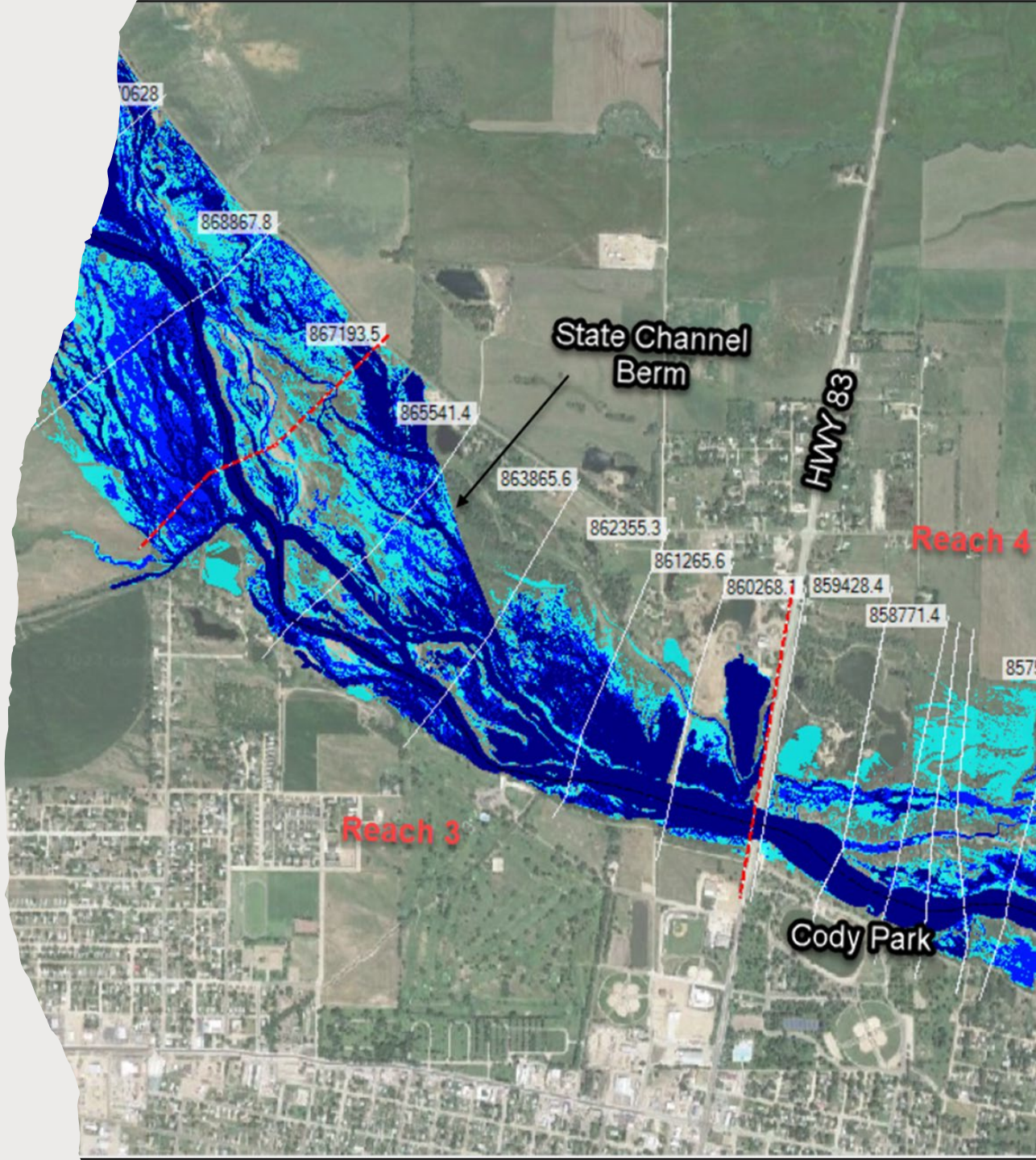

889202.5
879774.5
867193.5
860390.0
856779.1
848912.5
844919.5
831359.8
Buffalo Bill State Park Campground
Highway 83 Bridge
Cody Park
Railroad Bridge
Highway 30 Bridge
Tri-County Diversion
Legend
Reach Breaks
Reach 1 Upstream
Reach 2 Campground
Reach 3 Upstream HWY 83
Reach 4 Cody Park
Reach 5 Cody Park to Railroad
Reach 6 Railroad to HWY 30
Reach 7 HWY 30 to Confluence
N
0 2,500 5,000 10,000
Feet

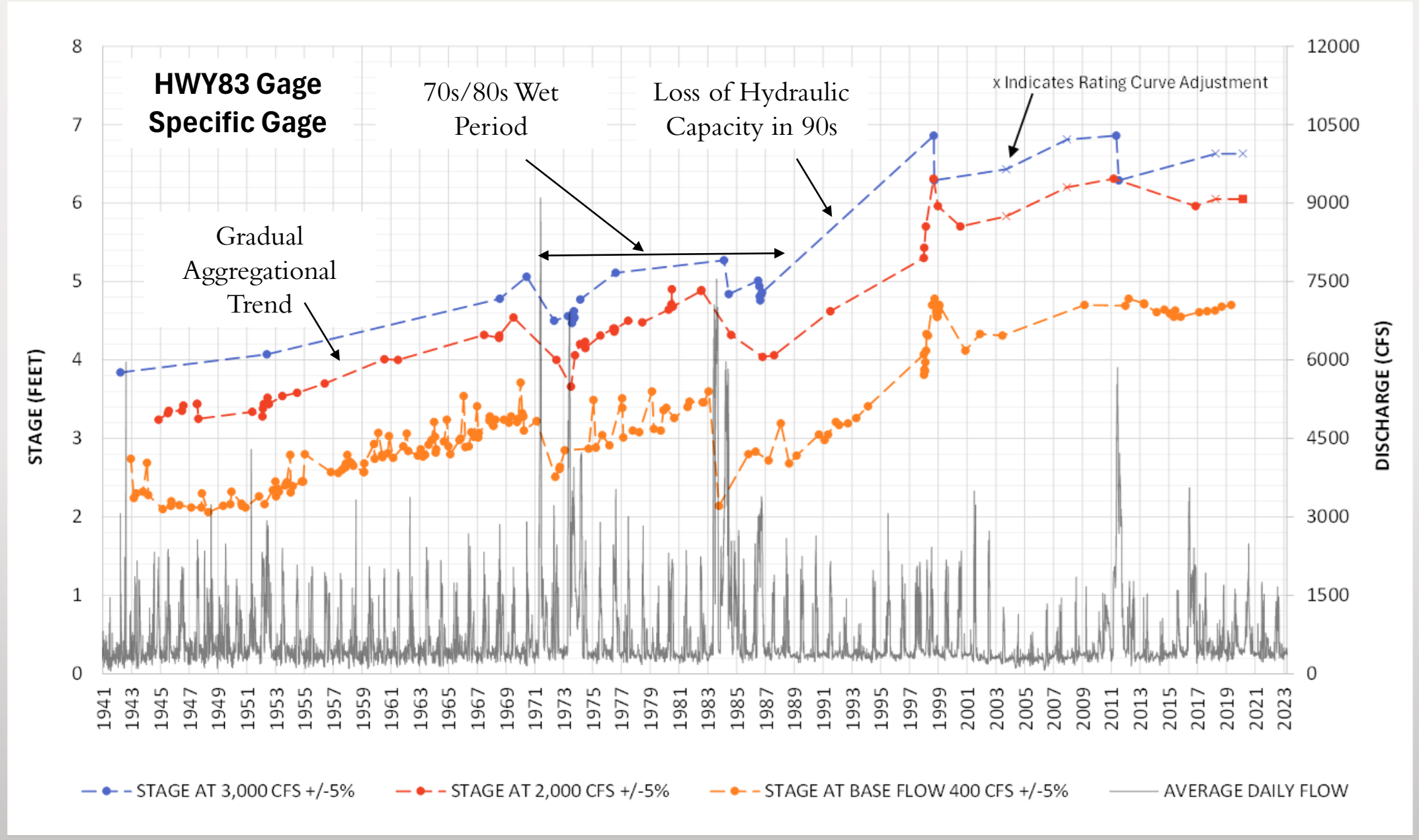
HYDROLOGIC ANALYSIS

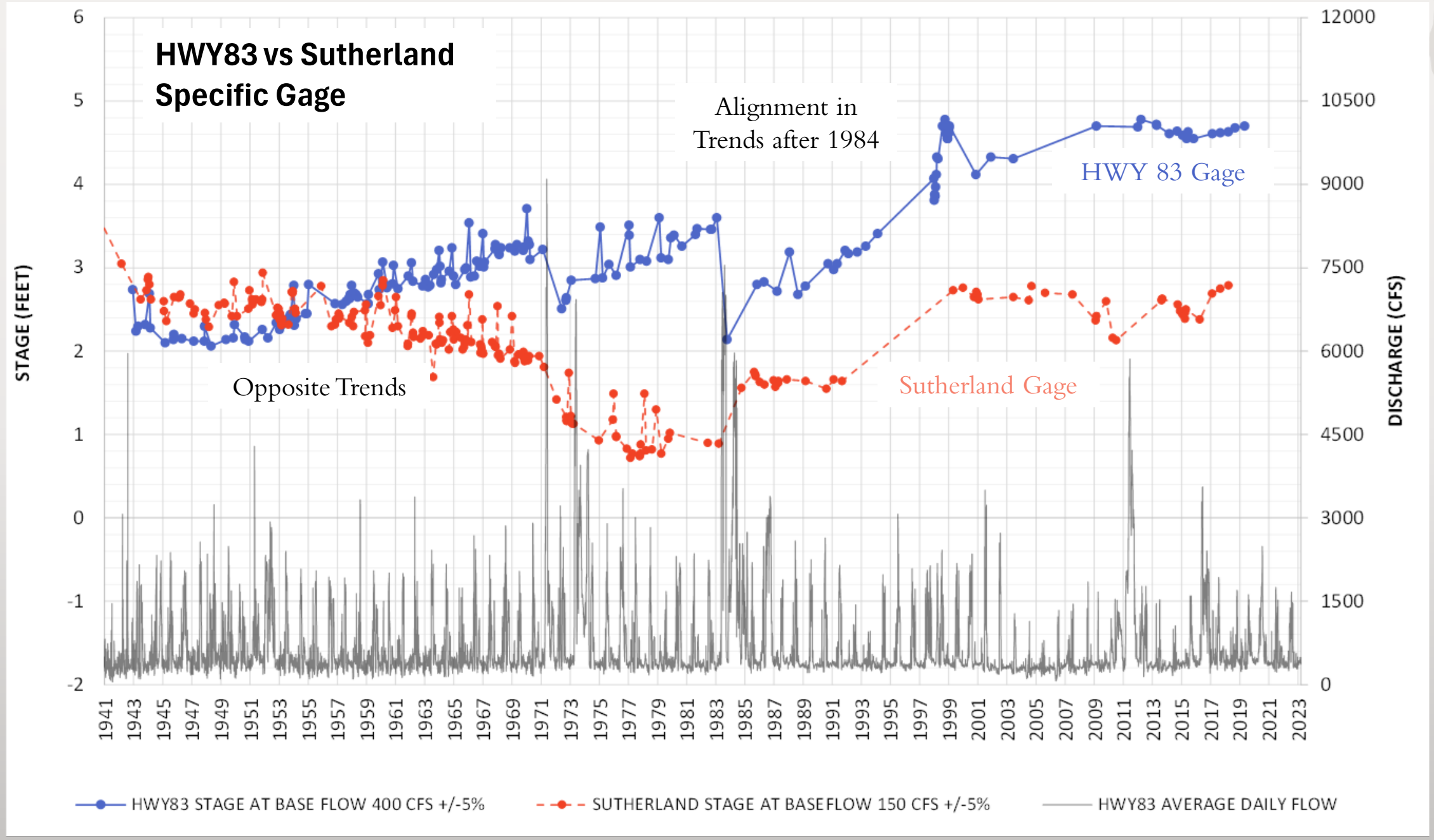


HYDRAULICS

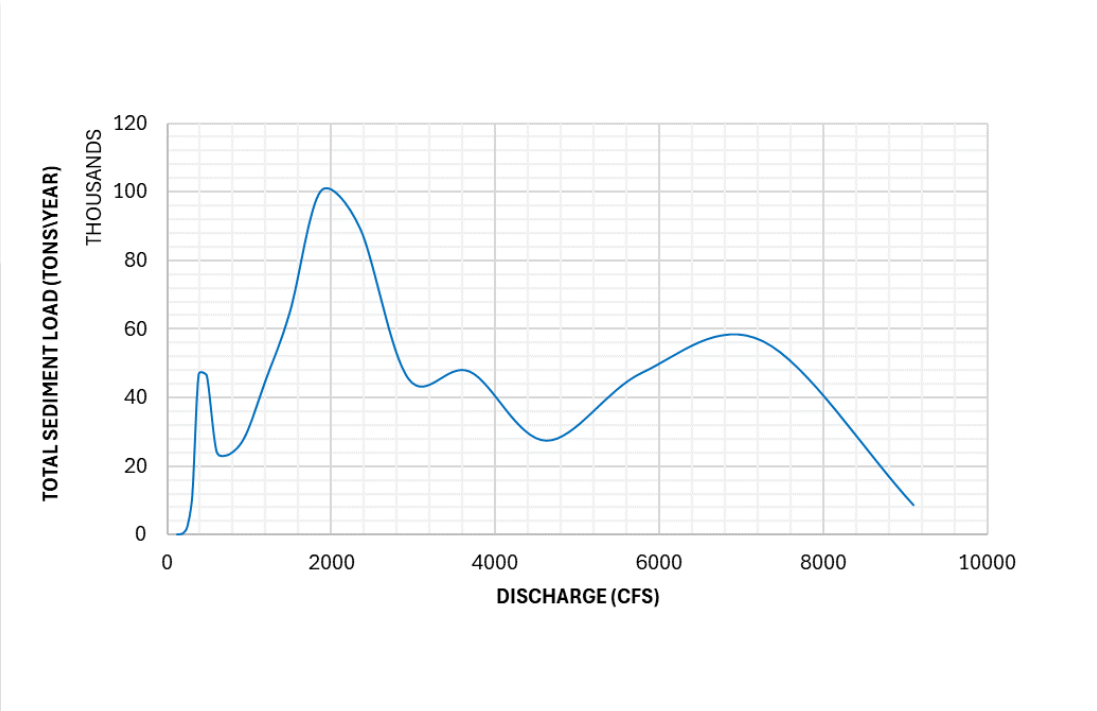
- Hydraulic Capacity
  - Capacity in 1980s ~5,420 cfs
  - Decline in hydraulic capacity in 1990s
  - 2000 to 2023 varies b/t 1,570 – 2,165 cfs
- 2D Hydraulic Model 400-6,000 cfs
  - Inundation Mapping
  - WSEL Profiles
  - Velocity / Shear Stress
  - Bankfull Parameters
  - Incipient Motion
- Specific Gage Analysis (Gage Data)
  - HWY 83
  - Sutherland

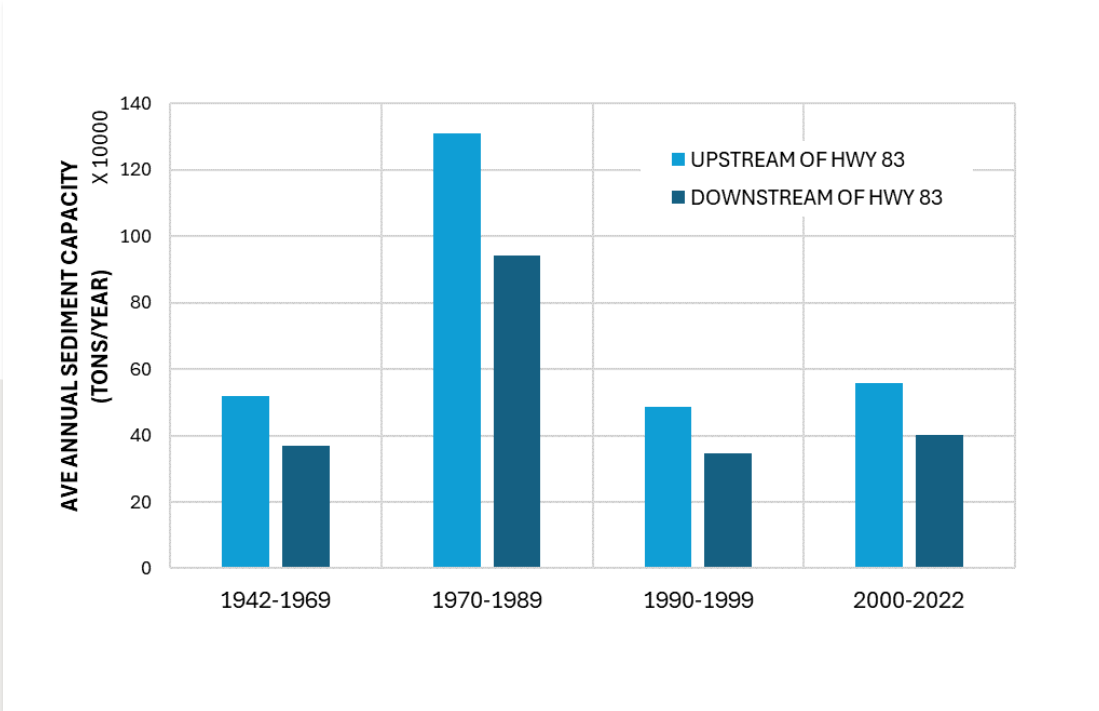



HWY83 Gage
Specific Gage
70s/80s Wet Period
Loss of Hydraulic Capacity in 90s
x Indicates Rating Curve Adjustment
Gradual Aggregational Trend
STAGE (FEET)
DISCHARGE (CFS)
0
1
2
3
4
5
6
7
8
0
1500
3000
4500
6000
7500
9000
10500
12000
1941
1943
1945
1947
1949
1951
1953
1955
1957
1959
1961
1963
1965
1967
1969
1971
1973
1975
1977
1979
1981
1983
1985
1987
1989
1991
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
STAGE AT 3,000 CFS +/-5%
STAGE AT 2,000 CFS +/-5%
STAGE AT BASE FLOW 400 CFS +/-5%
AVERAGE DAILY FLOW


HWY83 vs Sutherland Specific Gage
Alignment in Trends after 1984
HWY 83 Gage
Opposite Trends
Sutherland Gage
STAGE (FEET)
DISCHARGE (CFS)
6
5
4
3
2
1
0
-1
-2
12000
10500
9000
7500
6000
4500
3000
1500
0
1941 1943 1945 1947 1949 1951 1953 1955 1957 1959 1961 1963 1965 1967 1969 1971 1973 1975 1977 1979 1981 1983 1985 1987 1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015 2017 2019 2021 2023
HWY83 STAGE AT BASE FLOW 400 CFS +/-5%
SUTHERLAND STAGE AT BASEFLOW 150 CFS +/-5%
HWY83 AVERAGE DAILY FLOW

RESULTS - SEDIMENT TRANSPORT





Effective Discharge = 2,000 cfs

1.5 year Q = 2,050 cfs

Bankfull Q = 1,700

Average Annual Sediment Transport Capacity

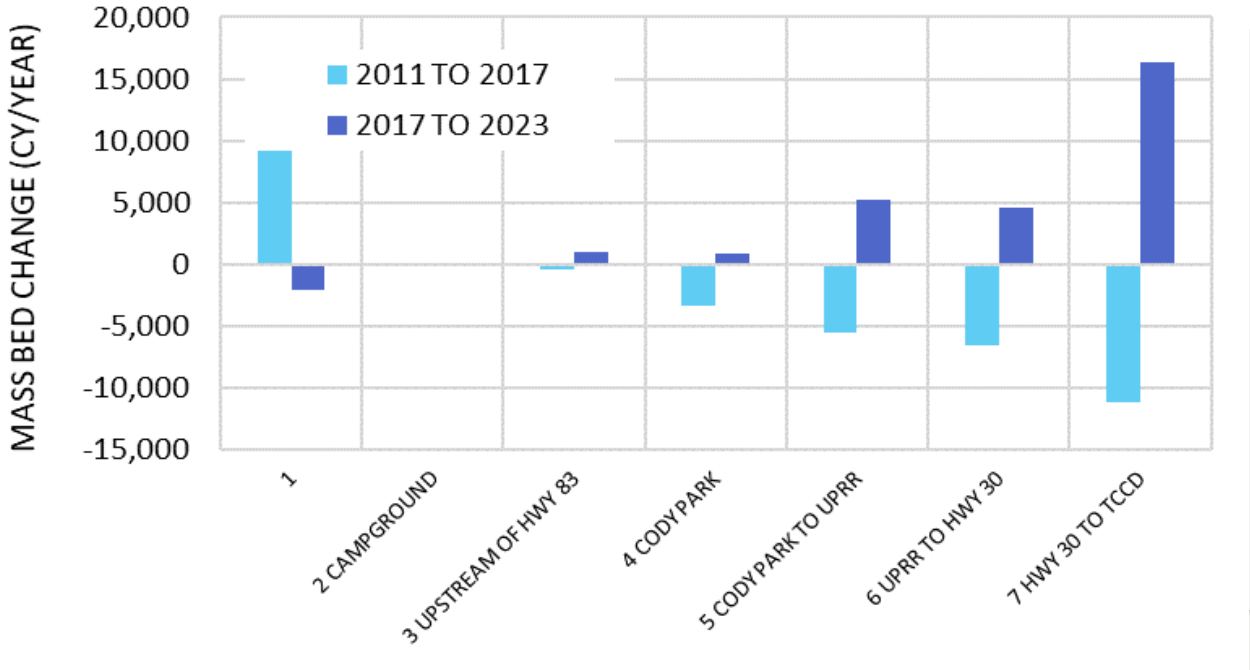
Capacity downstream of HWY 83 is 70% of upstream

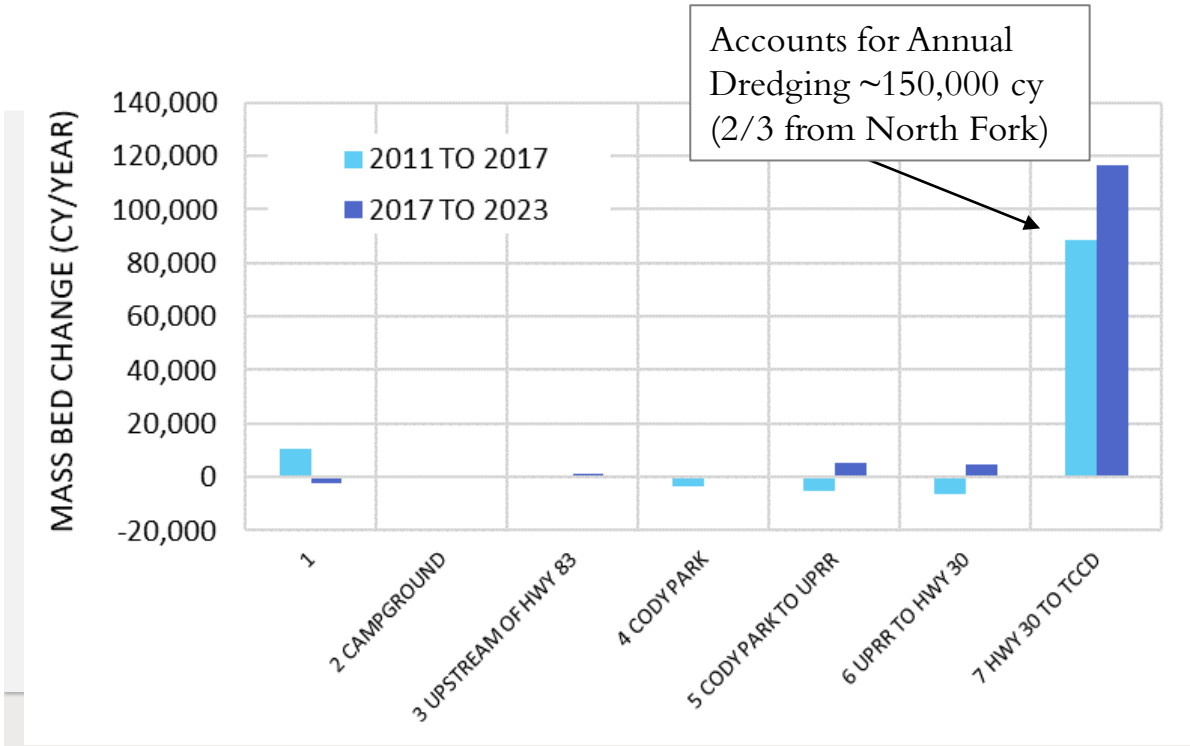
During **70s/80s capacity was ~2.5 times higher** (reflection of wet hydrology)

RESULTS - SEDIMENT TRANSPORT

Sediment Transport Continuity – Measured Mass Bed Change

- 2011-2017 Minor Degradation below HWY 83
- 2017-2023 Minor Aggradation increasing in Downstream Direction
- When annual dredging is accounted for in Reach 7 clear aggradation is noted at the TCCD
- Evaluation indicates little change between 2011 and 2023 even with 2011 flood event.



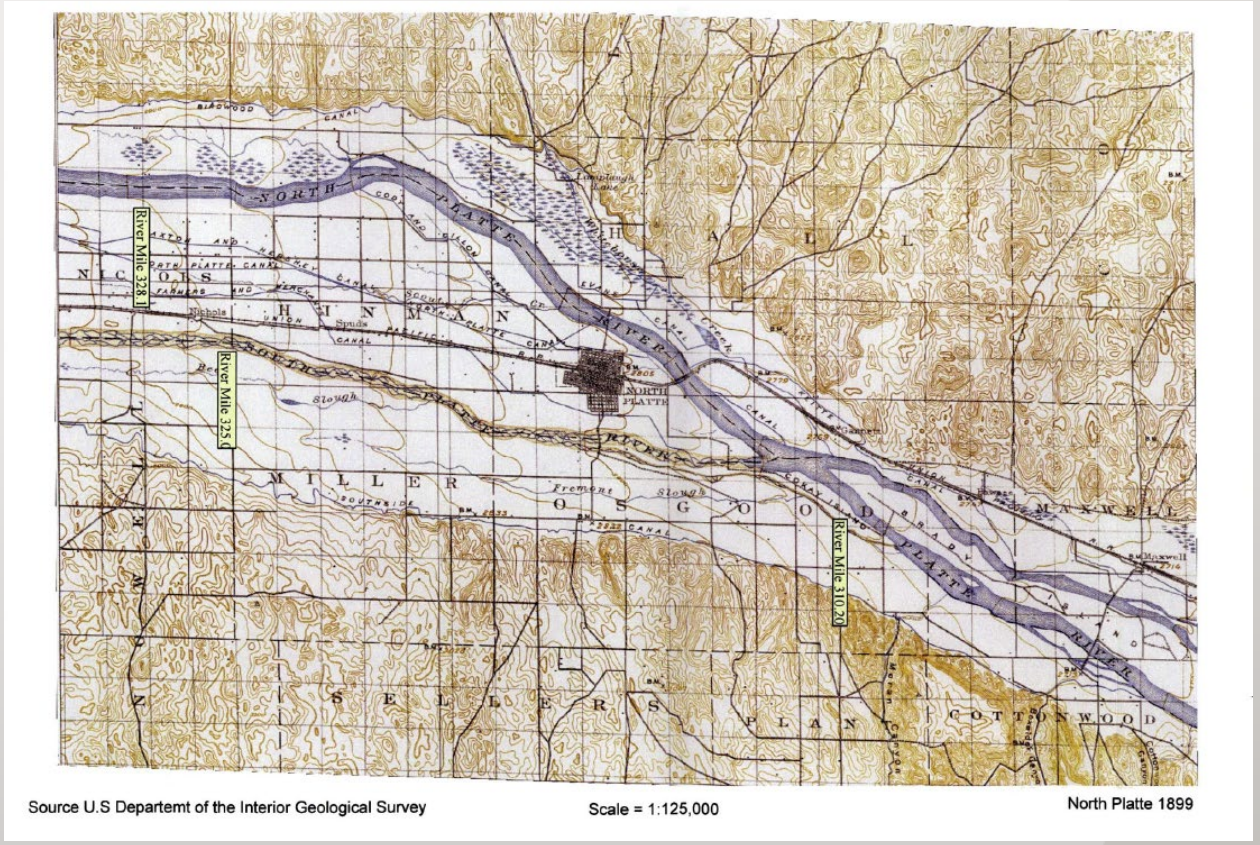


GEOMORPHIC ASSESSMENT

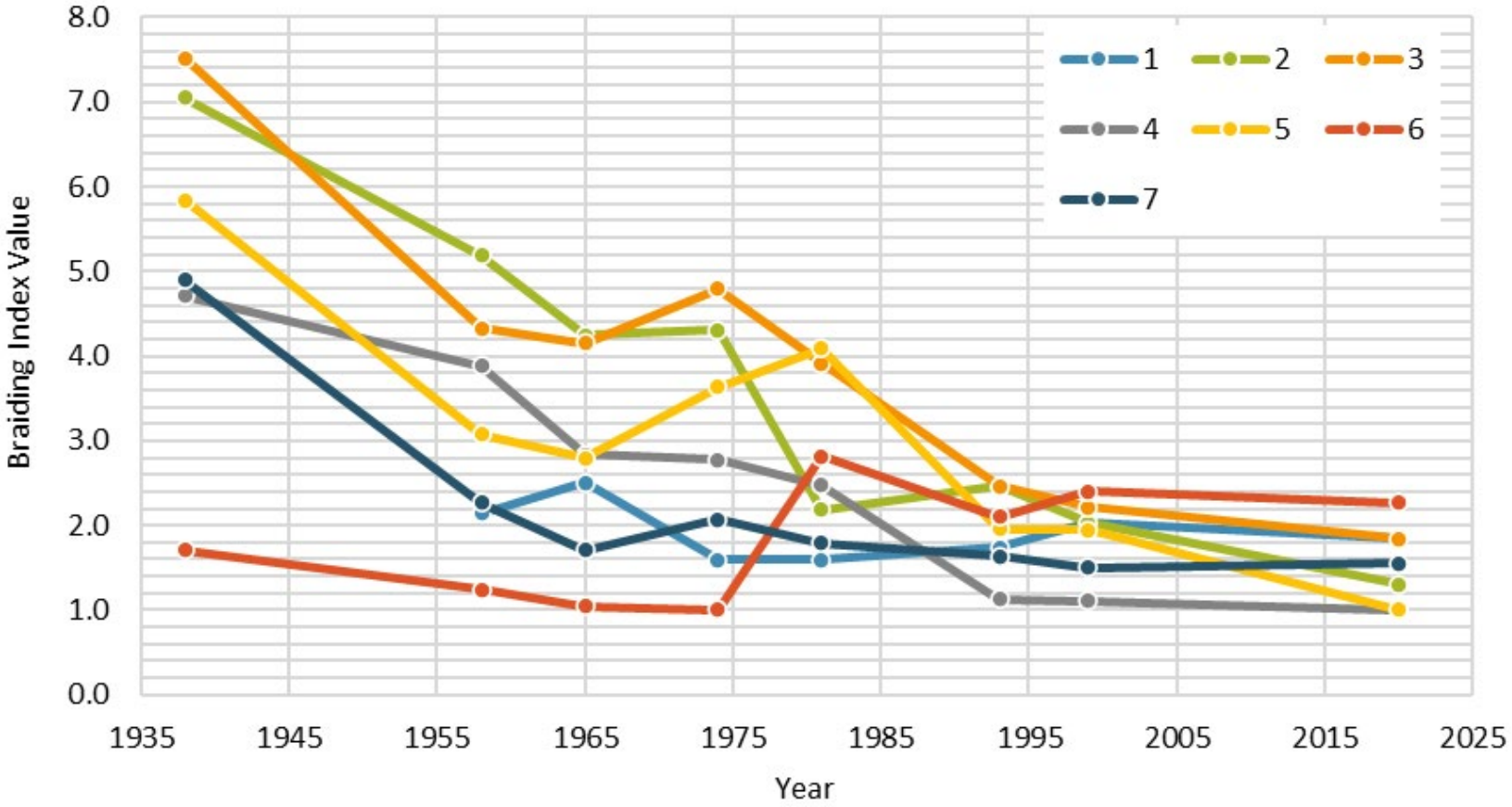
- Geomorphic assessment included a field-based analysis that considers four morphological characteristics:

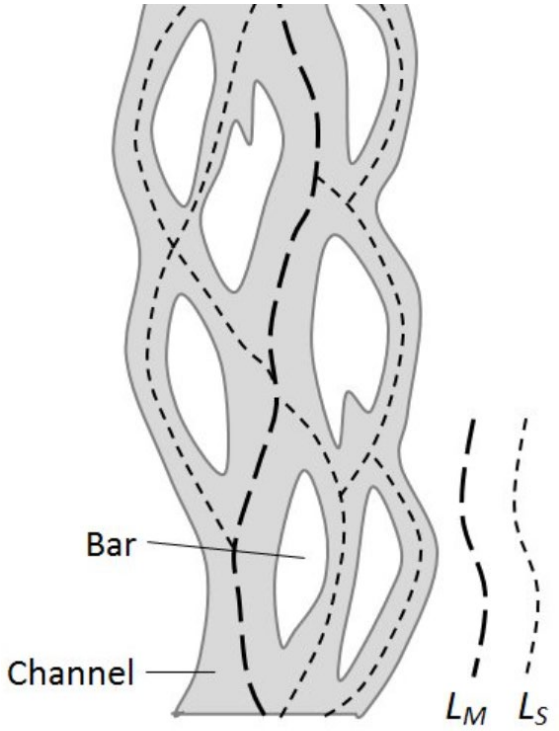
  pattern, geometry, profile, and sediment continuity

- Desktop-based analyses including analysis of historical aerial imagery
  - Highlight important geomorphic features using LiDAR
  - Identify channel evolution trends by evaluating geomorphic characteristics



RESULTS - GEOMORPHOLOGY



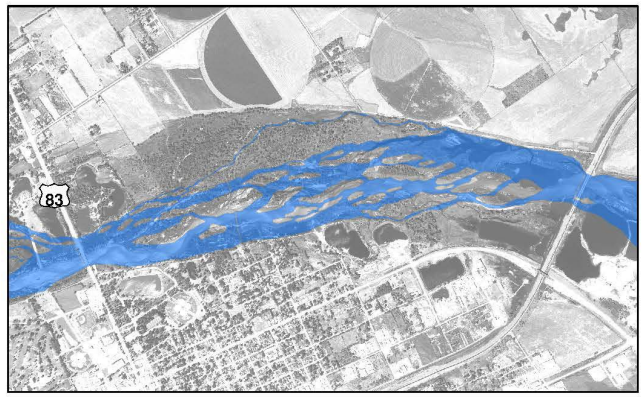


$$BI = (\Sigma L_S + \Sigma L_M)/\Sigma L_M$$

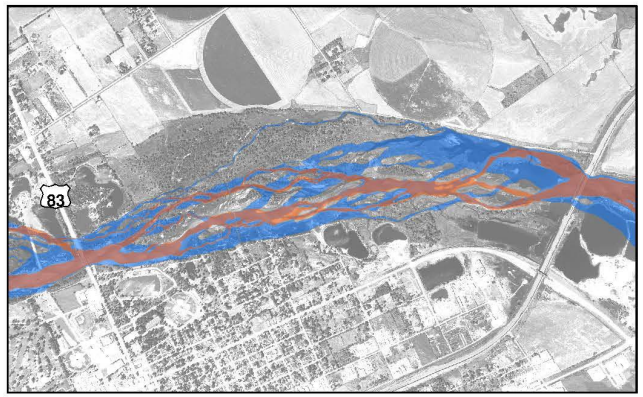
$$CW = A_C/\Sigma L_M$$

Channel Width

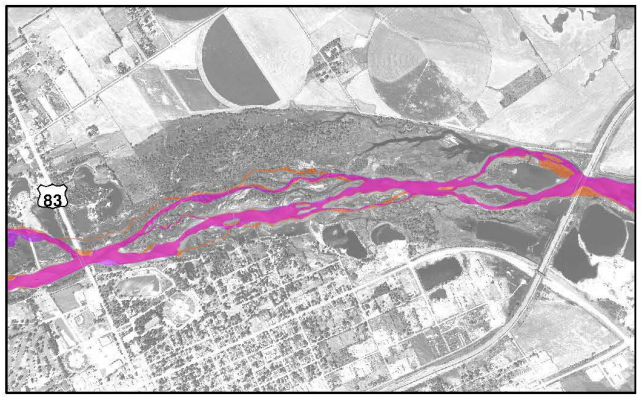
1938 ~900ft
1958 ~400 ft
1998 ~300 ft
Present ~300ft



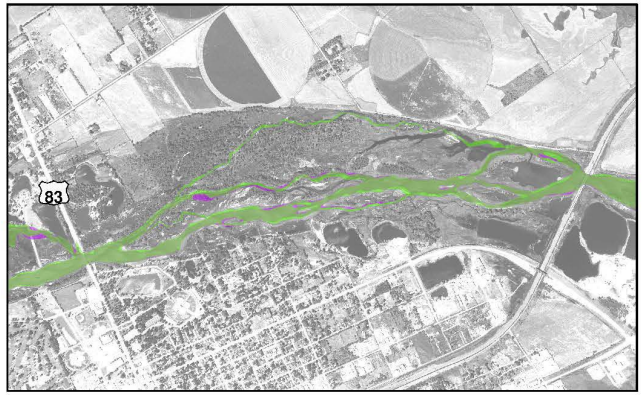
1938



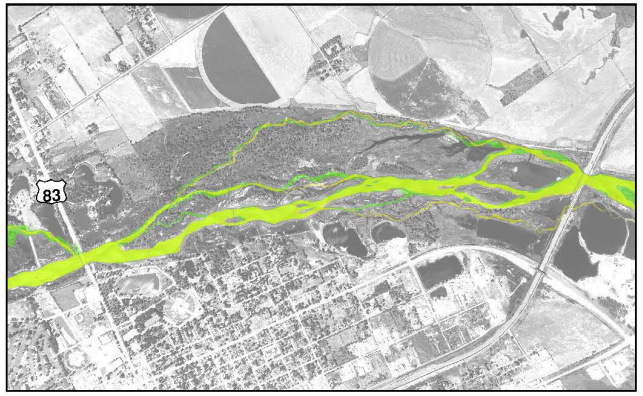
1938 vs 1958



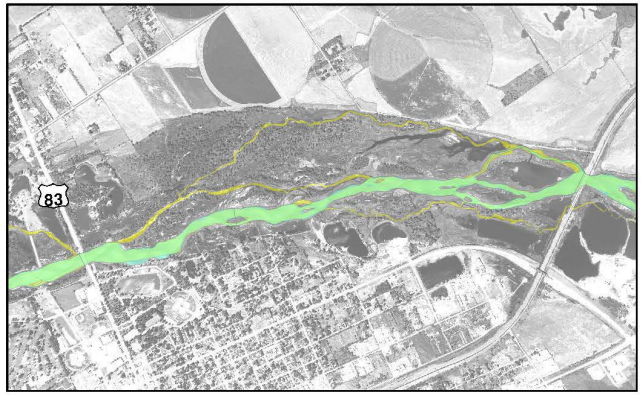
1958 vs 1965



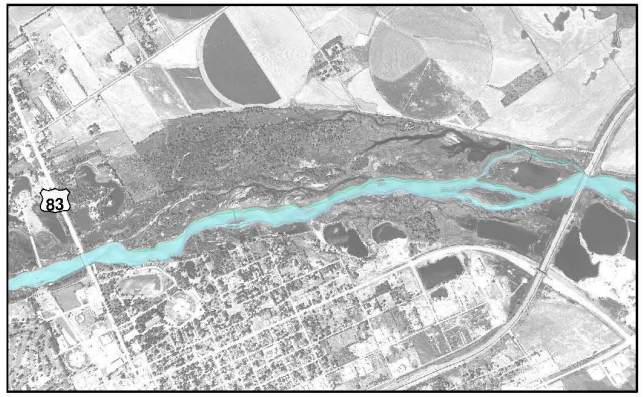
1965 vs 1974



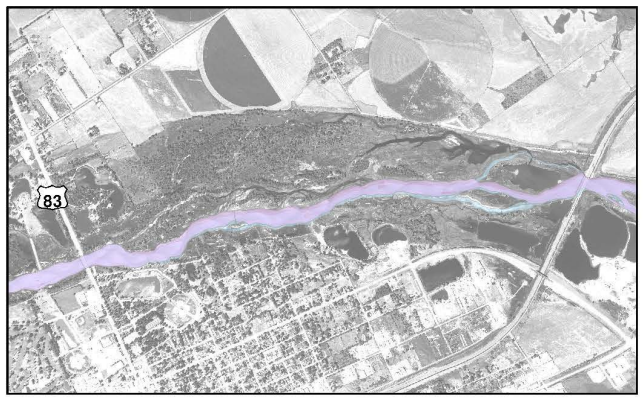
1974 vs 1981



1981 vs 1993



1993 vs 1999



1999 vs 2020

Active Channel Comparison
1938 - 2020
Reach 4 & 5

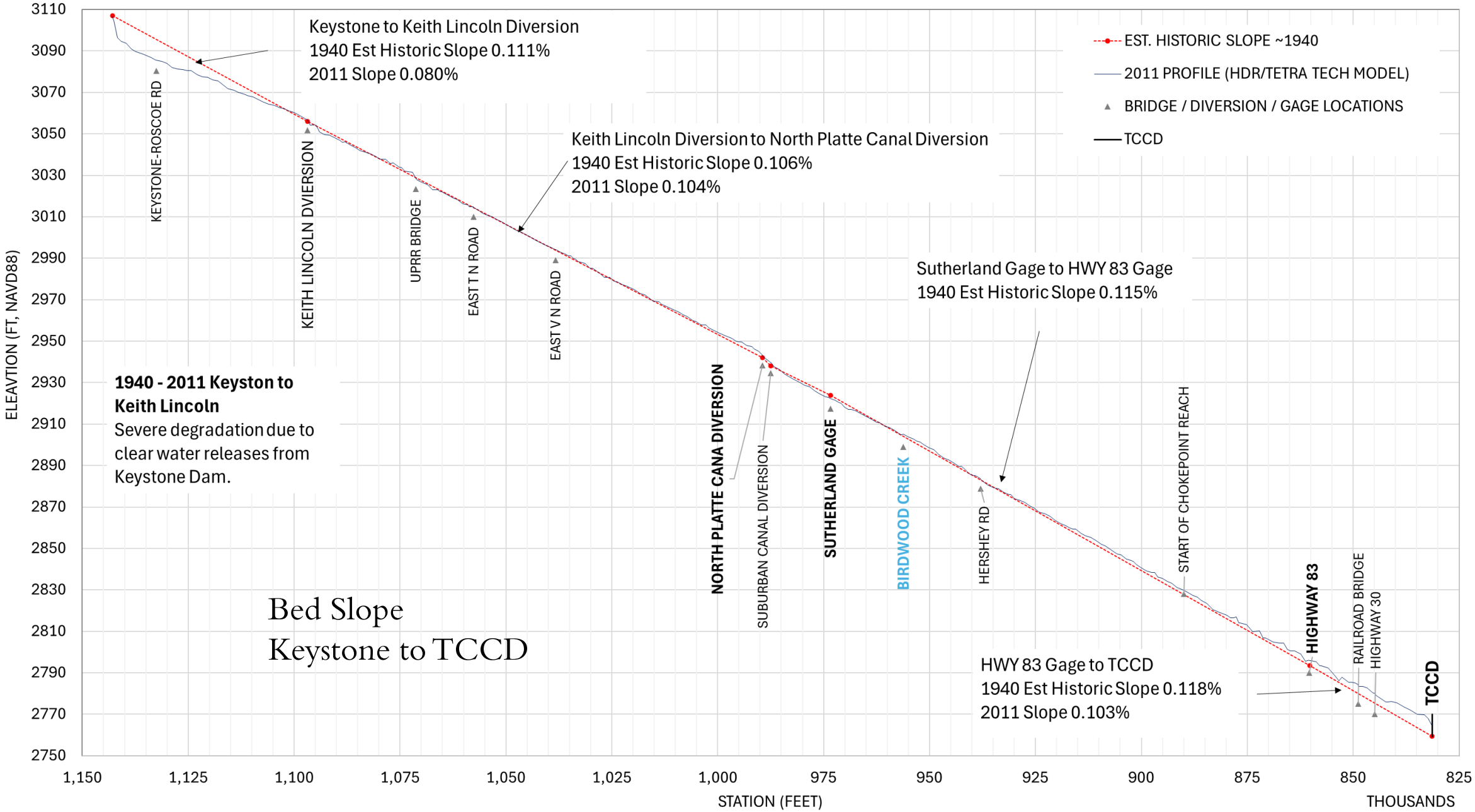
Legend

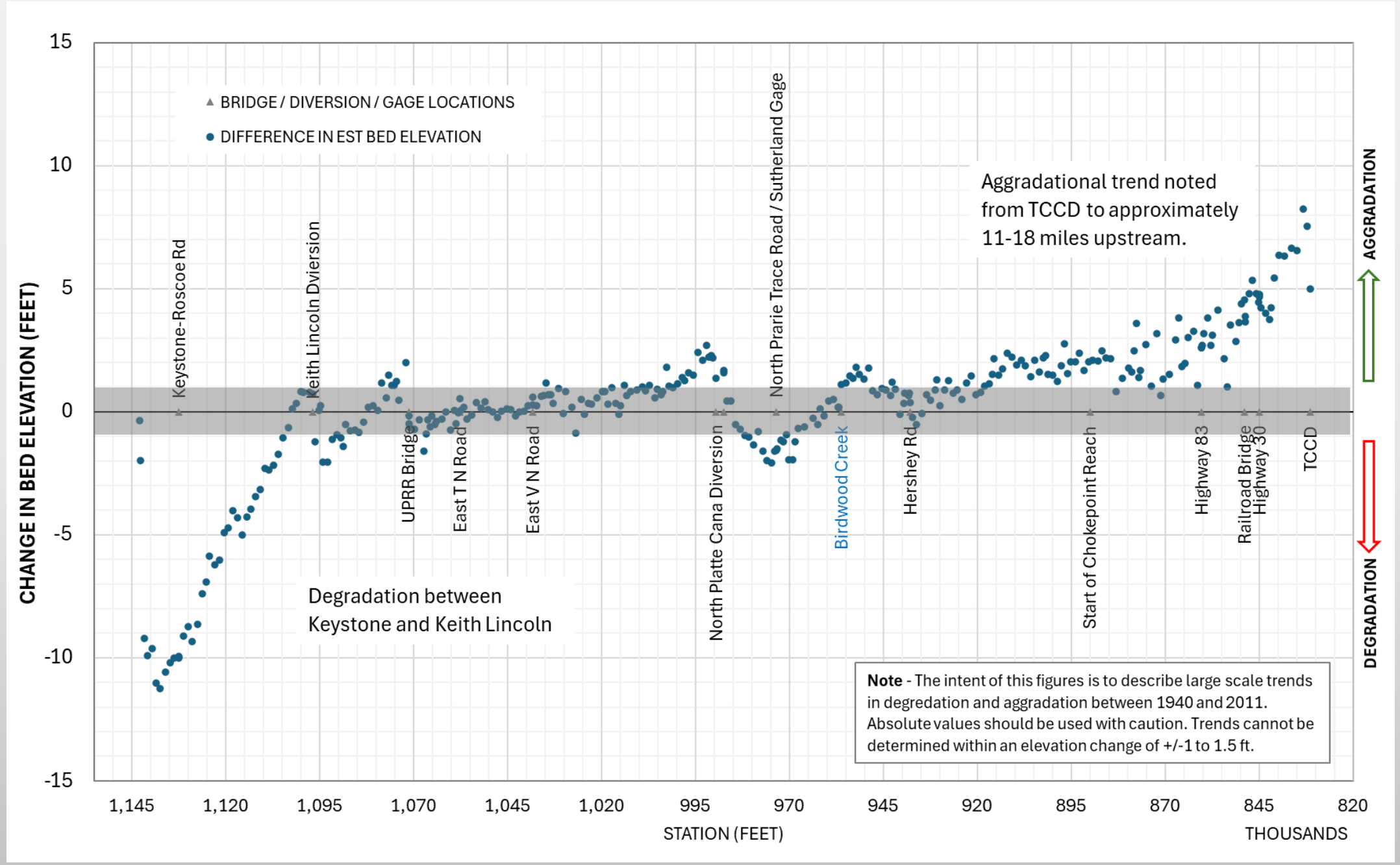
- 1938 Active Channel
- 1958 Active Channel
- 1965 Active Channel
- 1974 Active Channel
- 1981 Active Channel
- 1993 Active Channel
- 1999 Active Channel
- 2020 Active Channel

Active Channel Digitized From Historic Aerial Photography

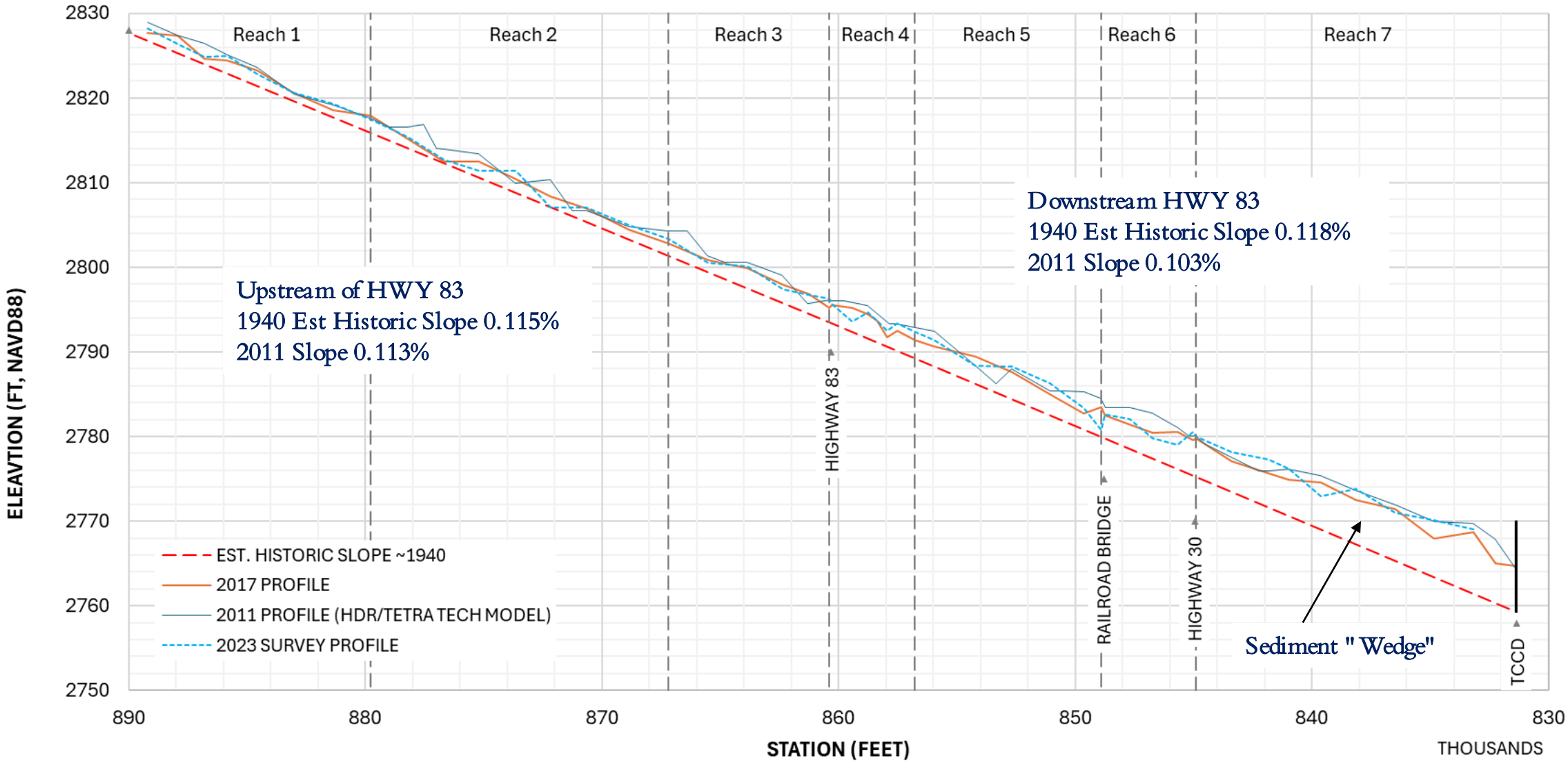
0 0.5 1 Miles

Aerial Photo 2020 NAIP


Keystone to Keith Lincoln Diversion
1940 Est Historic Slope 0.111%
2011 Slope 0.080%
Keith Lincoln Diversion to North Platte Canal Diversion
1940 Est Historic Slope 0.106%
2011 Slope 0.104%
Sutherland Gage to HWY 83 Gage
1940 Est Historic Slope 0.115%
HWY 83 Gage to TCCD
1940 Est Historic Slope 0.118%
2011 Slope 0.103%
EST. HISTORIC SLOPE ~1940
2011 PROFILE (HDR/TETRA TECH MODEL)
BRIDGE / DIVERSION / GAGE LOCATIONS
TCCD
1940 - 2011 Keyston to Keith Lincoln
Severe degradation due to clear water releases from Keystone Dam.
Bed Slope
Keystone to TCCD
KEYSTONE-ROSCOE RD
KEITH LINCOLN DVIERSION
UPRR BRIDGE
EAST T N ROAD
EAST V N ROAD
NORTH PLATTE CANA DIVERSION
SUBURBAN CANAL DIVERSION
SUTHERLAND GAGE
BIRDWOOD CREEK
HERSHEY RD
START OF CHOKEPOINT REACH
HIGHWAY 83
RAILROAD BRIDGE
HIGHWAY 30
TCCD
ELEAVTION (FT, NAVD88)
3110
3090
3070
3050
3030
3010
2990
2970
2950
2930
2910
2890
2870
2850
2830
2810
2790
2770
2750
1,150
1,125
1,100
1,075
1,050
1,025
1,000
975
950
925
900
875
850
825
STATION (FEET)
THOUSANDS


BRIDGE / DIVERSION / GAGE LOCATIONS
DIFFERENCE IN EST BED ELEVATION
Aggradational trend noted from TCCD to approximately 11-18 miles upstream.
Degradation between Keystone and Keith Lincoln
Keystone-Roscoe Rd
Keith Lincoln Dviersion
UPRR Bridge
East T N Road
East V N Road
North Platte Cana Diversion
North Prarie Trace Road / Sutherland Gage
Birdwood Creek
Hershey Rd
Start of Chokepoint Reach
Highway 83
Railroad Bridge
Highway 30
TCCD
AGGRADATION
DEGRADATION
CHANGE IN BED ELEVATION (FEET)
STATION (FEET)
THOUSANDS
15
10
5
0
-5
-10
-15
1,145
1,120
1,095
1,070
1,045
1,020
995
970
945
920
895
870
845
820
Note - The intent of this figures is to describe large scale trends in degredation and aggradation between 1940 and 2011. Absolute values should be used with caution. Trends cannot be determined within an elevation change of +/-1 to 1.5 ft.

RESULTS - GEOMORPHOLOGY



RESULTS – GEOMORPHOLOGY

Main channel length, side channel length, braiding index, and sinuosity have all remained relatively consistent since the mid-1990s.

- These trends suggest the current river pattern will remain stable in response to contemporary flow and sediment discharges.

Stable bed slopes suggests the current river profile along the Chokepoint segment will remain within the 0.11 to 0.12% range.

- Consistent channel bed elevation and corresponding bed slope trend is expected to continue in response to contemporary flow and sediment discharges.

Trend in **narrower active channel width** is contributing to a decrease in channel area, correlated with the decrease in hydraulic conveyance.

- Transition from a braided channel to a single thread channel contributes to a long-term reduction in active channel widths and hydraulic conveyance.

SUMMARY

Current Trends

- **Flow Characteristics** – The specific gage analysis using the Highway 83 gage data indicates a relatively stable bed elevation at Highway 83 between 2000-2022.
- **Hydraulic capacity** – no clear trend, fluctuates between 1,700 and 2,200 cfs
- **Sediment transport analyses** – sediment supplied to the North Platte River and the sediment transported through the reaches upstream of Highway 83 are roughly in balance.
  - Supported by bed elevation trends at the Highway 83 gage and comparisons of changes in channel bed slopes, profiles, and cross-sections.

SUMMARY

Current Trends

- **Geomorphology** – stable based on evaluation of historical trends, comparison of surveyed cross-sections, and hydraulic analyses
  - Limited river response to 2011 flood
- **Measured mass bed changes** from 2017 to 2023 suggest a stable grade trend in Reaches 1 through 4, and an aggradational trend occurring in Reaches 5, 6, and 7, increasing in the downstream direction.
  - These trends are supported by the changes in bed elevation and slopes.

GEOMORPHOLOGY AND SEDIMENT TRANSPORT STUDY OUTCOMES

FUTURE TRAJECTORY

- **Stable** based on comparison of surveyed cross-sections and hydraulic analyses, in combination with slowly changing vegetation patterns supports **relatively consistent hydraulic conveyance between 1999 and 2020**.

- **Relatively stable average bed slopes** in the Chokepoint segment expected to remain in a **quasi-equilibrium state** **assuming flow characteristics and sediment supply trends** are consistent with those over the previous 20 years, **and dredging operations continue at the TCCD structure**.

GEOMORPHOLOGY AND SEDIMENT TRANSPORT STUDY OUTCOMES

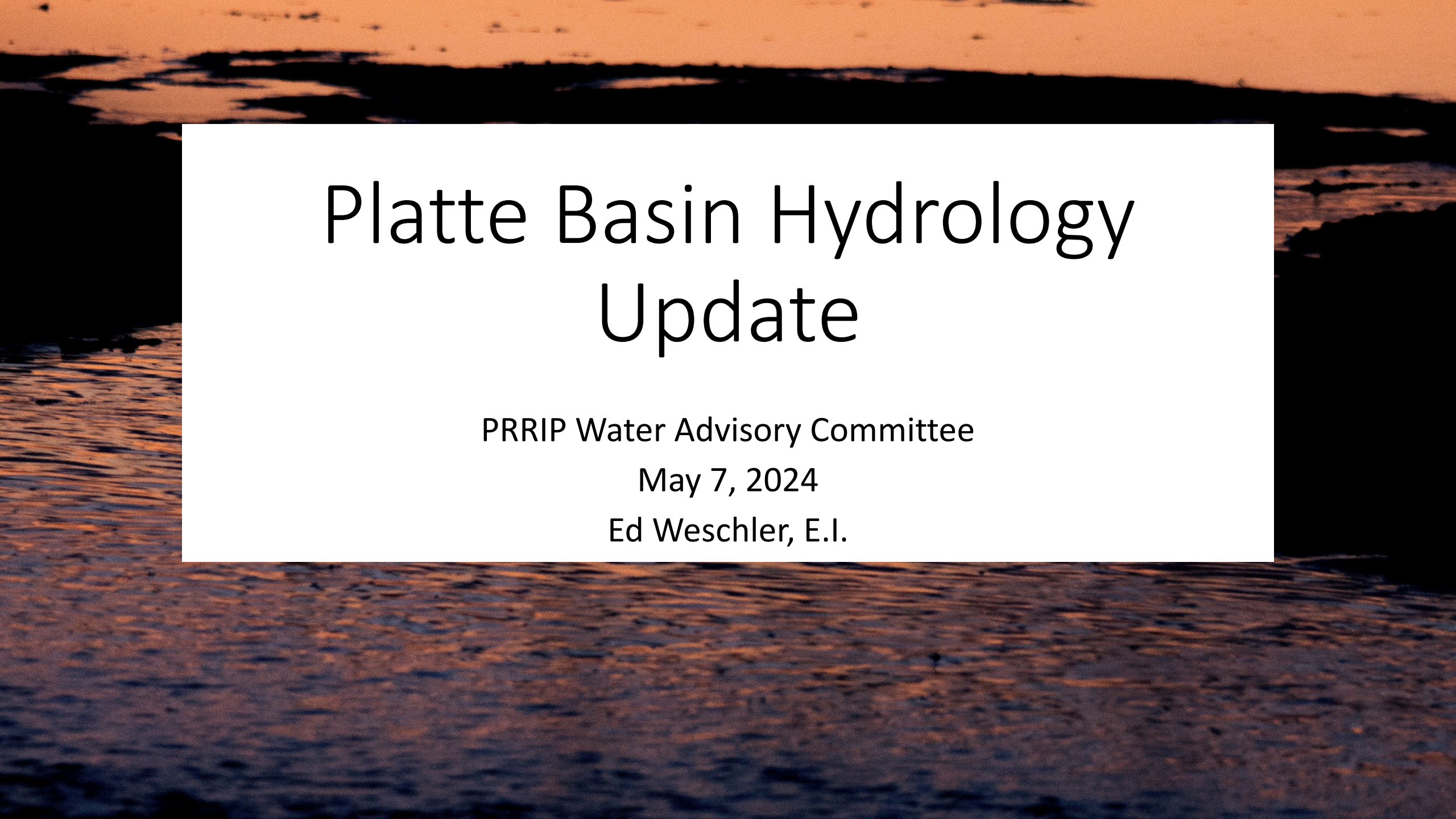
Predicted River Response to Stream Modification Alternatives

- Channel Widening
- Channel Widening with Jetties
- Modification of Tri-County Canal Diversion
- Dredging
- Dredging and Modification of Tri-County Canal Diversion

Phase III Alt Evaluation using 1D/2D Morphodynamic Modeling

- Hydraulic Capacity, Performance, and Sustainability

QUESTIONS /FEEDBACK



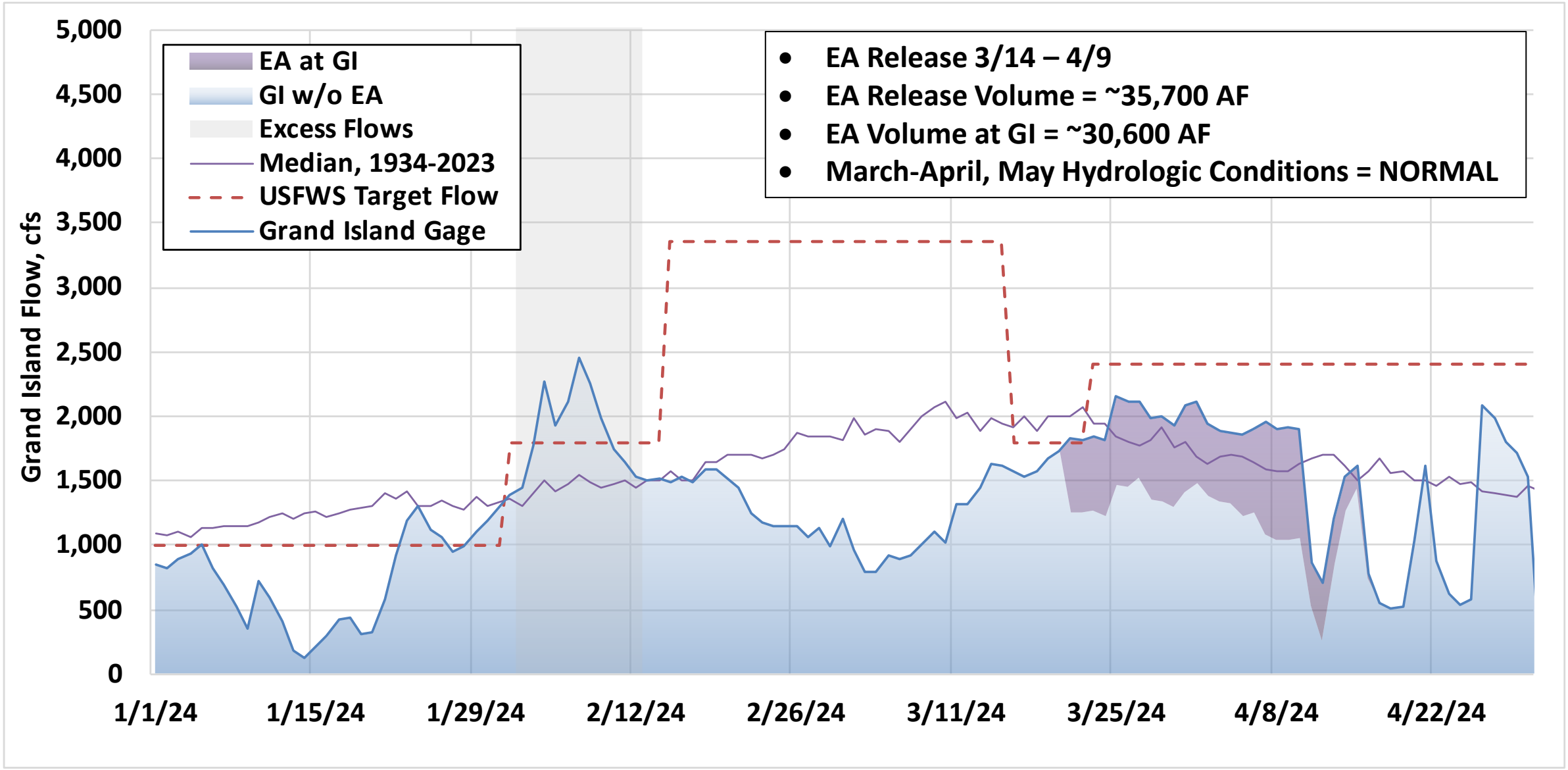
Platte Basin Hydrology Update

PRRIP Water Advisory Committee

May 7, 2024

Ed Weschler, E.I.

Flow updates



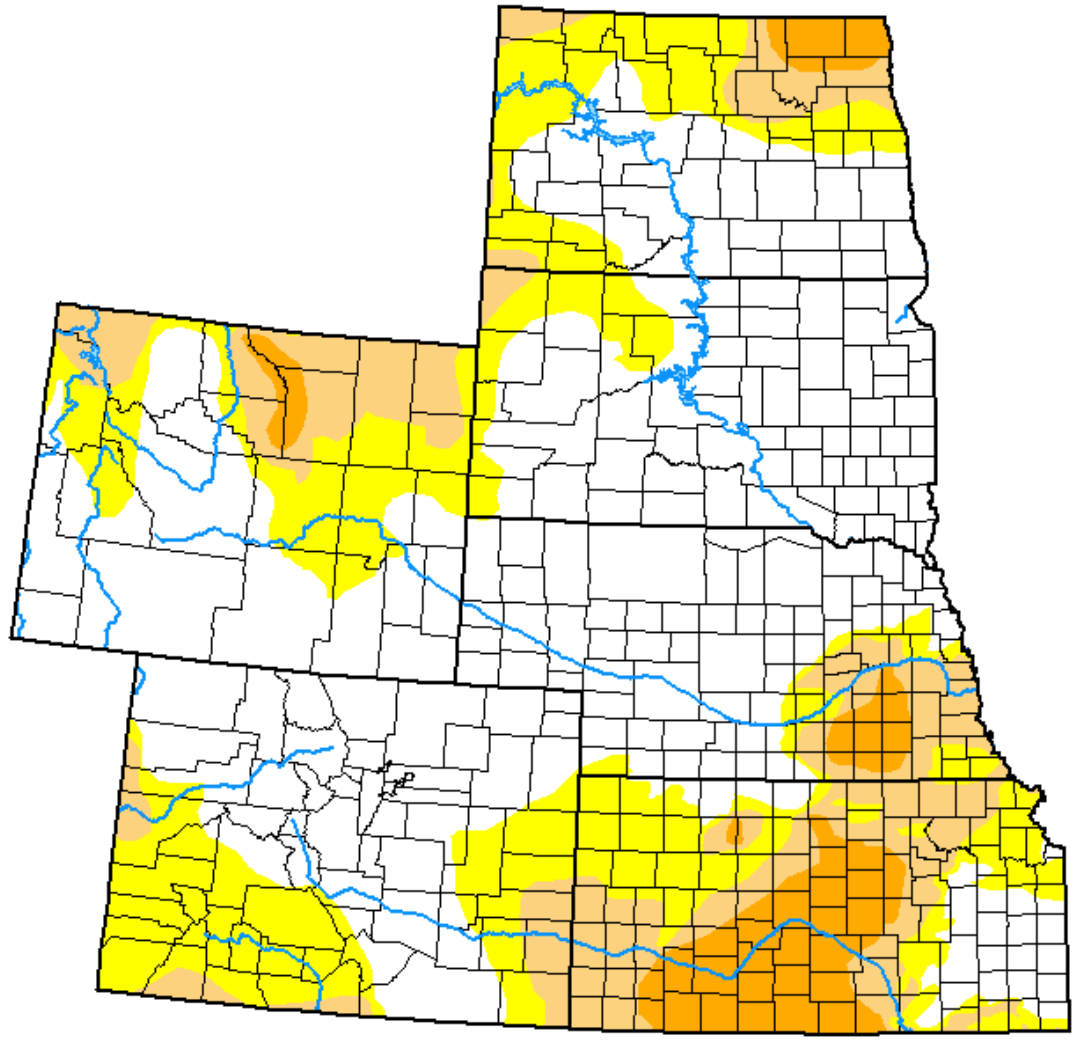
U.S. Drought Monitor

High Plains

April 30, 2024

(Released Thursday, May. 2, 2024)

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:

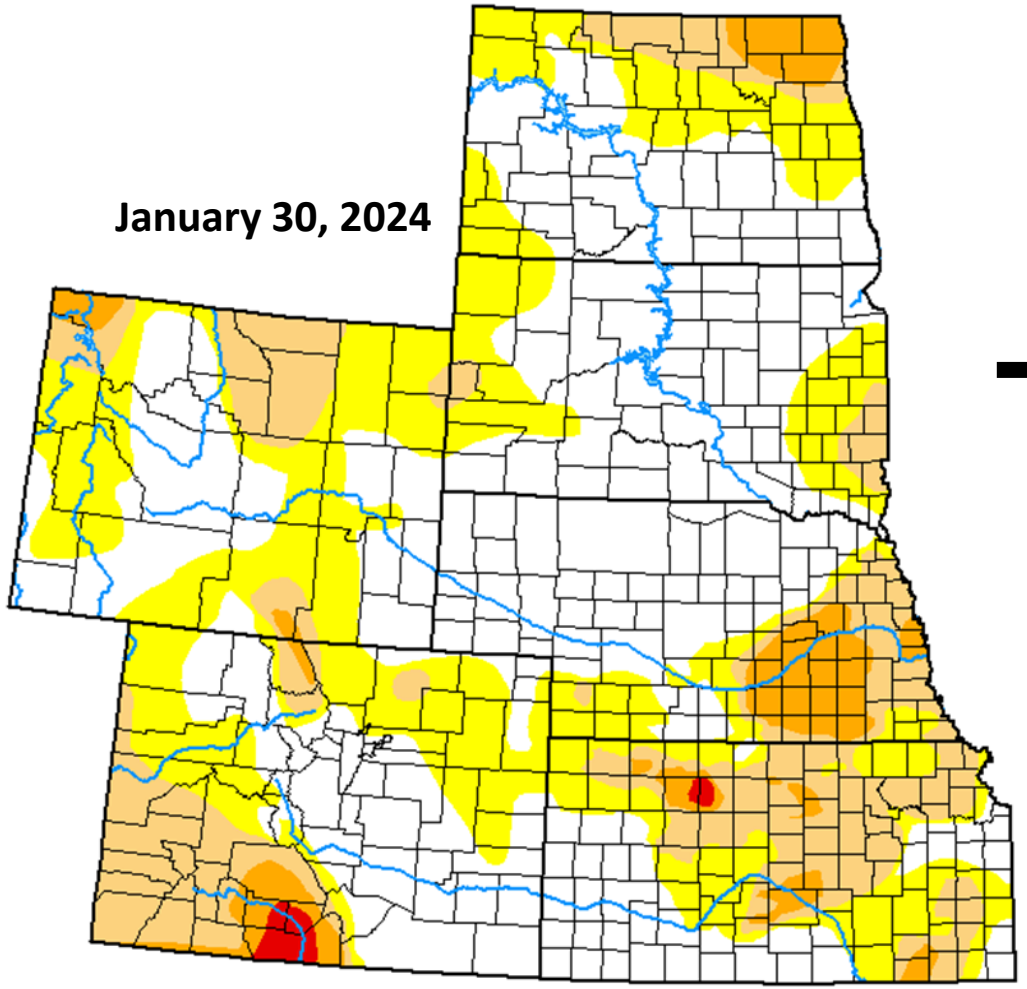
Curtis Riganti
National Drought Mitigation Center

droughtmonitor.unl.edu

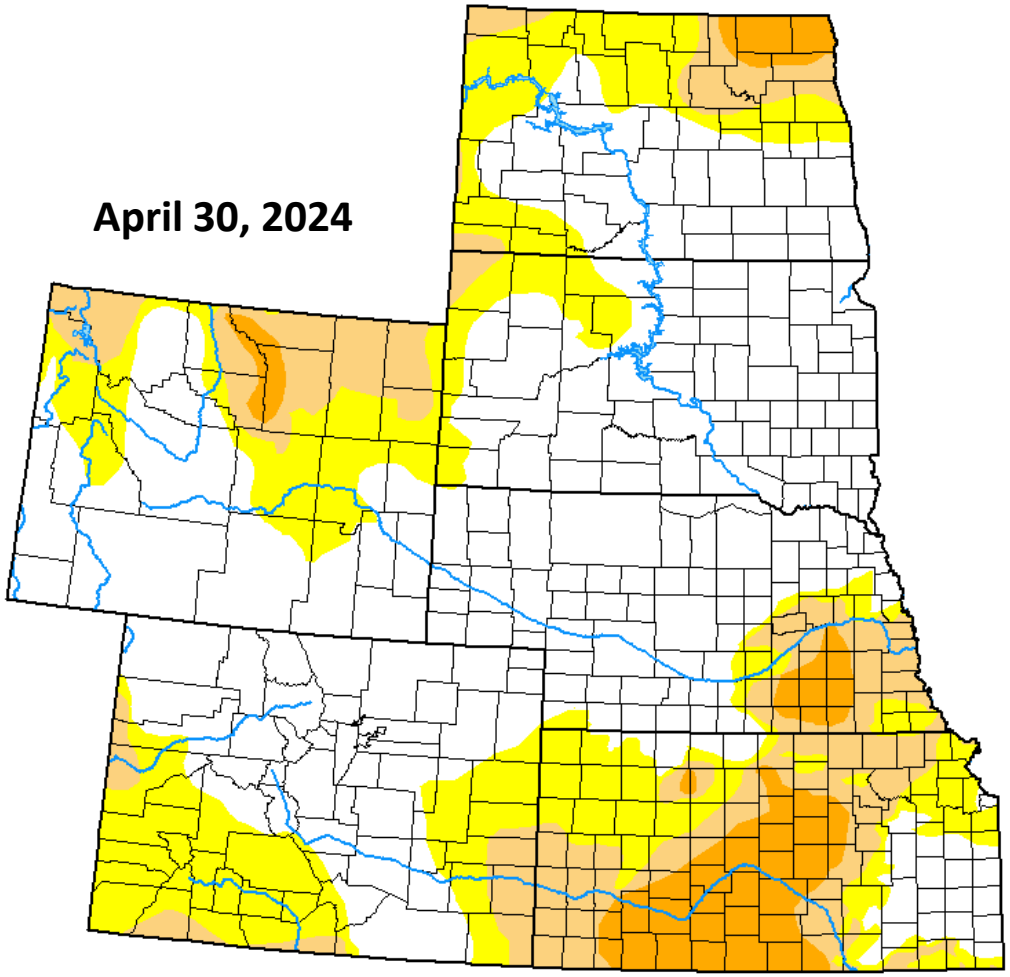
Drought Classification

- None
- D0 (Abnormally Dry)
- D1 (Moderate Drought)
- D2 (Severe Drought)
- D3 (Extreme Drought)
- D4 (Exceptional Drought)
- No Data

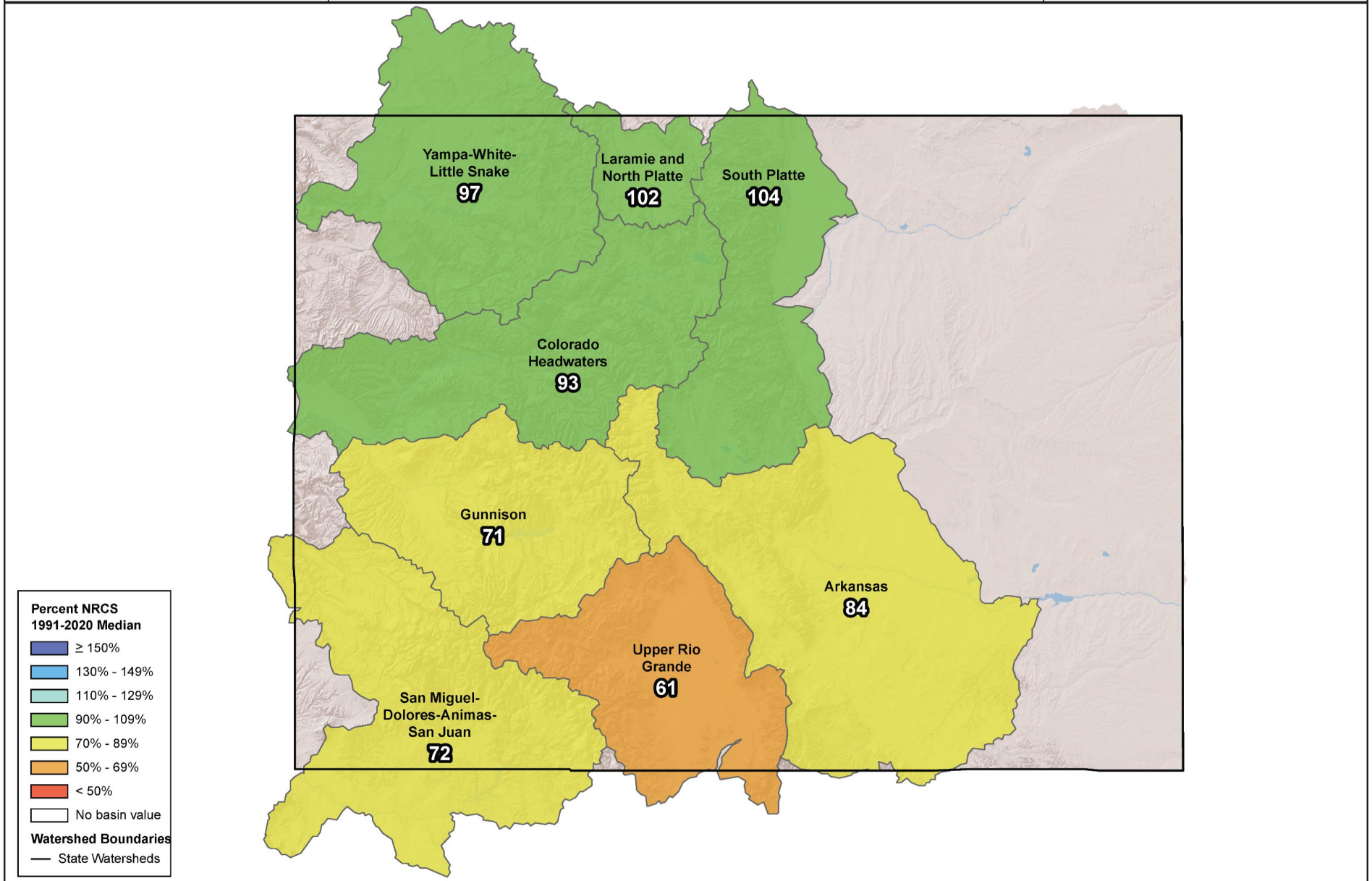
January 30, 2024



April 30, 2024



Snow Water Equivalent	Colorado SNOTEL Percent NRCS 1991-2020 Median	May 1, 2024, end of day



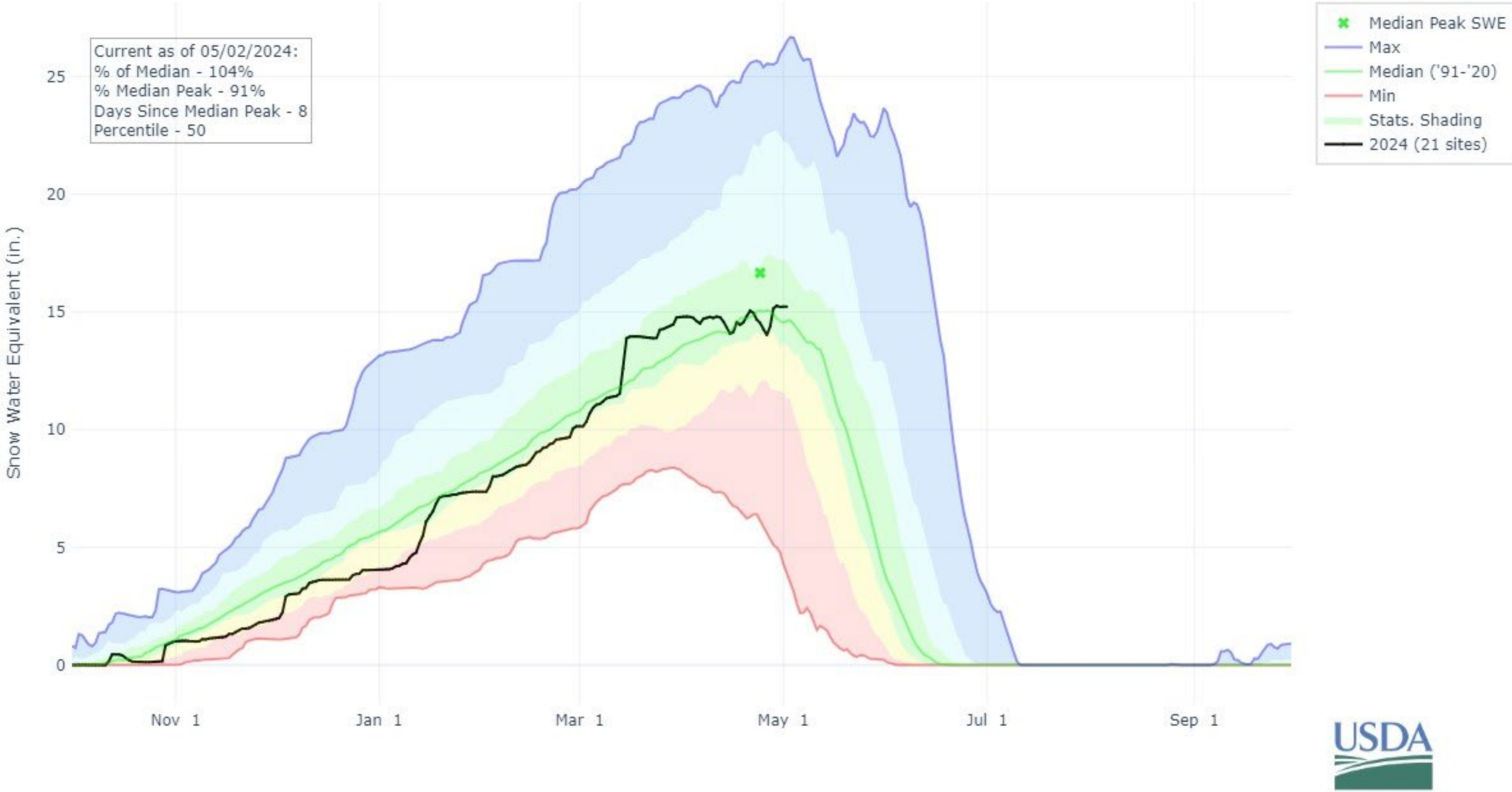
USDA Natural Resources Conservation Service
United States Department of Agriculture

N

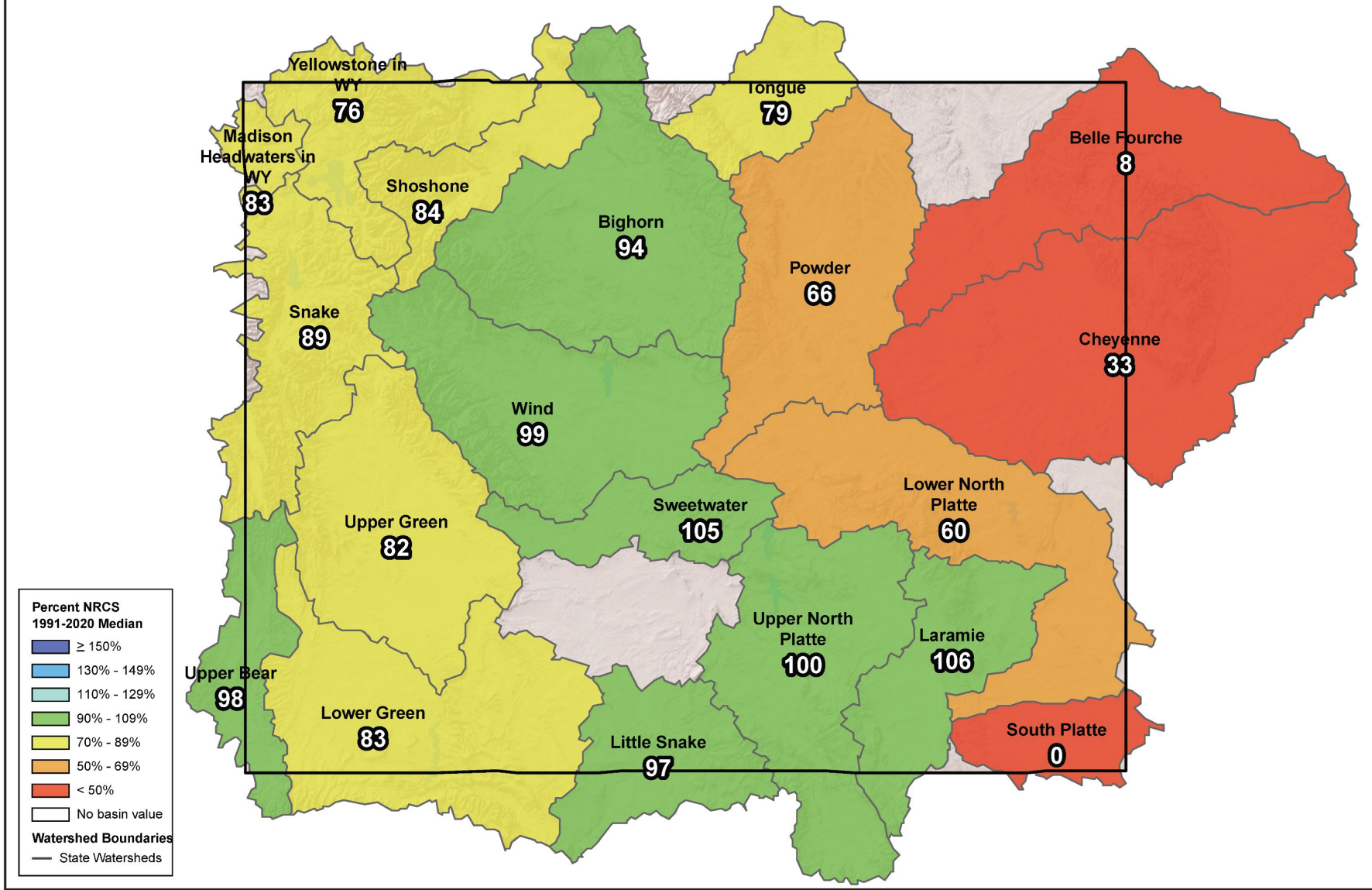
0 10 20 40 60 80 100 Miles

Created 5-02-2024

SNOW WATER EQUIVALENT IN SOUTH PLATTE



Snow Water Equivalent	Wyoming SNOTEL Percent NRCS 1991-2020 Median	May 1, 2024, end of day



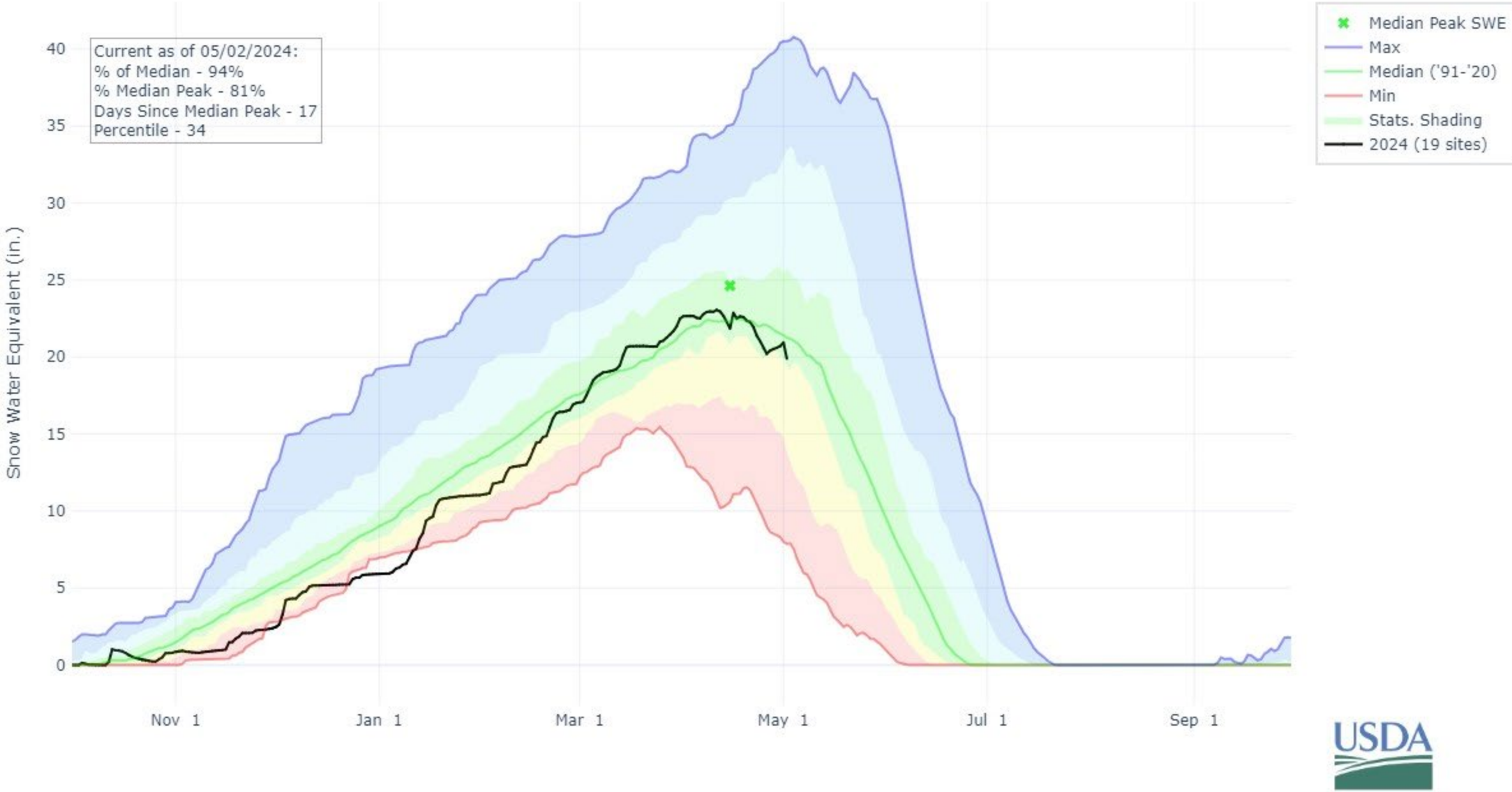
USDA Natural Resources Conservation Service
United States Department of Agriculture

N

Miles
0 10 20 40 60 80 100

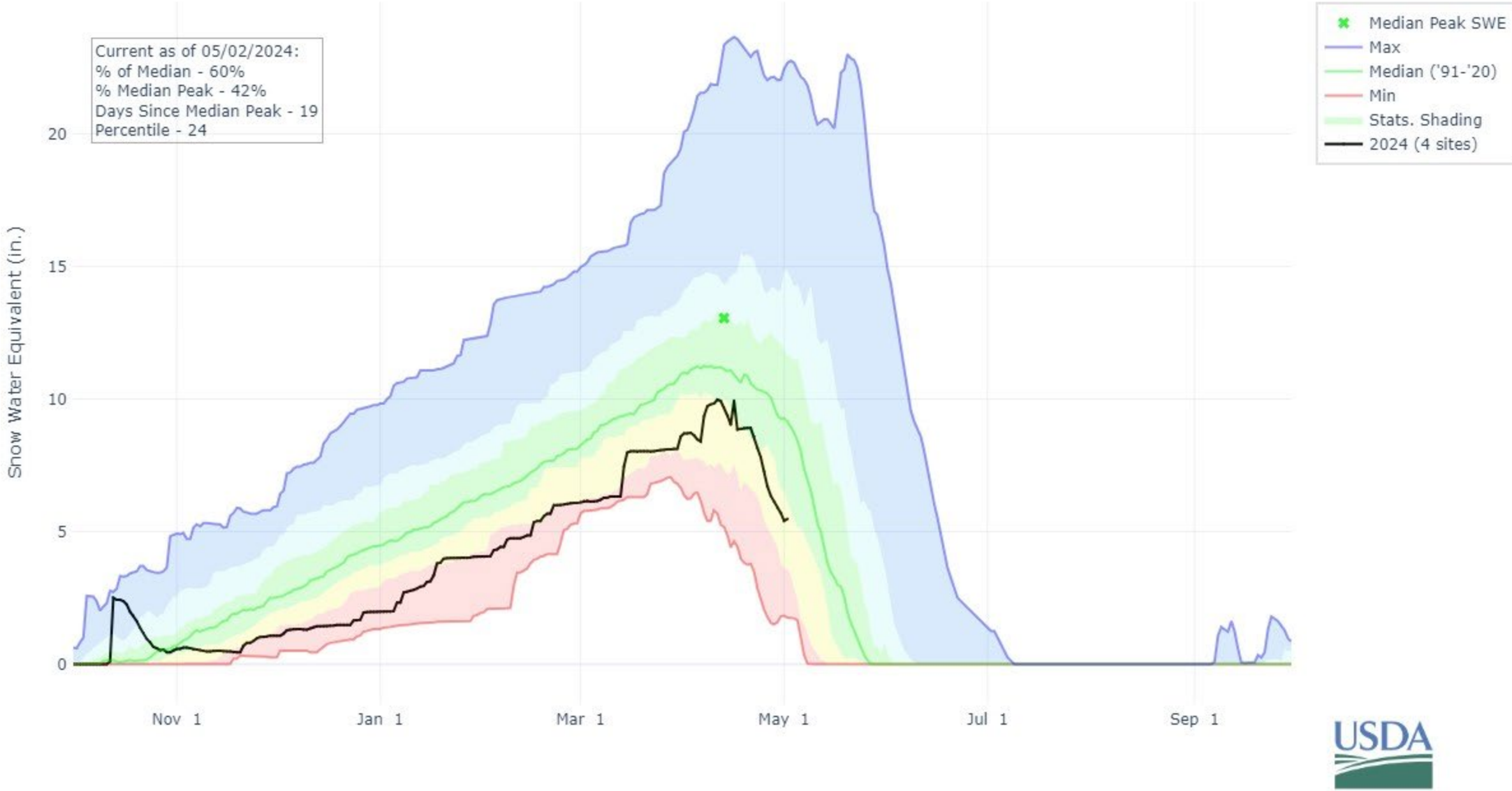
Created 5-02-2024

SNOW WATER EQUIVALENT IN UPPER NORTH PLATTE



USDA

SNOW WATER EQUIVALENT IN LOWER NORTH PLATTE



USDA

Questions?

Water Plan Updates

Seth Turner
Platte River Recovery Implementation Program
Water Advisory Committee Meeting
May 7, 2024

Photo Credit: Jagger Brewer - Rubicon

Water Action Plan
Leasing, Recharge, and Recapture

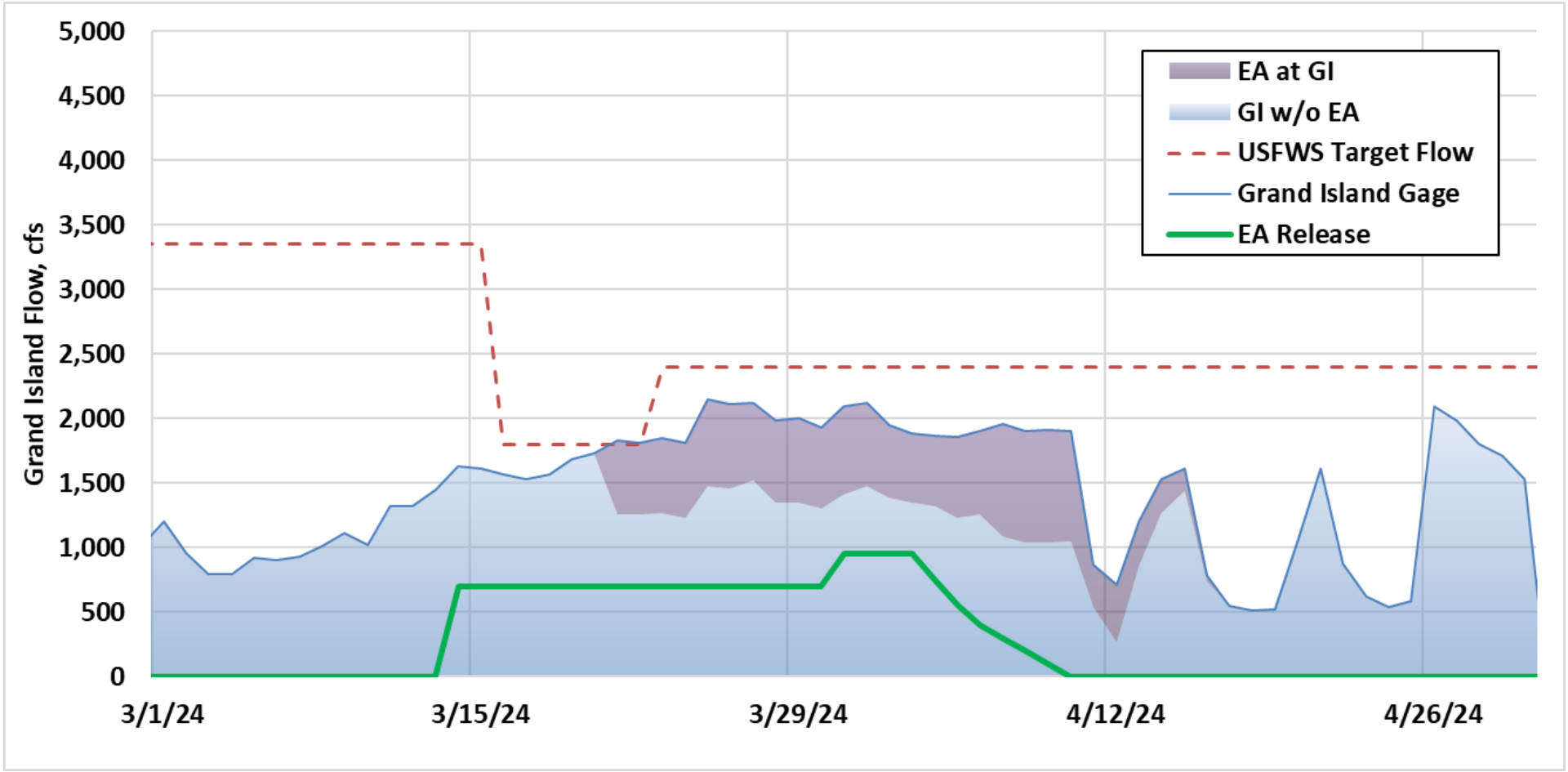
- Excess flow diversions for recharge
  - Total into Phelps, February 2-12 = 1,498 AF
  - Deliveries to Cottonwood Ranch, February 4-15 = 544.6 AF
  - Program share of Phelps recharge (75%) = 715 AF
- Recapture well pumping
  - Continuous target flow deficits at Grand Island
  - Most wells on since mid-February
  - Total pumped through April 29 = 1,397 AF (8 wells)

Expanded Recapture Reconnaissance Study

- Inter-fluve: Plum Creek assessment
- RJH: Elwood gravity outlet options
  - Likely open channel and pipeline options
  - 50 and 100 cfs capacities
- LRE Water: Recapture well siting and tradeoffs analysis
  - Potential locations in Platte River floodplain, south of Phelps Canal
  - Range of SDFs (different net benefits)
  - Conveyance to river
  - Then combinations of outlet options and recapture wells to maximize deficit reductions
- Present to WAC in August, GC in September

Lake McConaughy EA Release
Spring Whooping Crane Migration

- Release
  - March 14-April 9
  - 35,702 AF
  - Average 667 cfs
- 100% routed through NPPD system
- Overton
  - 34,627 AF (97%)
- Grand Island
  - March 21-April 16
  - 30,613 AF (86%)



PLATTE RIVER
RECOVERY IMPLEMENTATION PROGRAM

Lake McConaughy EA Release Germination Suppression

- 5th year
- Target 1,500 cfs at Grand Island from June 1-30
- Release start on/around May 24
- Coordination: USFWS, CNPPID, NPPD, NeDNR, EDO

Platte River Recovery Implementation Program (PRRIP) and CNPPID Irrigation Water Lease Program, Discussion and Future Options

May 7, 2024

For the PRRIP Water Advisory Committee, by
George Oamek
Honey Creek Resources, Inc.

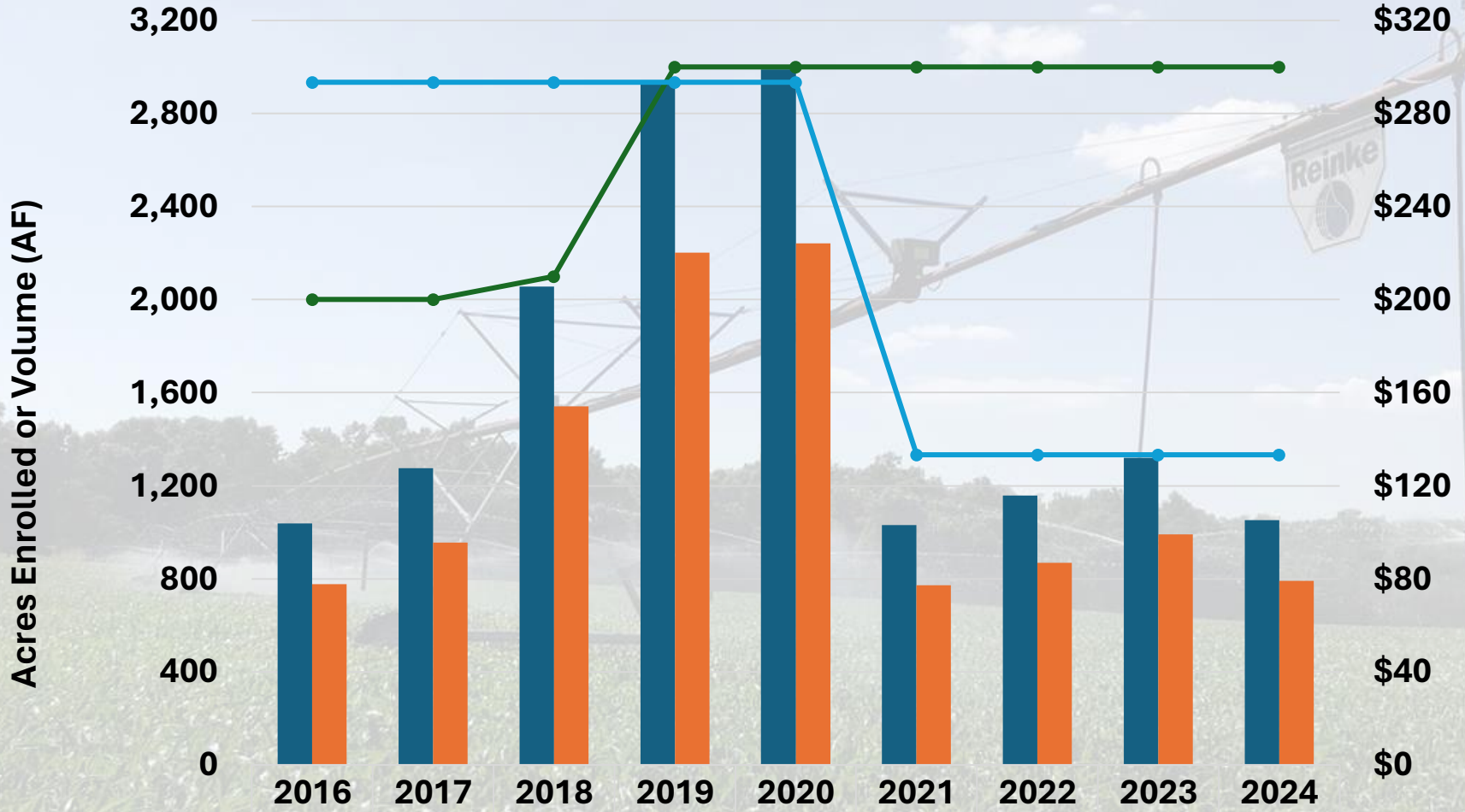
History of the lease program

- Up to 2015, the PRRIP was interested in leasing water from surface water irrigators, but opportunities were limited
- Started as a pilot study (2015-2018) between CNPPID irrigators and PRRIP beginning in 2015, continuing through 2024
  - Pays irrigators to fallow or dryland farm previously irrigated lands during years of full surface water allocation; leased water stored in Lake Mac
  - CNPPID manages but PRRIP sets the price
  - Annual leases with irrigators, not multi-year
  - Initial payment of $220/acre, or $293/acre-foot for 0.75 acre-feet/acre
  - Initially targeted 2,000 acres, expanded to 3,000 acres in 2019.

Historical perspective

- Fully subscribed by 2020 crop year
- A score of 1,900 acre-feet was approved in 2019
- PRRIP's offer was subsequently dropped to $100 per acre, or $133/acre-foot, due to
  - High cost relative to PRRIP's other water sources
  - Low commodity prices
- Interest in the lease program has since remained low
- The status quo provides few direct benefits to PRRIP other than maintaining the relationship

CNPPID Irrigator Lease, 2016-2024



	2016	2017	2018	2019	2020	2021	2022	2023	2024
Enrolled Acres	1,037	1,275	2,055	2,934	2,989	1,030	1,157	1,320	1,053
EA Credit (AF)	778	956	1,541	2,201	2,242	773	868	990	790
Max Acres	2,000	2,000	2,100	3,000	3,000	3,000	3,000	3,000	3,000
Unit Cost	$293	$293	$293	$293	$293	$133	$133	$133	$133

April 2 Irrigator Workshop, summary of observations

- Price is currently too low
  - *“For $100/acre I’ll still carry pipe, for $200/acre I’ll lease”*
  - No negatives with administration of the Program or with the PRRIP itself, just the price
- Annual leases are OK
  - Very little risk, “*I can decide year-to-year based on price offered”*
- Can the sign-up date be moved to March of the current year rather than the previous Fall?
- Not much previous thought given to multi-year leases by participants - too much risk due to crop price volatility
  - Some discussion about whether some multi-year leases may eventually be needed for PRRIP planning purposes
  - Discussion of reduce irrigator risk by indexing price to relevant variables, such as corn prices or cash rents

Lease Prices and Price Discovery

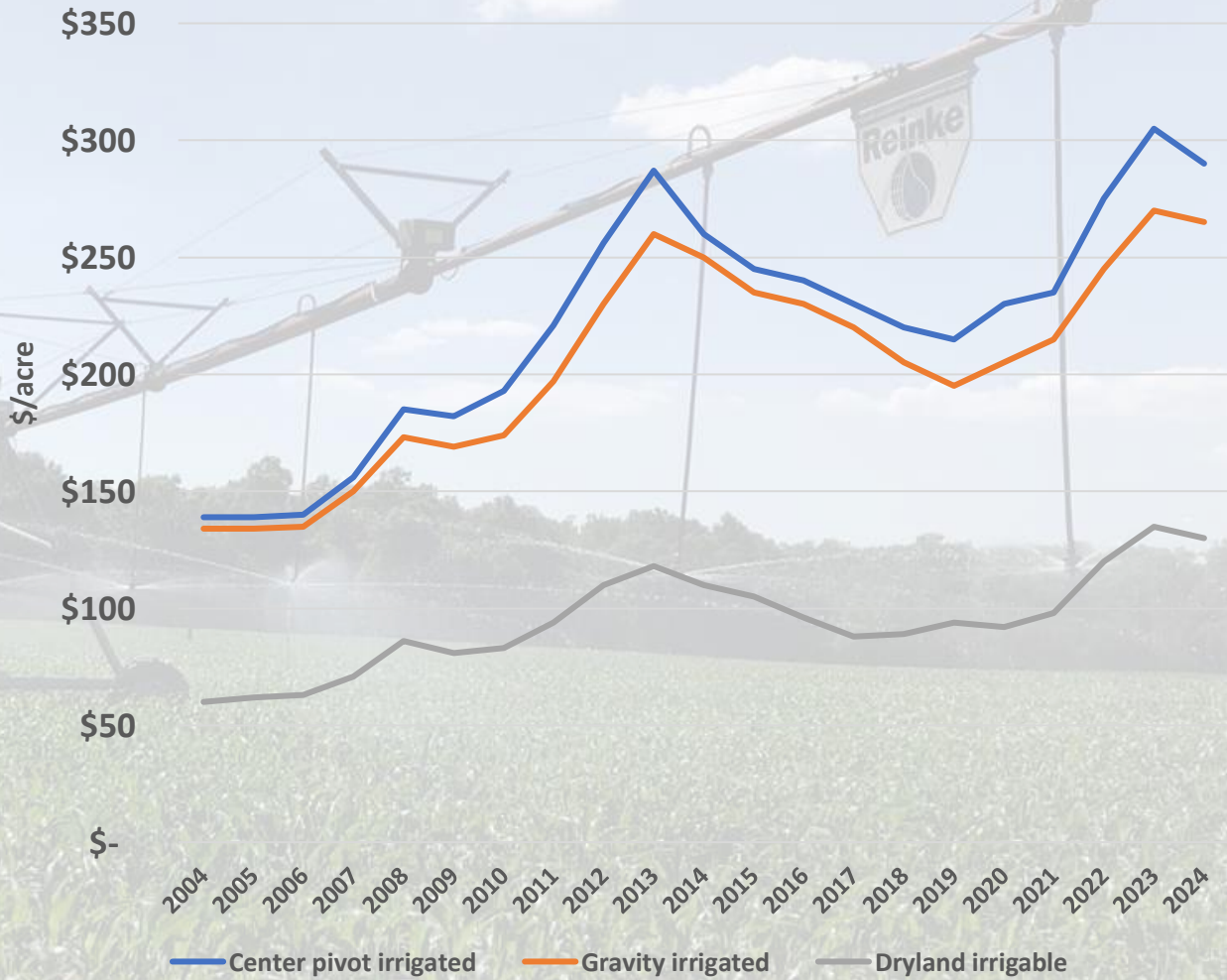
- So far, lease price has not been tied to specific benchmarks
- Lease prices paid in other regions are varied
- Is there a good benchmark or “price discovery” method?
  - Reflecting the water’s productive value plus {risk/reward/profit}
  - Easily verified and reproduced
- Examples
  - Cropland rental markets measure productive value
  - Reverse auction, like CRP, can reflect productive value and operator risk preferences
- Risk component
  - Institutional risk and price risk

Prices paid to irrigators for habitat supplies

- Middle Rio Grande Conservancy District fallowing program, year 5
  - $400/acre for partial season (May-Aug)
  - $700/acre for full season (Mar-Sept), about $280-$300/acre-foot
  - Funds provided by NM SEO, USBR, and USFWS
  - Annual leases
- Colorado River System Conservation Pilot Program, 2024
  - More an interstate water management issue than habitat, but same supply sources
  - Baseline price varies by Upper Basin state, but near $500/acre-foot, except for NM ($300/acre-foot)
  - Annual leases
- Colorado Water Trust-related pilot studies
  - Annual leases, multiple funding sources
  - $200/acre-foot, +/-, for higher elevation supplies irrigating mostly forages
- These prices are systematically tracked across the West by WestWater Research

Cropland rental market in Central NE, as reported by UNL Cooperative Extension

- Rental prices are an “efficient” reflection of farm profitability
- Changes over time with commodity markets, especially corn, with some dampening of extremes
- Gap between irrigated rent and dryland rent can be viewed as the value of irrigation supply
- Data published annually
- Some feel data lagging



Cropland rental market

- The figure maps the difference between center pivot and irrigable dryland rents and PRRIP lease payments
- Measures the value of irrigation supply but not irrigators' risk
- Current value is calculated to be $160/acre
- Economic incentive to participate prior to 2021

Reverse auction

- Irrigators submits bids for how much acreage they would fallow at what price
- Common approach for markets with one major buyer (like PRRIP)
  - NRCS's CRP uses this framework
  - Used by Edwards Aquifer (TX) irrigators to lease water to San Antonio
- Easiest described by example
- Observation: when the lease price was at $220/acre, 2020 workshop participants were indifferent to a reverse auction. At $100/acre, interest increased significantly

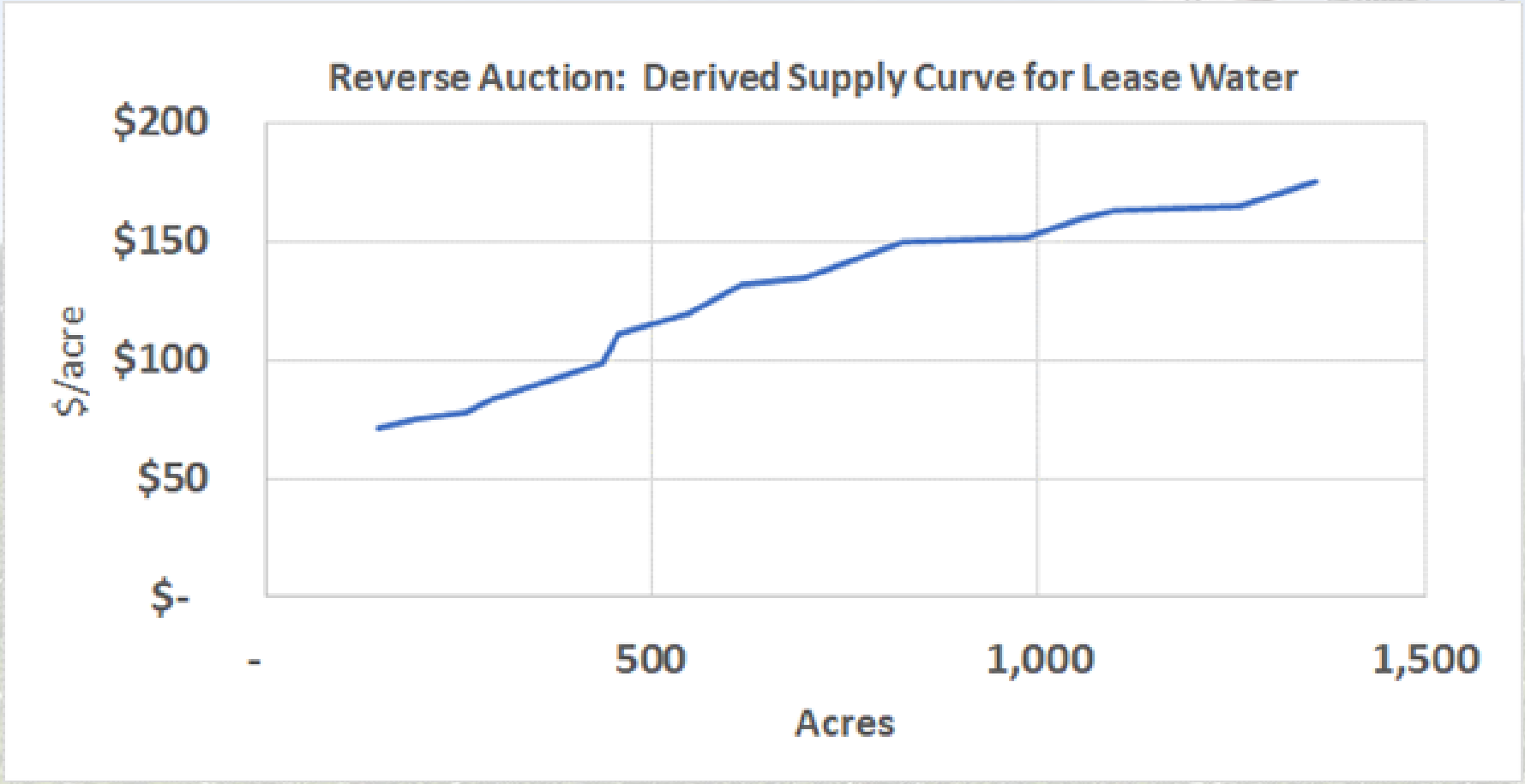
Reverse Auction Example -- Hypothetical

- Assume the PRRIP wants to lease surface water from 1,000 acres in CNPPID
- The PRRIP asks interested irrigators to submit sealed bids for how many acres they would fallow and at what price
- 15 irrigators submit bids

Unsealed bids			
Bidder	Bid, $/acre		Acres offered for fallowing
1	$	150	130
2	$	84	35
3	$	71	147
4	$	135	80
5	$	111	21
6	$	163	48
7	$	120	90
8	$	132	70
9	$	78	62
10	$	165	160
11	$	99	142
12	$	152	160
13	$	75	49
14	$	159	65
15	$	175	101
	Total		1,360

Unsealed bids			
Bidder	Bid, $/acre	Acres offered for fallowing	Cumulative acres
3	$ 71	147	147
13	$ 75	49	196
9	$ 78	62	258
2	$ 84	35	293
11	$ 99	142	435
5	$ 111	21	456
7	$ 120	90	546
8	$ 132	70	616
4	$ 135	80	696
1	$ 150	130	826
12	$ 152	160	986
14	$ 159	65	1,051
6	$ 163	48	1,099
10	$ 165	160	1,259
15	$ 175	101	1,360

The derived price, or supply, curve shows that 1,000 acres corresponds to $150/acre



Implementing a reverse auction

- A critical mass of interested irrigators would be needed
  - Currently, 61 agreements with 29 irrigators; CNPPID delivers to about 650 irrigators
  - < 5% of irrigators participate; average acres per irrigator = 36 acres; average acres per contract = 17 acres
- Most irrigators already understand the method
- The resulting price is uncertain but not arbitrary
  - Should reflect both productivity loss and producer's risk preferences
  - Some pricing limits may need to be developed
  - Irrigators could submit multiple bids

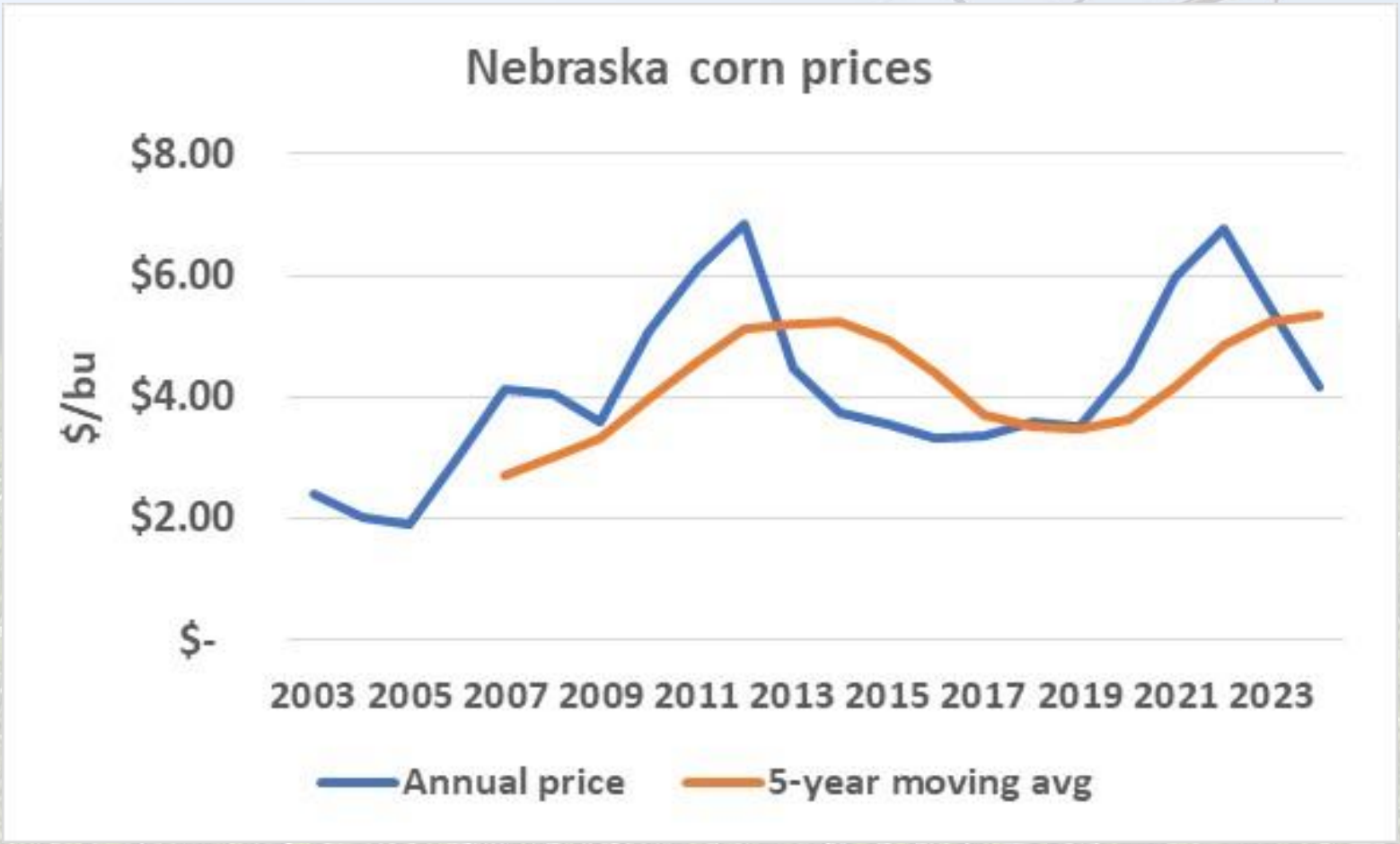
Lease Term

- Currently single year, annual sign-up
- 2020 workshop identified a desire for multi-year leases, or at least a choice; 2024 workshop participants preferred single year lease
- *Some form of multi-year leases would appear necessary to provide a degree of planning and financial certainty to the PRRIP*
  - *Actual multi-year contracts, or*
  - *Assurance that the single-year approach will continue?*
- A need to adjust lease prices over time and in multi-year leases
  - Index to respond to commodity price changes
  - The longer the lease, the more important the indexing method
  - Something like flex leases used for irrigated cropland

Price adjustments for multi-year leases

- Index with the change in annual crop commodity prices
  - Very volatile
- Index with a 5-year moving average of crop prices (corn) to dampen swings
  - Less volatile
- Use cropland rental market changes to develop index
  - Less volatile than above
- Use more traditional price indices, such as CPI, PPI, ENR, or others
  - Even less volatile but not logically connected

Annual variability in Nebraska corn prices



WAC discussion for 2025 crop year

1. Continue for another year at $100/acre
   - The lease program will continue to contract
   - No real benefit for PRRIP and only a few irrigators
2. Eliminate lease program
   - Remove an option - not necessarily permanent but re-establishing the relationship would take time
   - Would need careful consideration by WAC and GC relative to other water sources and costs
3. Continue for another year at a higher price
   - Set price using crop rental market benchmark, $160/acre currently ($213/acre-foot), or
   - Set price using a reverse auction, or
   - Set price using criteria TBD

Options for 2025

4. Extend program for more than one year and offer multi-year contracts
   - Price discovery method and price adjustment over time determined by cropland rental market, or
   - Price discovery and adjustment over time TBD

PRRIP follow-up

- Governance Committee will address the lease program in June and September
  - Whether to continue to discontinue the program
  - If continued, under what terms?

Questions?

Nebraska New Depletion Plan Update

PRRIP Water Advisory Committee Meeting

May 7, 2024

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Update on Nebraska's New Depletion Plan

- 2022 Permitted Activities
- Robust Review Update
- Update on other activities

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2022 Permitted Water Uses

- Permits issued by the NRDs and the Department

Type	Total
Groundwater Transfers	47
Groundwater Wells	45
Groundwater Variances	16
Surface Water Permits	9

2022 Groundwater Transfer Permits

	Upstream of AHR	Within AHR	Total
Groundwater Transfers	23	24	47

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2022 Groundwater Well Permits

Use	Upstream of AHR	Within AHR	Total
Replacement Well	14	11	25
Irrigation	4	-	4
Supplemental GW	3	4	7
Dewatering	-	8	8
Observation	1	-	1
Total	**22**	**23**	**45**

2022 Groundwater Variance Permits

Type	Upstream of AHR	Within AHR	Total
Exemption to Allocation	16	-	16
Total	**16**	**-**	**16**

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2022 Surface Water Permits

Type	Upstream of AHR	Within AHR	Total
Recharge (Temporary)	8	-	8
Temporary Manufacturing	1	-	1
Total	**9**	**-**	**9**

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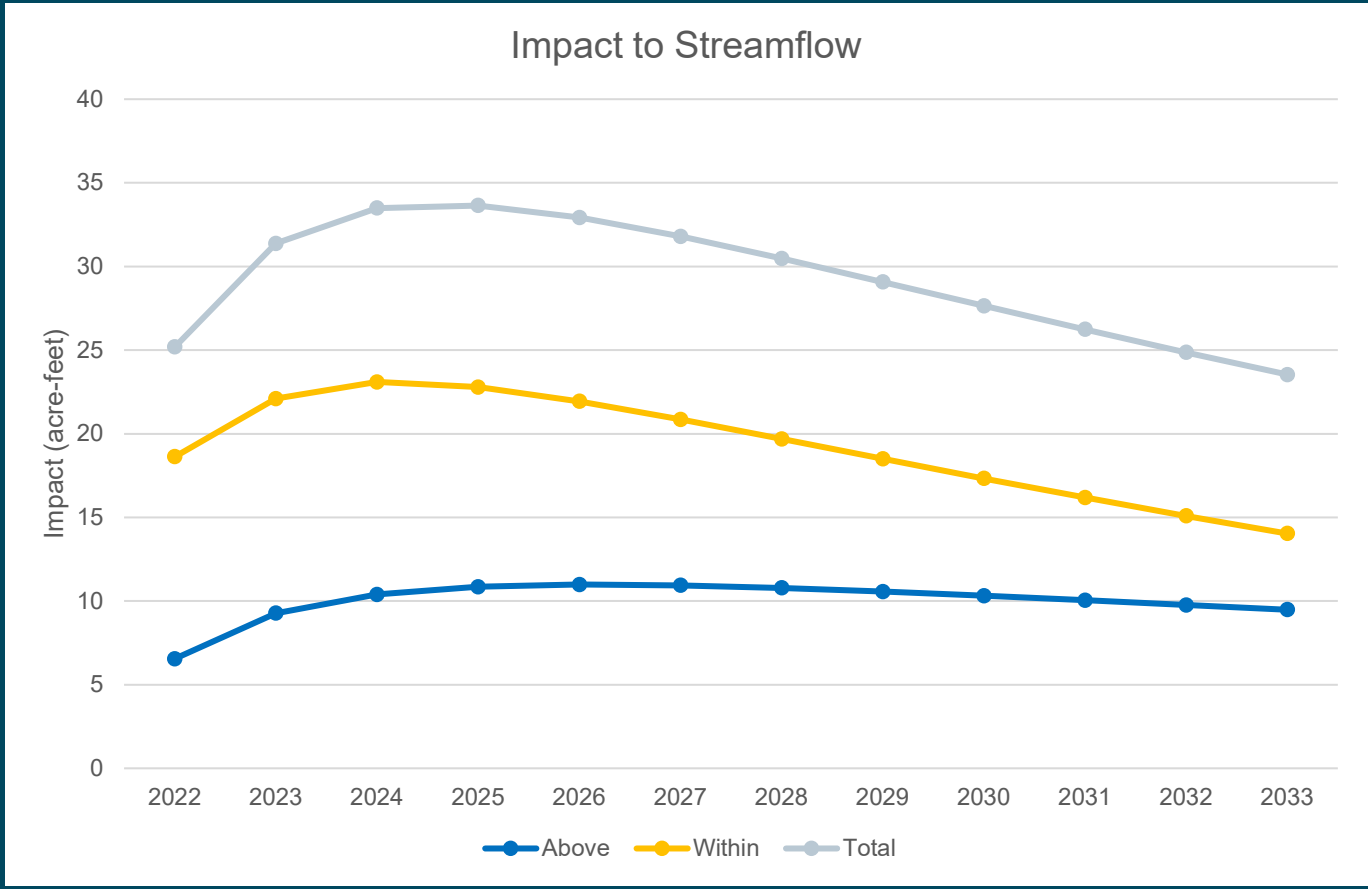
Effects to Streamflow from 2022 Permitted Activities in Acre-feet

Year	Upstream of AHR			Within AHR			Both Reaches
	Mitigations	New Uses	Net Effect	Mitigations	New Uses	Net Effect	Net Effect
2022	26.82	-20.26	6.56	22.41	-3.79	18.63	25.19
2023	39.88	-30.6	9.28	39.23	-17.14	22.1	31.37
2024	48.43	-38.03	10.39	52.05	-28.96	23.09	33.49
2025	54.76	-43.91	10.85	61.55	-38.76	22.79	33.64
2026	59.77	-48.79	10.98	68.98	-47.04	21.94	32.92
2027	63.89	-52.96	10.94	75.03	-54.17	20.86	31.8
2028	67.37	-56.59	10.78	80.1	-60.41	19.69	30.48
2029	70.36	-59.79	10.57	84.43	-65.93	18.5	29.07
2030	72.98	-62.66	10.32	88.19	-70.86	17.33	27.65
2031	75.29	-65.24	10.05	91.5	-75.31	16.19	26.24
2032	77.35	-67.58	9.77	94.44	-79.35	15.09	24.86
2033	79.21	-69.72	9.49	97.09	-83.05	14.04	23.53

Net Effect to Streamflow from 2022 Permitted Activities



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2023 Robust Review: Input Data Updates

- Input datasets reviewed/updated through 2020 include:
  - Land Use data and Irrigable Acres spatial datasets for all UP NRDs
    - Irrigation status, irrigation source, crop type
  - Historical Excess Flows & Projected Excess Flows at IMP-defined reach scale
  - Municipal & Industrial Pumping
  - Available Metered Groundwater Pumping
  - Augmentation Pumping
  - Weather data
  - Livestock Population Analysis
- Completed a tillage field survey and incorporated conservation practices (increased prevalence of no-till, change in crop growing degree days, crop phenology)
- Changed calculations from cell to parcel based in certain areas
- Updated groundwater modeling platforms and completed recalibration

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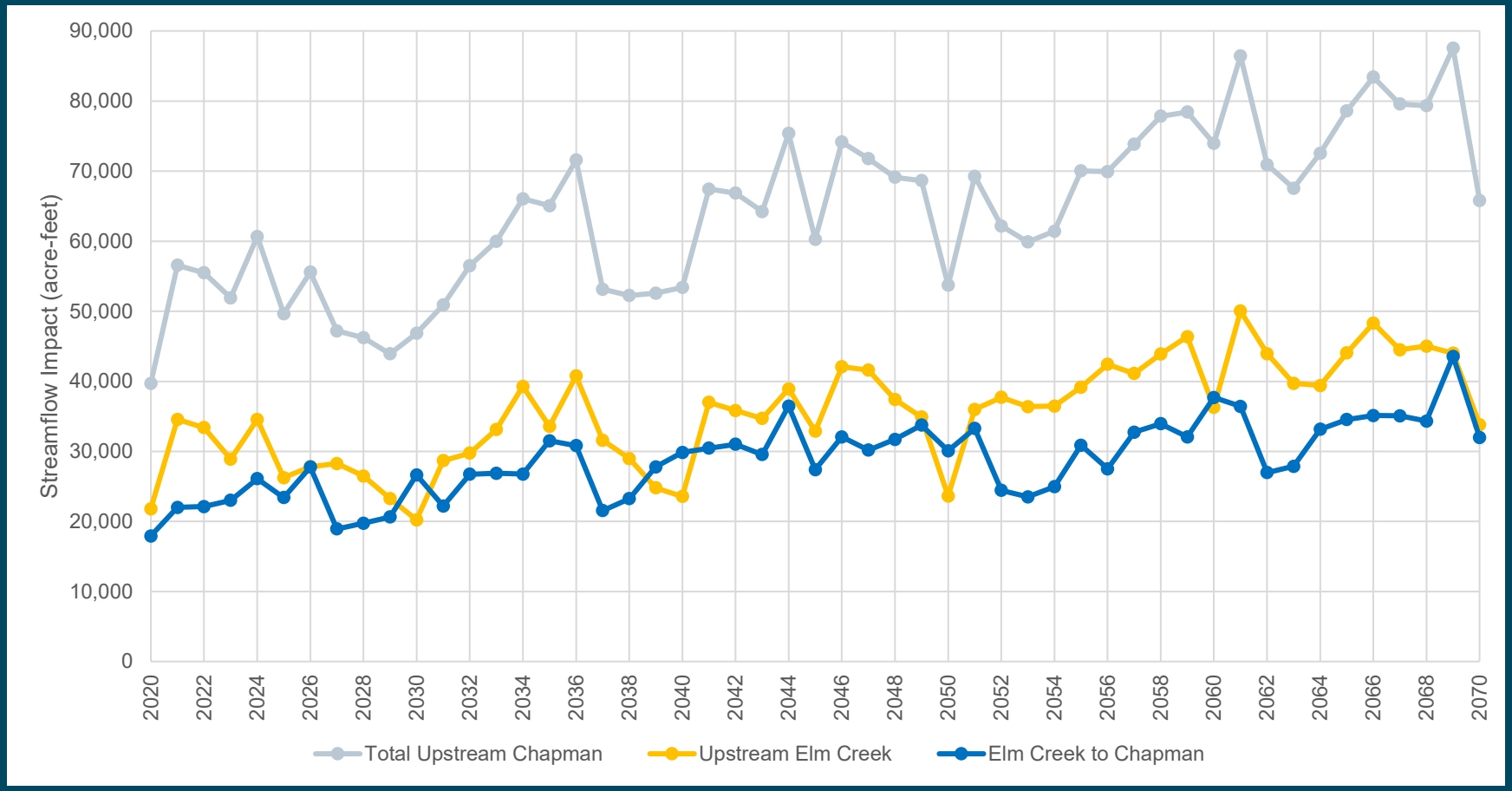
2023 Robust Review Results: Projected Streamflow Impacts

Year	Impacts Upstream Elm Creek (AF)	Impacts Elm Creek to Chapman (AF)	Combined Impacts Upstream Chapman (AF)
2022	33,400	22,100	55,500
2023	28,900	23,000	51,900
2024	34,600	26,100	60,700
2025	26,300	23,400	49,700
2026	27,800	27,800	55,600
2027	28,300	18,900	47,200
2028	26,500	19,800	46,300
2029	23,300	20,600	43,900
2030	20,200	26,600	46,800
2031	28,700	22,200	50,900
2032	29,800	26,700	56,500
2033	33,100	26,900	60,000

2023 Robust Review Results: Projected Streamflow Impacts



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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, 2024.
- 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

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Questions?

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WYOMING DEPLETIONS REPORT WATER YEAR 2023

PRRIP WAC Presentation

May 7, 2024

George Moser

Existing Baseline No. 1

Compliance with the Modified North Platte Decree

- Wyoming complied with the Modified Decree as per the intentionally irrigated acreage report submitted to the NPDC on January 18, 2024. The intentionally irrigated acreage was 206,386 acres for the sub-basin above Guernsey Reservoir.

Kendrick Project

- The Bureau of Reclamation (BOR) reported 24,249 acres were irrigated under the Kendrick project in Water Year 2023 which did not exceed the benchmark acreage of 24,249 acres.

Table I. Existing Water Related Baseline No. 1

Decree Category	Benchmark Acreage	2023	Difference Acreage
Irrigated Acreage – Above Guernsey	226,000	206,386	19,614
Irrigated Acreage - Kendrick	24,249	24,249	0

Existing Baseline No. 2

Sub-basin	Table 2.4 - Irrigation Season - Overruns / Underruns AF								
	Irrigation Use	Municipal Use	Industrial Use	Rural Domestic	Retired / Mitigation	Post 1997 Activities	Total	Tracking Factors Table I	Effects State Line (AF)
	1	2	3	4	5	6	7	8	9
Above Pathfinder	-----	-1,297.84	338.58	-75.07	-1.29	160.32	-875.30	0.90	-787.77
Pathfinder to Guernsey	-----	-1,143.42	-3,370.03	24.13	-40.90	301.55	-4,228.67	0.98	-4,122.95
Guernsey to State Line	-25,291.20	-792.66	-28.37	2.13	514.24	58.67	-25,537.18	1.00	-25,537.18
Horse Creek	-----	-30.31	0.00	32.20	-1.95	40.12	40.06	0.00	0.00
Upper Laramie	-3,264.28	-883.55	0.00	96.73	-0.79	53.41	-3,998.48	0.25	-999.62
Lower Laramie	-30,904.21	-315.47	0.00	-16.73	-0.62	119.51	-31,117.53	0.50	-15,558.76
WY 2023 Total	-59,459.69	-4,463.25	-3,059.82	63.40	468.69	733.58	-65,717.09		-47,006.28

Sub-basin	Table 2.4 - Non-Irrigation Season - Overruns / Underruns AF								
	Irrigation Use	Municipal Use	Industrial Use	Rural Domestic	Retired / Mitigation	Post 1997 Activities	Total	Tracking Factors Table II	Effects State Line (AF)
	1	2	3	4	5	6	7	8	9
Above Pathfinder	-----	-275.83	474.68	-37.53	-662.11	73.12	-427.67	0.93	-397.74
Pathfinder to Guernsey	-----	90.30	-3,976.23	12.07	-19.16	255.56	-3,637.46	1.00	-3,637.46
Guernsey to State Line	-----	-311.16	-1,135.46	6.07	0.00	41.34	-1,399.21	1.00	-1,399.21
Horse Creek	-----	-30.56	0.00	16.10	0.00	34.91	20.45	1.00	20.45
Upper Laramie	-----	-53.49	0.00	53.37	0.00	37.89	37.77	0.50	18.88
Lower Laramie	-----	-73.06	0.00	-8.37	0.00	56.22	-25.20	1.00	-25.20
WY 2023 Total	-----	-653.79	-4,637.01	41.70	-681.28	499.04	-5,431.34		-5,420.28

Table 2.4 summarizes Irrigation, Municipal, Industrial, Rural Domestic, and Post-1997 Activities for both the Irrigation and Non-Irrigation Seasons for each respective sub-basin.

Existing Baseline No. 2

Sub-basin	Table 2.4 - Irrigation Season - Overruns / Underruns AF								
	Irrigation Use	Municipal Use	Industrial Use	Rural Domestic	Retired / Mitigation	Post 1997 Activities	Total	Tracking Factors Table I	Effects State Line (AF)
	1	2	3	4	5	6	7	8	9
Above Pathfinder	-----	-1,297.84	338.58	-75.07	-1.29	160.32	-875.30	0.90	-787.77
Pathfinder to Guernsey	-----	-1,143.42	-3,370.03	24.13	-40.90	301.55	-4,228.67	0.98	-4,122.95
Guernsey to State Line	-25,291.20	-792.66	-28.37	2.13	514.24	58.67	-25,537.18	1.00	-25,537.18
Horse Creek	-----	-30.31	0.00	32.20	-1.95	40.12	40.06	0.00	0.00
Upper Laramie	-3,264.28	-883.55	0.00	96.73	-0.79	53.41	-3,998.48	0.25	-999.62
Lower Laramie	-30,904.21	-315.47	0.00	-16.73	-0.62	119.51	-31,117.53	0.50	-15,558.76
WY 2023 Total	-59,459.69	-4,463.25	-3,059.82	63.40	468.69	733.58	-65,717.09		**-47,006.28**

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Guernsey to State Line	-----	-311.16	-1,135.46	6.07	0.00	41.34	-1,399.21	1.00	-1,399.21
Horse Creek	-----	-30.56	0.00	16.10	0.00	34.91	20.45	1.00	20.45
Upper Laramie	-----	-53.49	0.00	53.37	0.00	37.89	37.77	0.50	18.88
Lower Laramie	-----	-73.06	0.00	-8.37	0.00	56.22	-25.20	1.00	-25.20
WY 2023 Total	-----	-653.79	-4,637.01	41.70	-681.28	499.04	-5,431.34		**-5,420.28**

The overall underrun during the Irrigation season was ~47,000 AF and ~5,400 AF during the Non-Irrigation season.

Existing Baseline No. 3

South Platte River Basin

In Water Year 2023, the reported acre-feet of post-1997 storage in the South Platte Basin in Wyoming was 100.82 acre-feet which is an increase from 80.56 acre-feet reported in 2022.

Questions?

For comments, questions, or additional information please contact

Michelle Hubbard

michelle.hubbard@wyo.gov

307-777-7641