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DEPT. OF NATURAL RESOURCES

# Nebraska Department of Natural Resources Preliminary Republican River Basin Forecast for 2025

**November 13, 2024**

*Nebraska Department of Natural Resources (NeDNR)*

# Agenda:

- Preliminary Forecast and Accounting
- Augmentation Impacts
- TBNRD Hydrologically Balanced Assessment

# Preliminary Forecast and Accounting

# Topic Outline

- Final 2023 Accounting
- Preliminary 2024 Accounting
- Early Dry-year Forecast (2025)
- Compact Call Year Evaluation Flow Chart
- Forecasted NRD Projections for 2025

# Final 2019-2023 Accounting

Hardy Balances, Table 3C	LRNRD	MRNRD	URNRD
2019	40,300	47,000	65,800
2020	14,800	28,500	26,300
2021	2,200	12,200	12,600
2022	-6,900	2,100	-7,100
2023	-9,400	-2,800	-5,700
<b>2019-2023</b>	<b>41,000</b>	<b>86,900</b>	<b>91,900</b>
<b>Remaining Compact Compliance Volume (RCCV)</b>	<b>0</b>	<b>0</b>	<b>0</b>

\*Units are acre-feet unless otherwise noted.

\*\*Values throughout accounting and forecast presentation rounded to nearest 100. Sum of subtotals may not equal totals due to rounding.

# Final 2022-2023 Accounting

<b>Guide Rock Balances, Table 5C</b>	<b>LRNRD</b>	<b>MRNRD</b>	<b>URNRD</b>
2022	-7,700	100	-9,700
2023	-8,300	-2,900	-5,700
<b>2022-2023</b>	<b>-16,000</b>	<b>-2,700</b>	<b>-15,400</b>
<b>Remaining Compact Compliance Volume (RCCV)</b>	<b>0</b>	<b>0</b>	<b>0</b>

# Preliminary 2024 Accounting

Year	Item	Information Source
<b>Provisional Data for T=0 (Current Year or Immediate Past Irrigation Season)</b>	Pumping	Prior year pumping
	Surface Water Use	Estimated from preliminary data and previous years values
	Streamflow	Available provisional records – end-of-year estimated
	Evaporation	Prior year records and provisional data

# Preliminary 2024 Accounting

- MRNRD completed management actions in 2024
  - Riverside retirement
  - Besler retirement
  - Culbertson bypass



# Preliminary 2024 Accounting: Guide Rock with Management Actions

<b>Guide Rock Balances, Table 5C</b>	<b>LRNRD</b>	<b>MRNRD</b>	<b>URNRD</b>
2023 (final)	-8,300	-2,900	-5,700
2024 (projected)	-7,800	-3,400	-4,700
<b>2023-2024 Balance</b>	<b>-16,000</b>	<b>-6,300</b>	<b>-10,400</b>

# Preliminary 2024 Accounting: Hardy with Management Actions

Hardy Balances, Table 3C	LRNRD	MRNRD	URNRD
2020-2023 (final)	800	39,900	26,200
2024 (projected)	-8,500	-2,900	-4,000
<b>2020-2024 Balance</b>	<b>-7,800</b>	<b>37,100</b>	<b>22,200</b>

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# Early Dry-Year Forecast (2025)

# Dry-Year Forecast

Year	Item	Information Source
<b>Forecast Year T+1 (Coming Irrigation Season)</b>	Groundwater Consumptive Use and Imported Water Supply Credit	Average Values for T=0 and T-1
	Surface Water Consumptive Use	Colorado: Average of T-1 and T-2 use Kansas: $+(0.1858 \times \text{HCLcontent}) + 9,575$ Nebraska: $-(4 \times 10^{-7}) \times (\text{NE lake volume})^2 + 0.52 \times \text{NElakeVolume} - 42,000$
	Streamflow	$(5\text{-year average of state line flows}) \times 0.41 + 0.23 \times \text{HCLcontent} - 27,450$

# Compliance Balances

Year	Guide Rock Balance (AF)
T=0 (2024, projected)	-15,900
T=+1 (2025, early forecast)	-35,000
2-Year Forecast Balance	-50,900

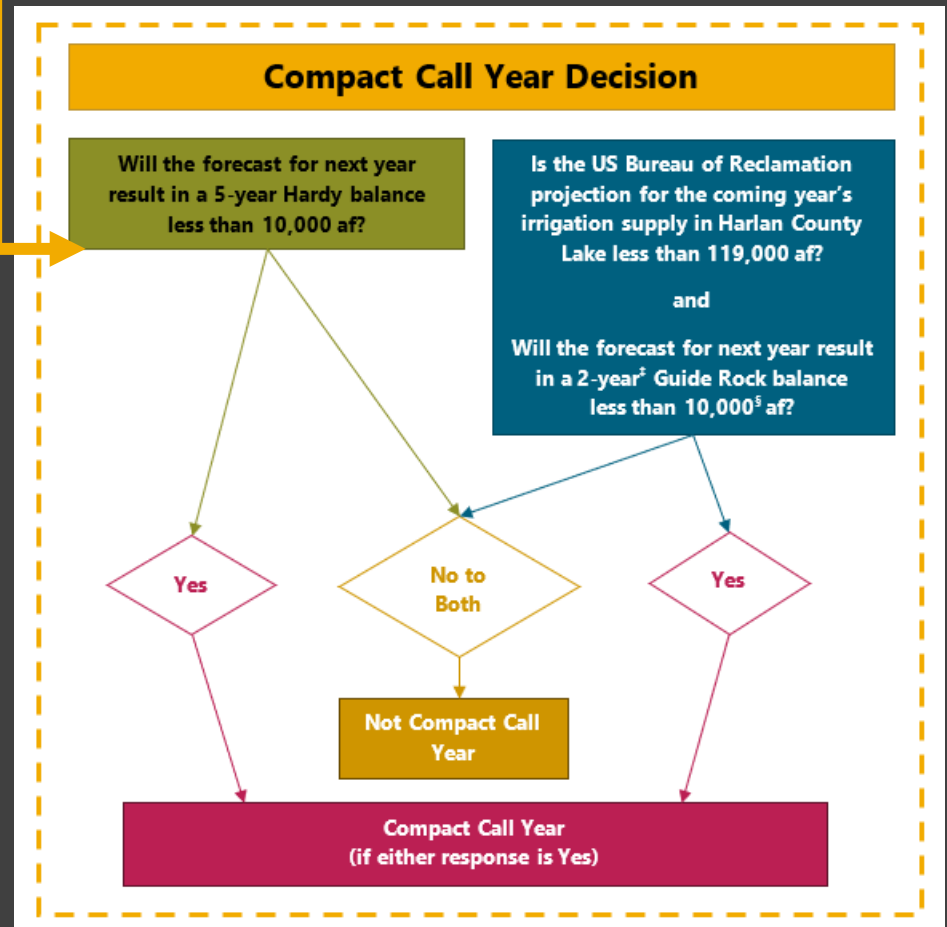
Year	Hardy Balance (AF)
T=-3 to 0 (2021-2024, projected)	-18,200
T=+1 (2025, early forecast)	-29,200
5-Year Forecast Balance	-47,400

# Compact Call Year Evaluation:

Will the forecast for next year result in a 5-year Hardy balance less than 10,000 AF?

Year	Hardy Balance (AF)
5-Year Forecast Balance	-47,400

YES.



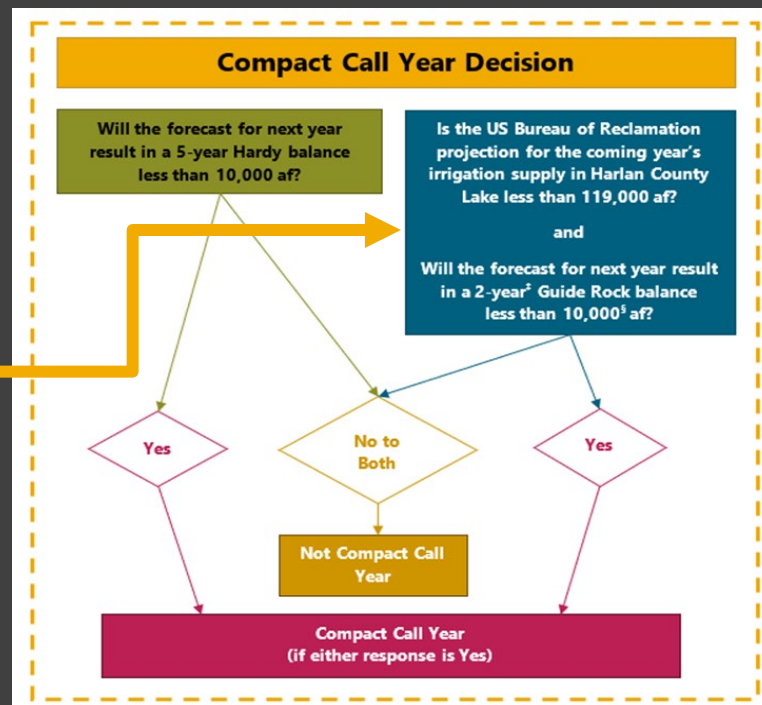
# Compact Call Year Evaluation:

Is the US Bureau of Reclamation projection for the coming year's irrigation supply in Harlan County Lake less than 119,000 AF?

AND

Will the forecast for next year result in a 2-year<sup>2</sup> Guide Rock balance less than 5,000 AF?

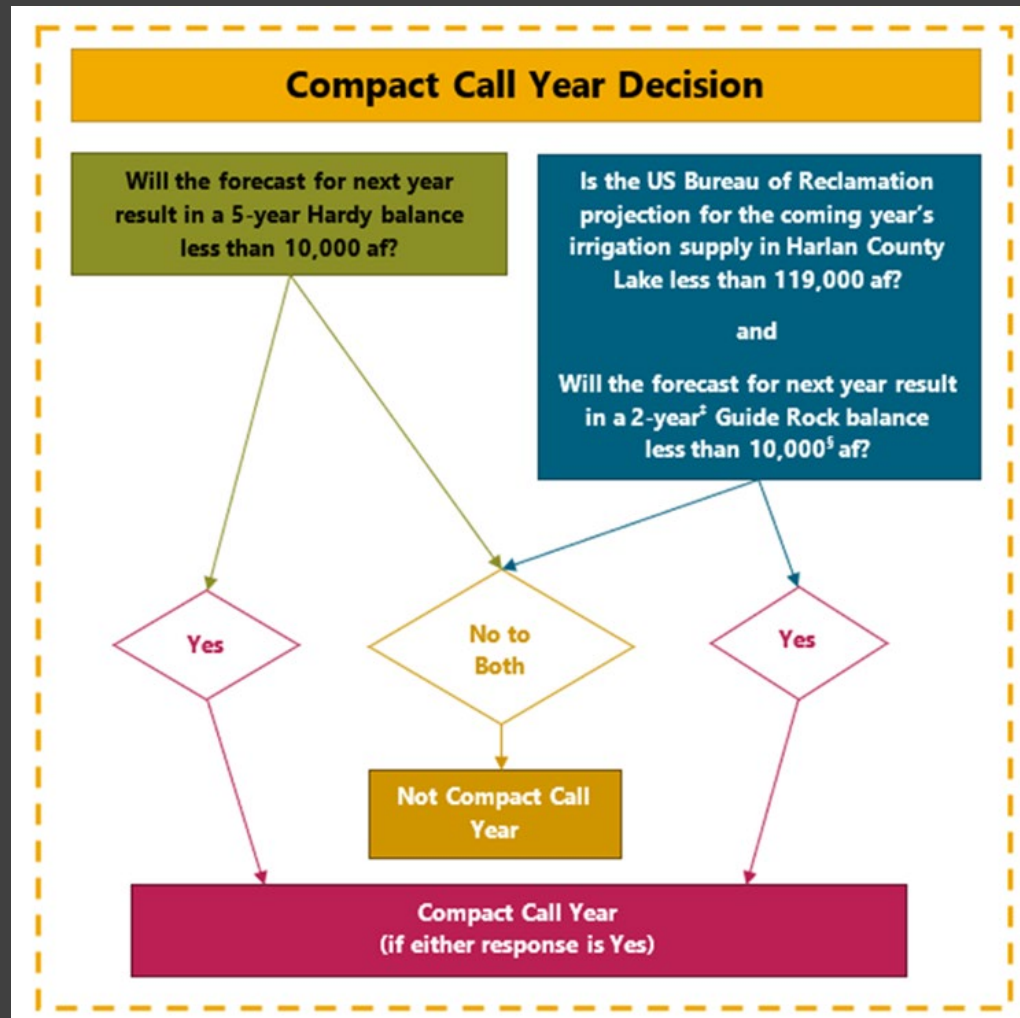
Yes, to Harlan County Lake Irrigation Supply.  
Yes, to Guide Rock balance.



Year	Guide Rock Balance (AF)
HCL Irrigation Supply	101,900
2-Year Forecast Balance	-50,900

§ In the second consecutive Compact Call Year, the 10,000 a-f threshold for the Guide Rock test will be reduced to 5,000 a-f. For the third and subsequent consecutive Compact Call Years, this value will be reduced to zero.

# Compact Call Year Evaluation: 2025 projected to be a Compact Call Year.





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# NRD-Specific Forecast Balances

# NRD Annual Guide Rock Balance Forecast for Upcoming Year (2025)

	LRNRD	MRNRD	URNRD	Total
Allowable Depletion Distribution Percentage from IMPs	24.5%	31.1%	44.4%	100.0%
Allowable Groundwater Depletions	35,200	44,700	63,900	143,800
Projected Groundwater Depletions	46,800	55,900	76,200	178,900
<b>2025 Forecast Balance (no action)</b>	<b>-11,600</b>	<b>-11,200</b>	<b>-12,300</b>	<b>-35,000</b>
2024, projected	-7,800	-3,400	-4,700	-15,900
<b>2-Year Forecast Balance</b>	<b>-19,300</b>	<b>-14,600</b>	<b>-17,200</b>	<b>-50,900</b>
<b>RCCV</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

# NRD Annual Hardy Balance Forecast for Upcoming Year (2025)

	LRNRD	MRNRD	URNRD	Total
Allowable Depletion Distribution Percentage from IMPs	25.3%	30.8%	43.9%	100.0%
Allowable Groundwater Depletions	38,600	47,000	67,000	152,500
Projected Groundwater Depletions	49,700	55,900	76,200	181,700
<b>2025 Forecast Balance (no action)</b>	<b>-11,100</b>	<b>-8,900</b>	<b>-9,200</b>	<b>-29,200</b>
2021-2024, projected	-22,600	8,600	-4,200	-18,200
<b>5-Year Forecast Balance</b>	<b>-33,700</b>	<b>-300</b>	<b>-13,300</b>	<b>-47,400</b>
<b>RCCV</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

# Summary

- Based on the preliminary forecast, the IMP checklist indicates that 2025 is projected to be a **Compact Call Year**.
- Preliminary dry-year forecast currently approximated at:
  - 2024-2025 at Guide Rock balance of **-50,900 ac-ft**
  - 2021-2025 at Hardy balance of **-47,400 ac-ft**

# Next Steps

- **Preliminary Forecast and Basin-Wide Meeting**

- Participants can discuss the forecasted streamflow and surface water consumptive use.
- From these discussions, surface water project sponsors may present a plan to NeDNR to achieve a consumptive use that is less than forecasted consumptive use. Such a plan could allow surface water project sponsors to avoid a potential Compact Call Year.

- **Final Forecast and Compact Call Year Determination**

- NeDNR will publish the final forecast before January 1 of each year as required by Neb. Rev. Stat. § 46-715(6), including both short and long-term forecasts and whether a Compact Call Year will be designated.
- If any potential deficit between allowable and forecast depletions is projected, that information will also be included with the final forecast.

- <https://dnr.nebraska.gov/water-planning/lower-republican-nrd>

# Timeline

- **December 2024:** NeDNR notifies the NRDs in writing that the following year will be a Compact Call Year and notifies the NRDs how much yield from potential management actions may be needed within the CCY.
- **January 2025:** The NRDs notify NeDNR in writing about planned management actions to ensure Compact compliance.
  - NeDNR then issues orders to implement surface water controls.
- **Late February or early March 2025:** NeDNR provides a written assessment of the NRDs' planned management actions. If NeDNR determines that proposed management actions are insufficient to ensure compliance with the Compact, the IMPs, or the Republican River Basin-Wide Plan, the NRDs will implement additional controls to make up the remaining deficit.
- **April 2025:** NeDNR notifies Colorado, Kansas, and relevant federal agencies in writing about preliminary management actions and the anticipated water yield.

# Timeline

- **May-December 2025:** NeDNR provides monthly preliminary accounting estimates to the NRDs, Kansas, Colorado, and the Bureau.
  - 10<sup>th</sup> of every month
- **June 2025:** NeDNR notifies Colorado, Kansas, and relevant federal agencies in writing about management actions taken and to be taken, and the anticipated water yield.
- **June 30, 2025:** Bureau finalizes Water-Short Year designation.
- **By October 1, 2025:** Nebraska and Kansas review accounting;
  - Kansas can request remaining Compact compliance volume.
- **September–October 2025:** NeDNR notifies the NRDs in writing about the assessment of NRD management actions and identifies specific additional management actions that are required by each NRD.

# Augmentation Impacts



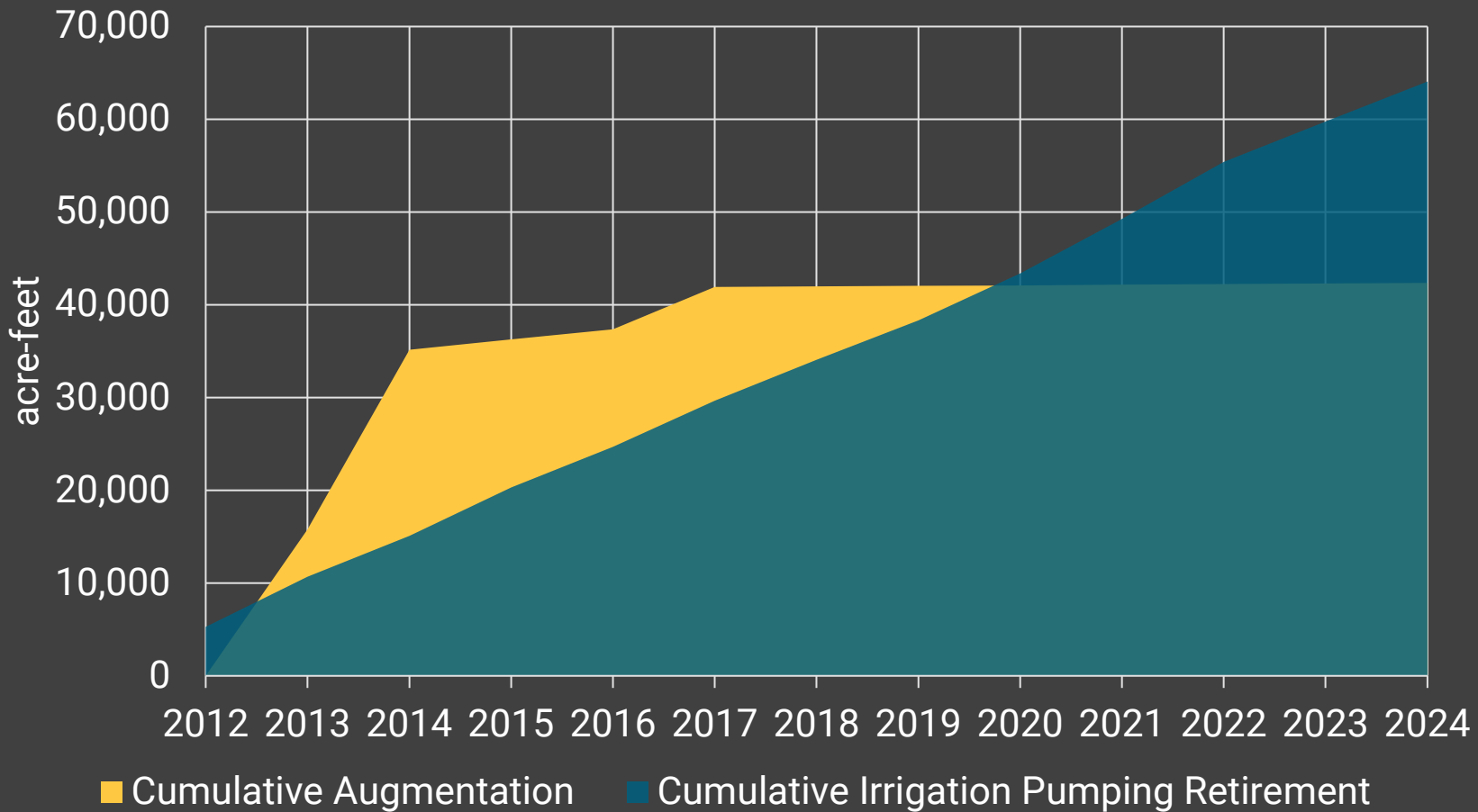
# Augmentation Impacts – IMP

Our IMPs state:

“...NeDNR will annually evaluate whether offsets are necessary to mitigate new net depletions resulting from augmentation pumping or other management actions.”

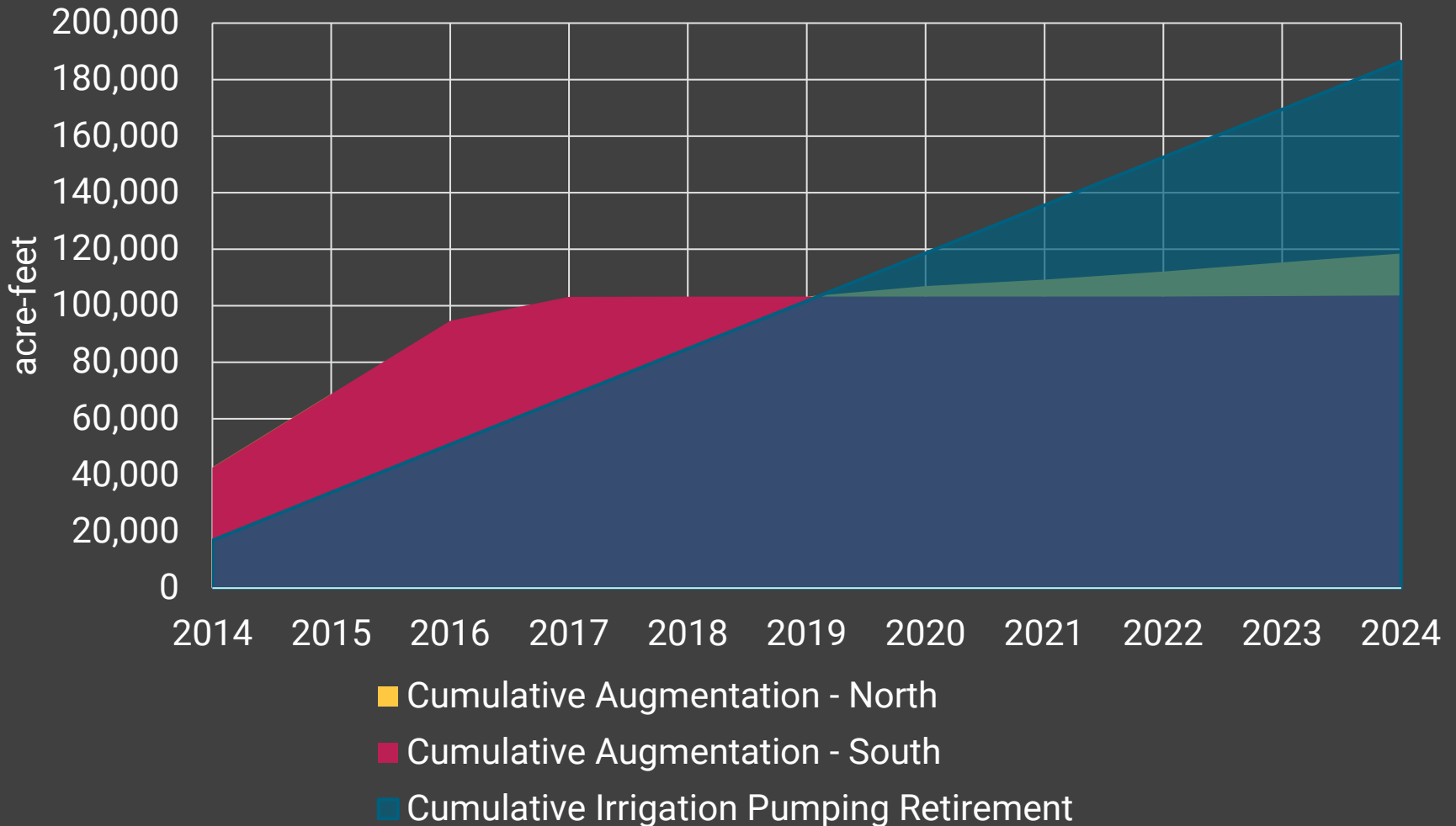
# Augmentation Impacts – Model Inputs

## Rock Creek



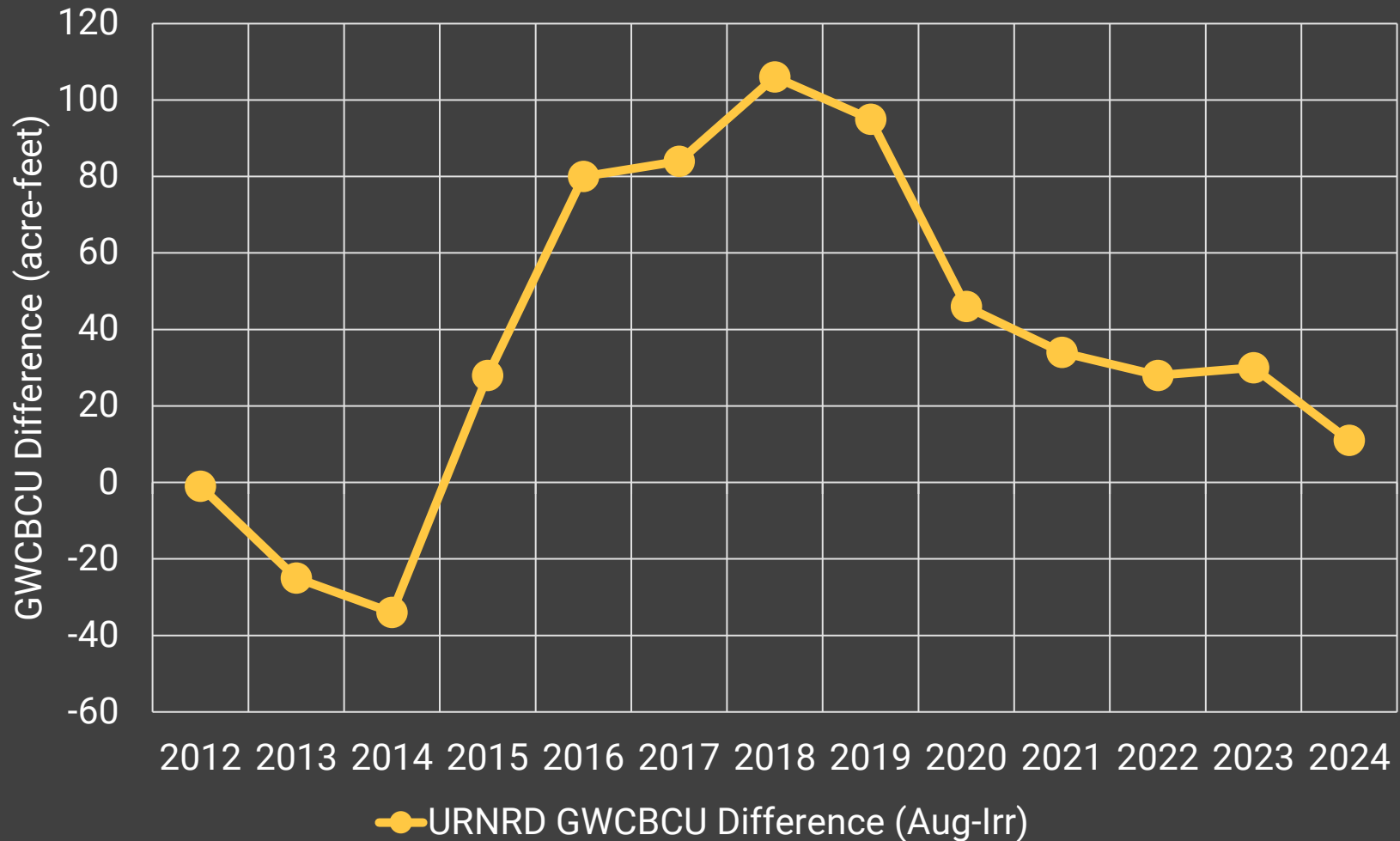
# Augmentation Impacts – Model Inputs

N-CORPE



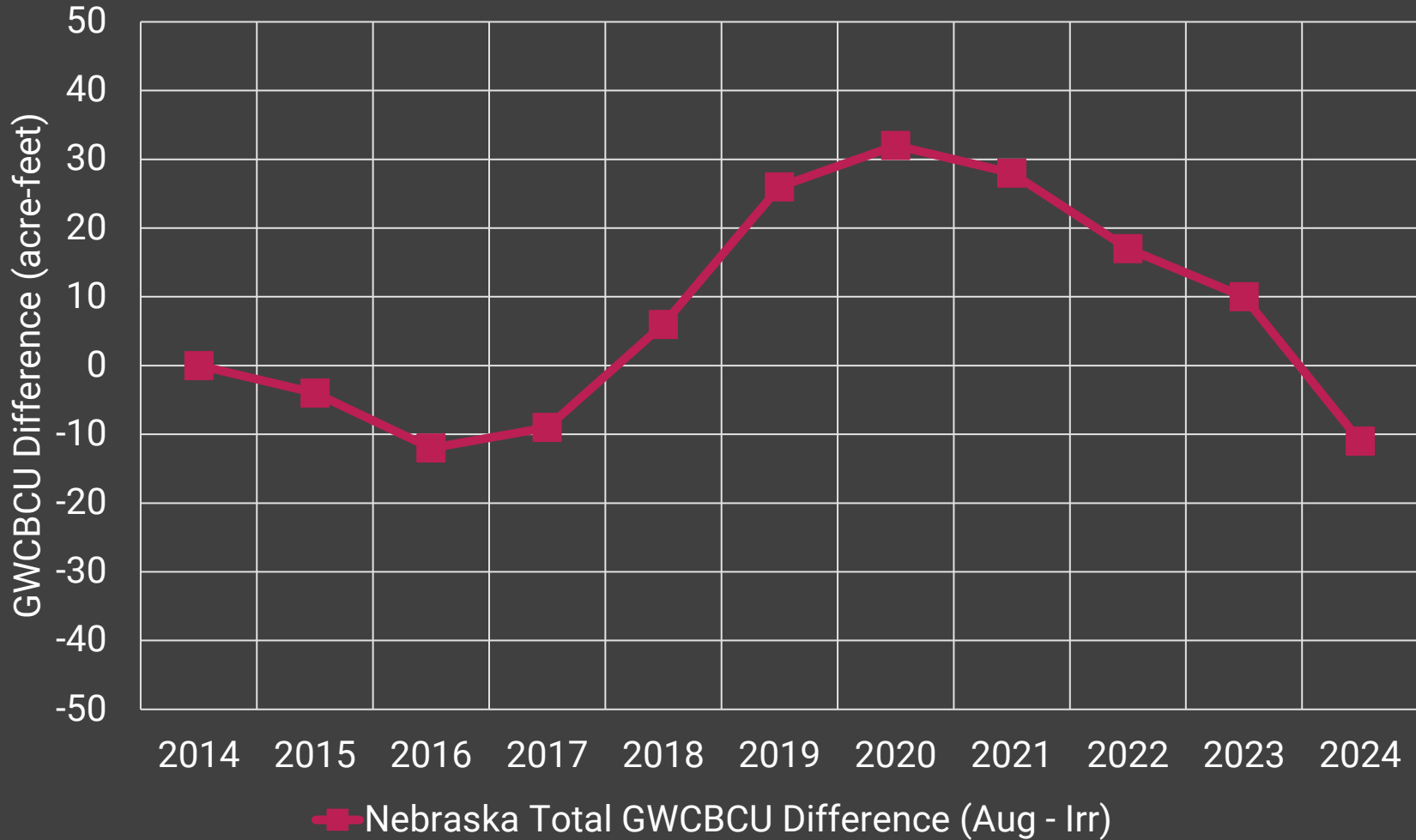
# Augmentation Impacts – Oct. 2024 run

## Rock Creek Impacts



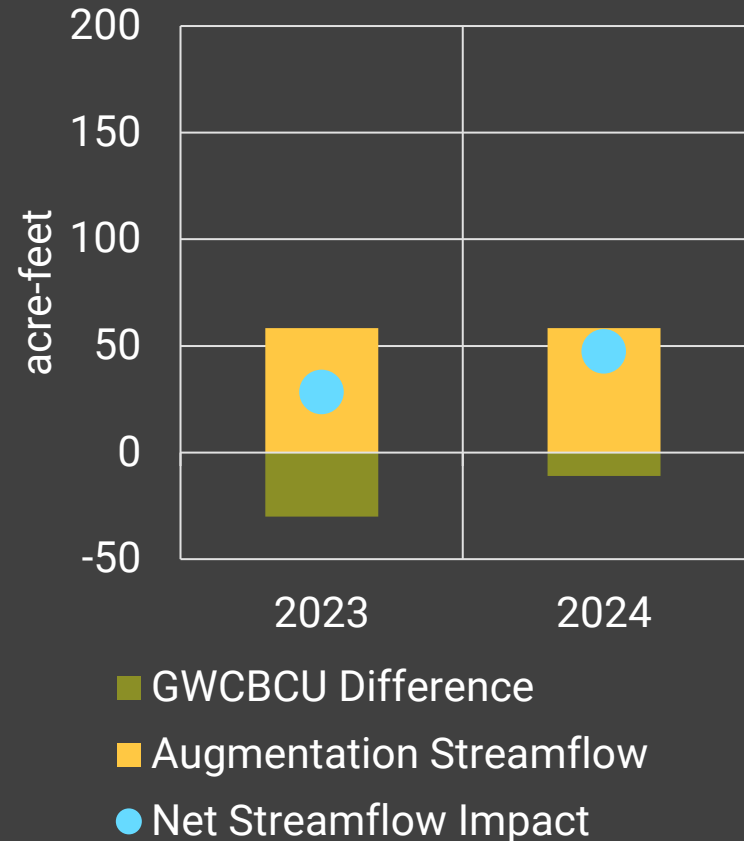
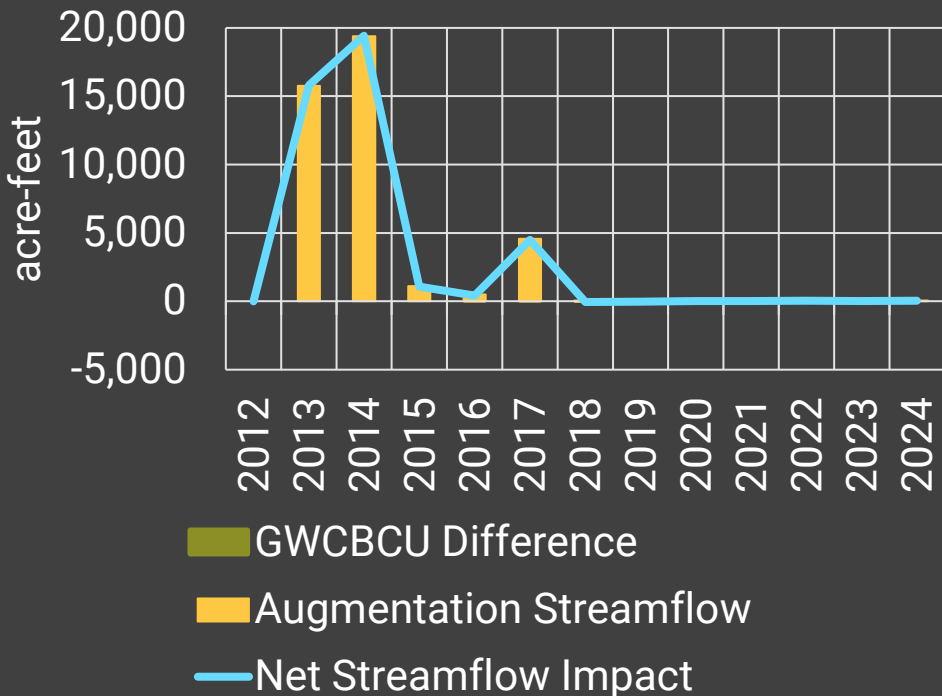
# Augmentation Impacts – Oct. 2024 run

## N-CORPE Impacts



# Augmentation Net Streamflow Impacts – Rock Creek

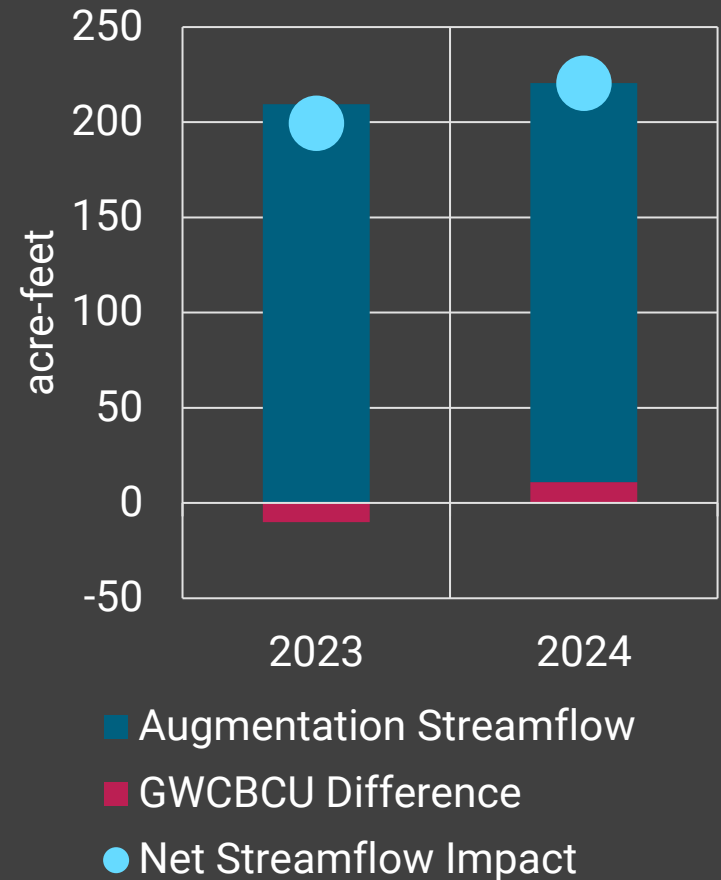
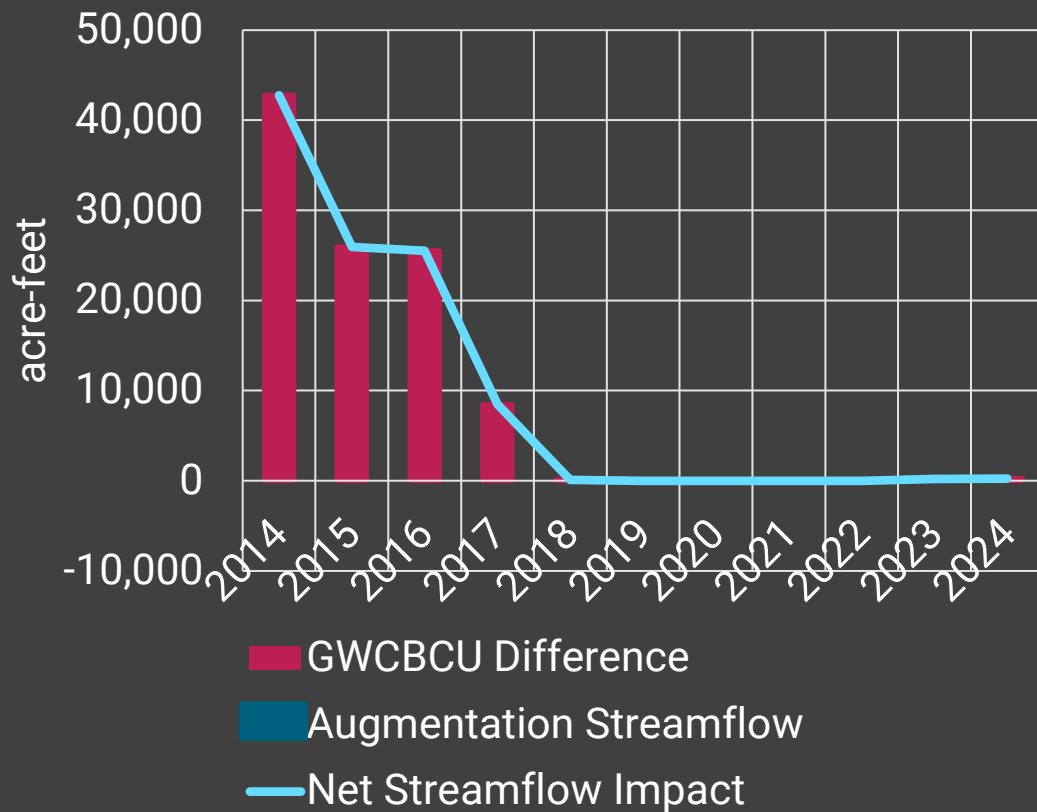
## Rock Creek Augmentation Net Impacts to Streamflow



\*Augmentation streamflow assumed to occur in same year as pumped; 2023 pumping repeated for 2024

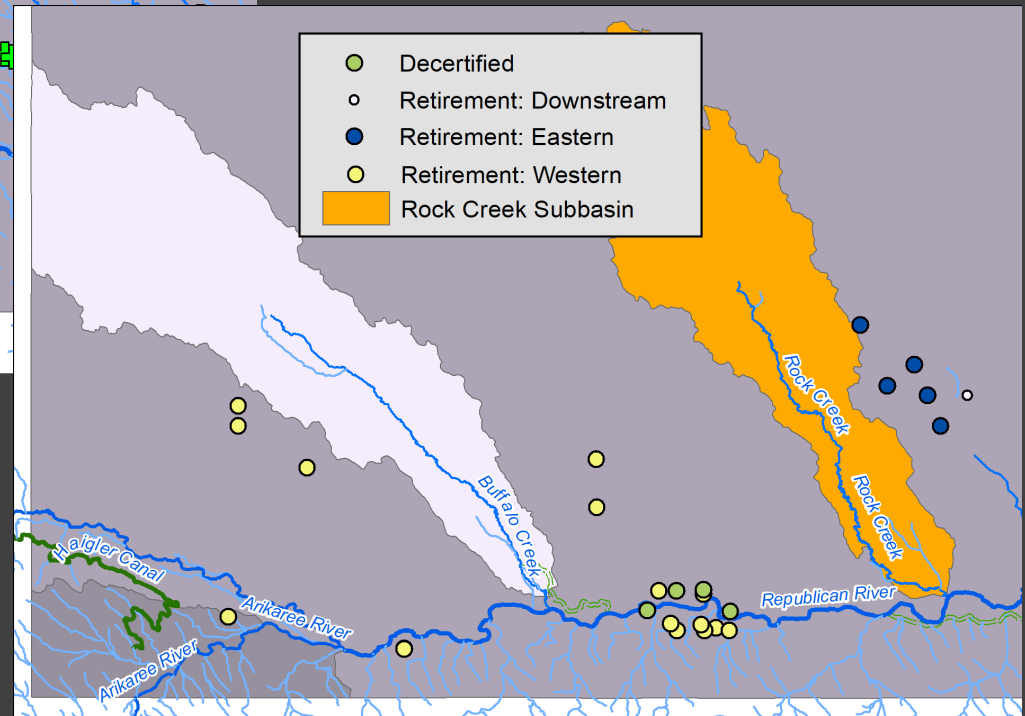
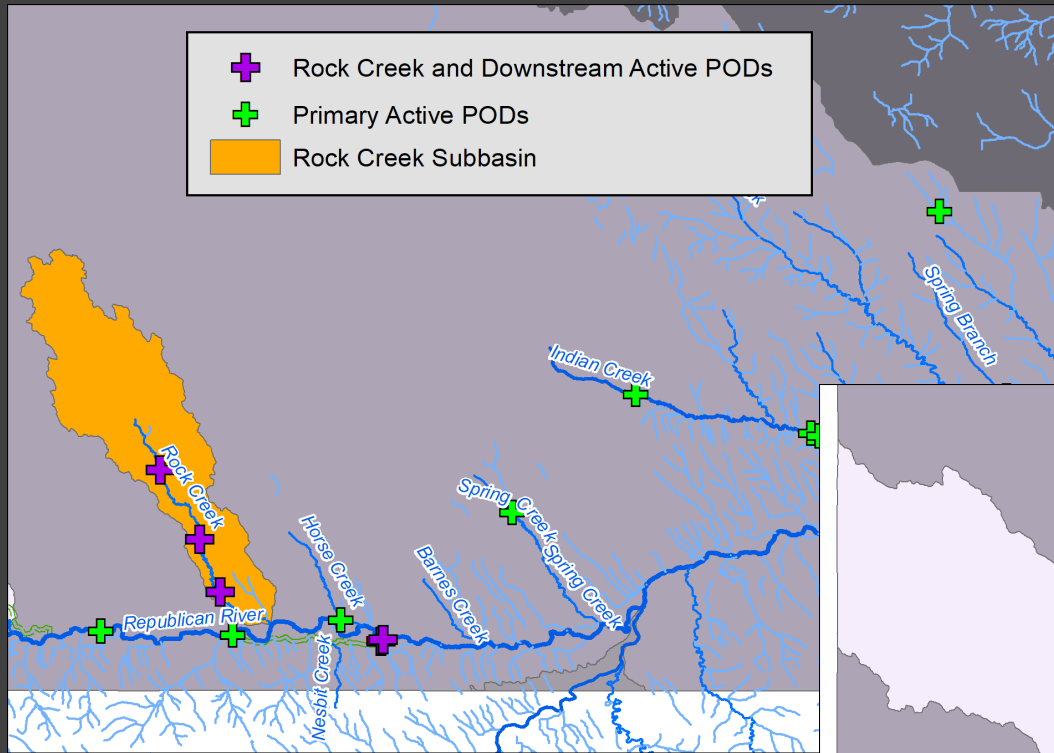
# Augmentation Net Streamflow Impacts – N-CORPE

## N-CORPE Augmentation Net Impacts to Streamflow



\*Augmentation streamflow assumed to occur in same year as pumped; 2023 pumping repeated for 2024

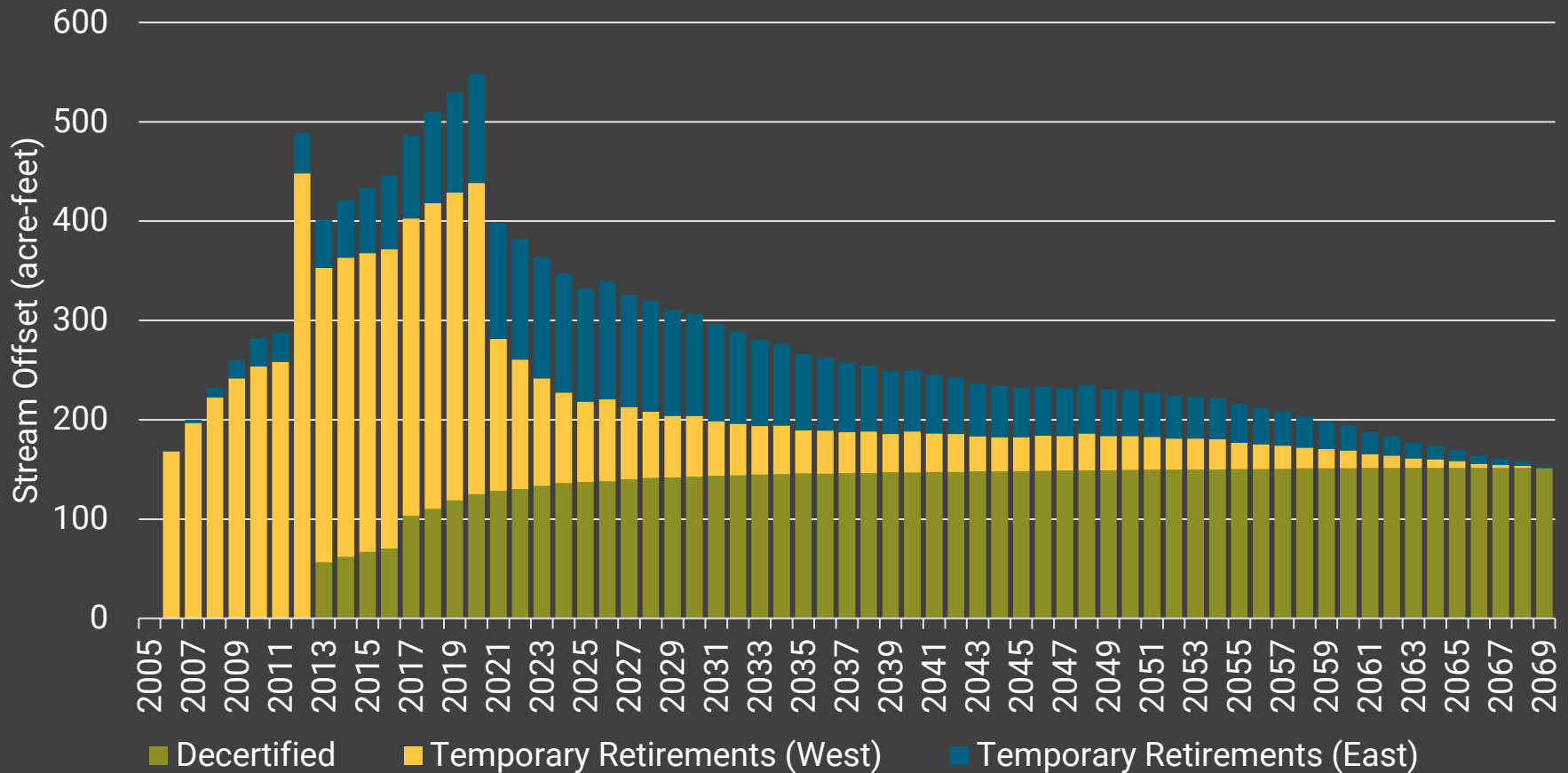
# Augmentation Impacts – Rock Creek Offsets





# Augmentation Impacts – Rock Creek Offsets February 2020 Report

Annual Offset from Decertified and Retired Historical Uses Affecting and Upstream of the Rock Creek and Republican River Confluence



# Hydrologically Balanced Assessment

For the IMP for the Republican Basin  
Portion of Tri-Basin NRD

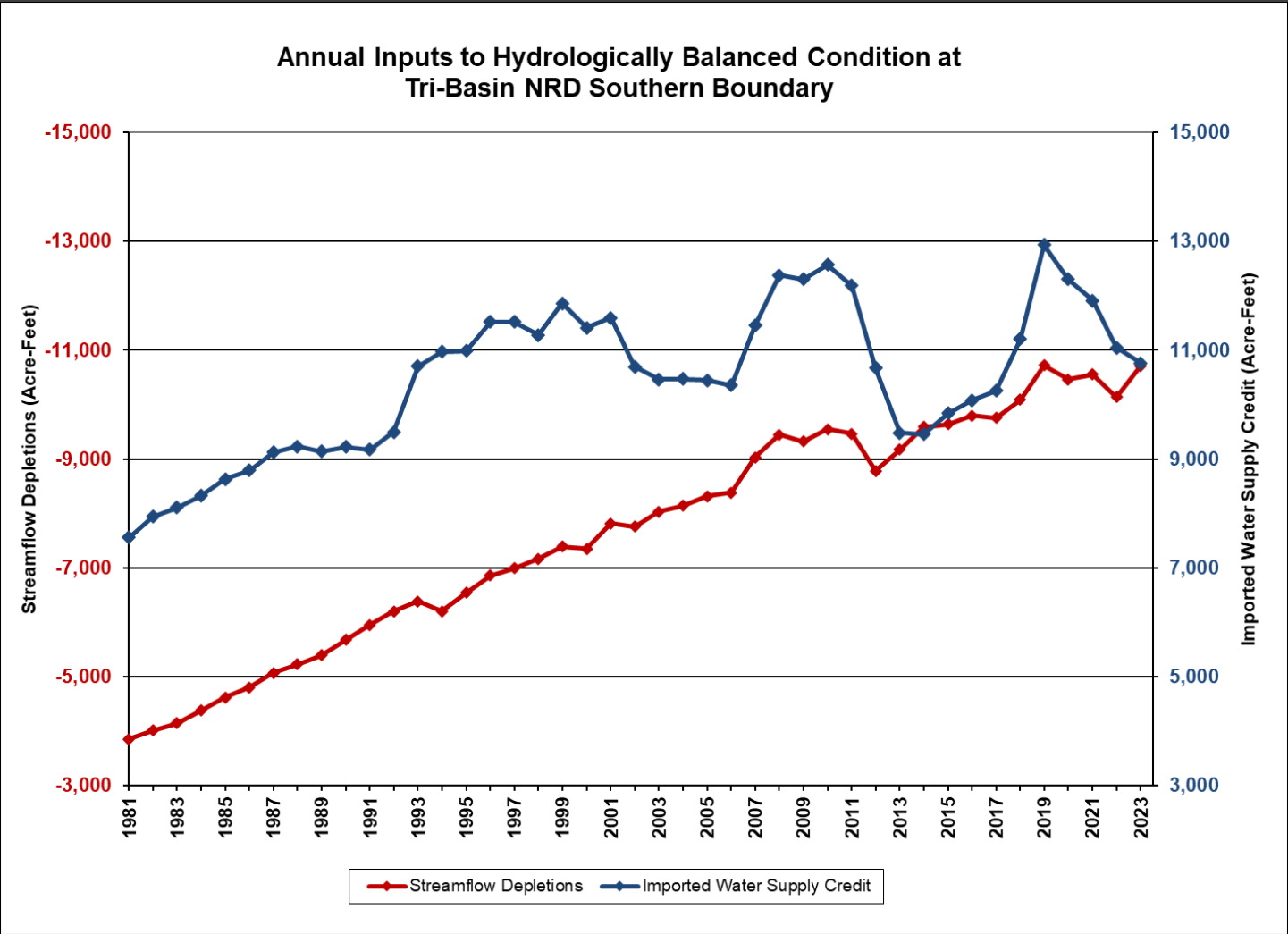
## Goal A, Objective 1

“Revise existing NRD integrated water management rules and regulations, to the extent necessary, to insure **that the NRD will incrementally achieve and sustain a hydrologically “balanced” condition** so that, in combination with imported water contributions from the Platte basin, streamflow augmentation and other management actions, Tri-Basin NRD water users will not cause a net depletion to streamflow.....**Under a hydrologically balanced condition in the context of this plan, baseflow impacts and the mound credit will be equal.**”

# Assessment

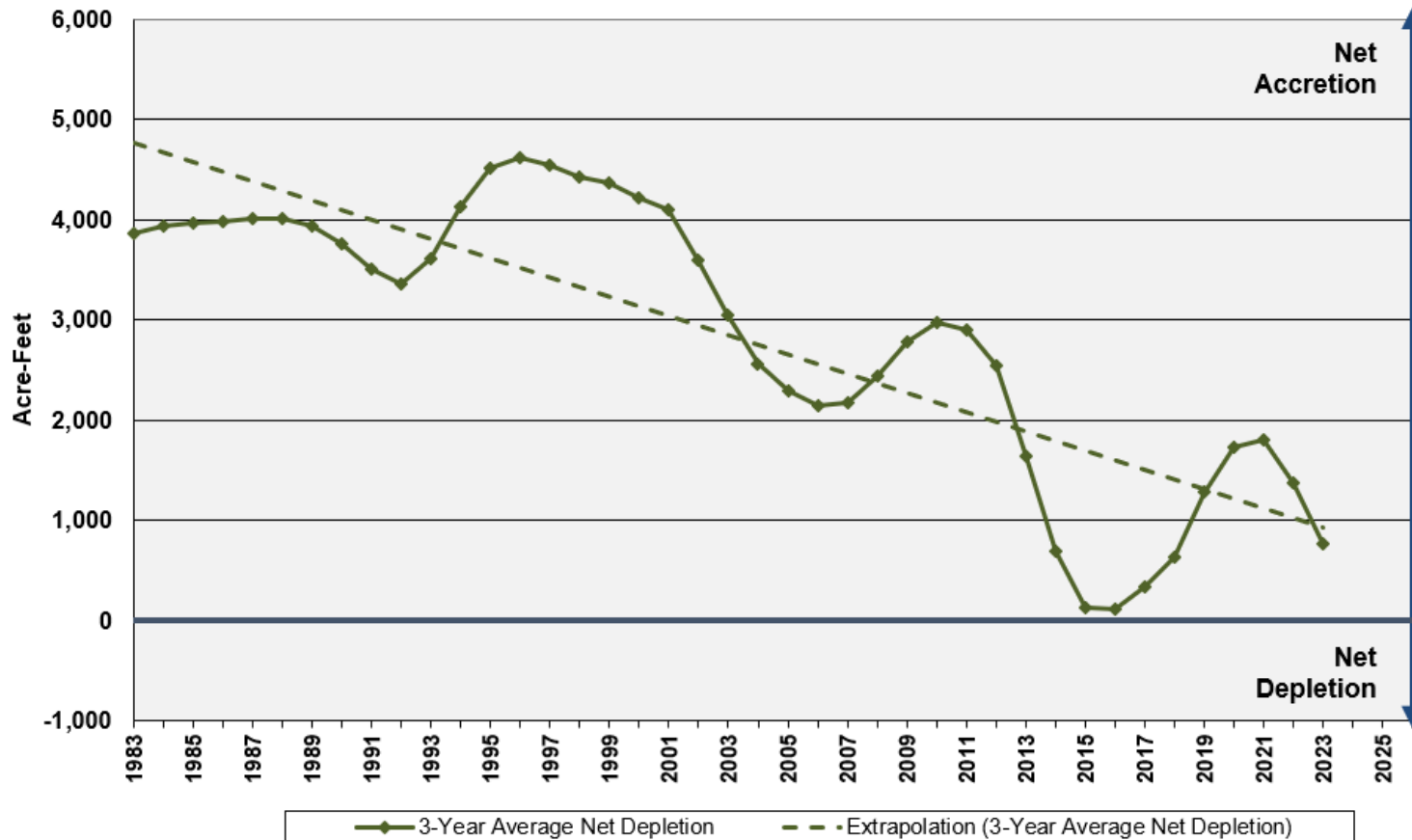
“Goal A Objective 1 of this IMP is to establish a hydrologically ‘balanced’ condition in which Tri-Basin NRD water users will **not cause a net depletion to streamflow of the Republican basin when evaluated on a three-year rolling average basis**.”

# Modeled Depletions and Accretions, 1981 – 2023

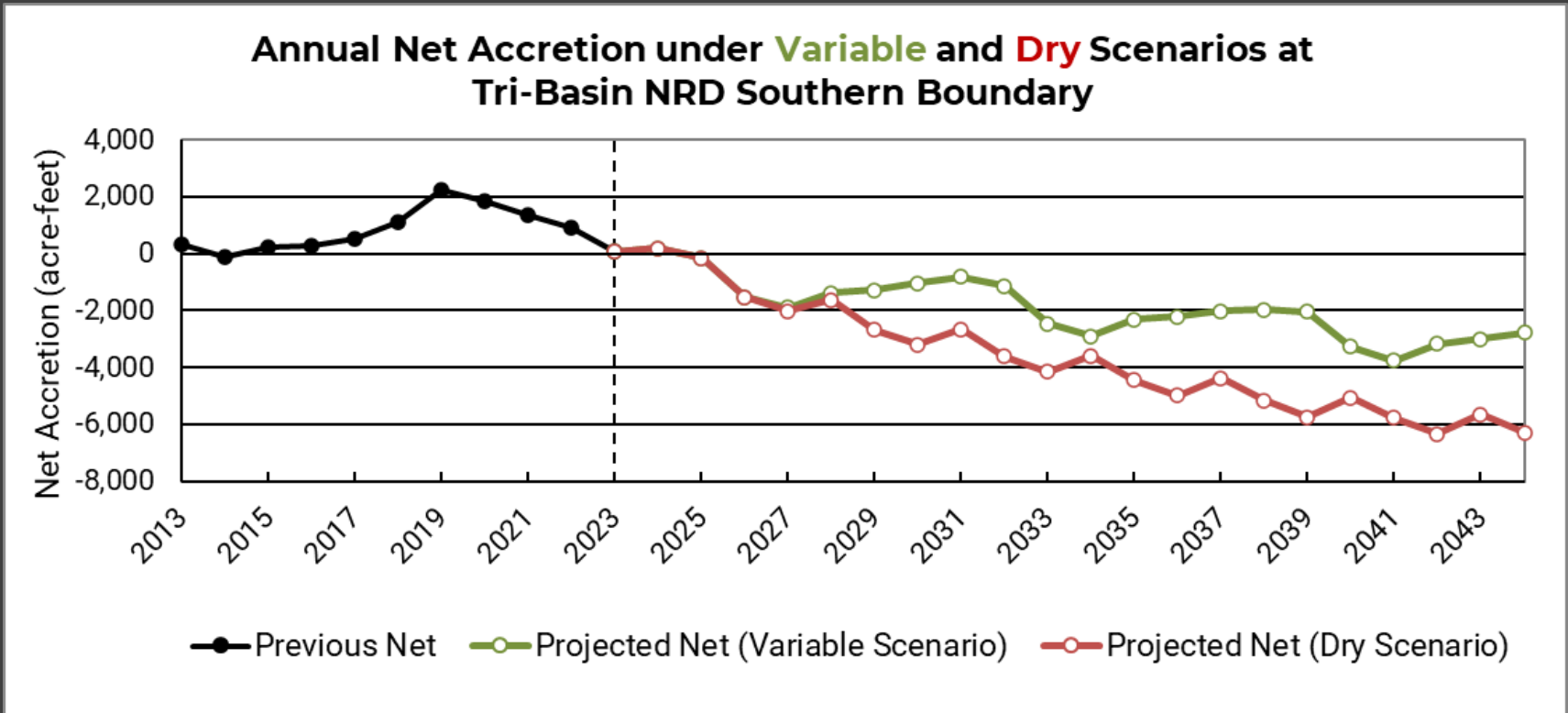


# Hydrologically Balanced Assessment

## 3-Year Rolling Average for Hydrologically Balanced Condition at Tri-Basin NRD Southern Boundary



# Projected Net Accretion



In 2026, the 3-year average net accretion projected to be negative (-508 ac-ft).

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