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Nebraska Department of Natural Resources Preliminary Republican River Basin Forecast for 2019

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Jesse Bradley, Kari Burgert, Carol Flaute, Brian Harmon, Margeaux Carter
Nebraska Department of Natural Resources

Topic Outline

- Forecast 2018 Projection
- Preliminary 2018 Accounting Results
- Early Dry-year Forecast (2019)
- Compact Call Year Evaluation Flow Chart
- Forecasted NRD Projections for 2019
- Kansas Compliance Water Request Update

Forecast 2017-2018 Projection (issued Dec. 2017) with Management Actions

	LRNRD	MRNRD	URNRD
2017 Balance (Provisional)	5,000	9,000	12,600
2018 Balance (Forecast)	-12,800	-9,500	-15,400
2-Year Balance (from Forecast)	-7,800	-500	-2,800
Total Remaining Compact Compliance Volume	-4,100	-4,600	-600
Forecast of Additional Compact Compliance Volume that could have been required in 2018	-11,900	-5,100	-3,400

*Units are acre-feet unless otherwise noted.

**All values rounded to nearest 100. Sum of subtotals may not equal totals due to rounding.

Final 2017 Accounting

Total Actual Compact Balance without NRD actions				8,000
	LRNRD	MRNRD	URNRD	Total
Actual GW Depletion	46,700	52,600	78,400	177,700
Distribution Percentage	22.7%	32.6%	44.7%	100.0%
Balance by NRD (no action)	1,800	2,600	3,600	8,000
Total Management Actions	3,800	7,300	10,100	21,200
2017 Balance	5,600	9,900	13,700	29,200
Remaining Compact Compliance Volume (RCCV)	-4,100	-4,600	-600	-9,300

Distribution percentages were adjusted for relative increase from WSY Baseline Depletion Percentages for distribution of a positive balance

Preliminary 2018 Accounting

Year	Item	Information Source
Provisional Data for T=0 (Current Year or Immediate Past Irrigation Season)	Pumping	2017 Pumping
	Surface Water Use	Estimated from preliminary data and previous years values
	Streamflow	Available provisional records – end-of-year estimated
	Evaporation	2017 records and provisional data

Preliminary 2018 Accounting – Guide Rock

Total Accounting Balance without NRD actions				-18,000
	LRNRD	MRNRD	URNRD	Total
Actual GW Depletion	50,200	63,300	84,000	197,500
Distribution Percentage	25.4%	32.0%	42.5%	100.0%
Balance by NRD (no action)	-4,600	-5,700	-7,700	-18,000
Total Management Actions	0	1,400	0	1,400
2018 Balance	-4,600	-4,300	-7,700	-16,600

Current Projection: 2017-2018 Balance at Guide Rock

	LRNRD	MRNRD	URNRD	Total
2017 Balance (final)	5,600	9,900	13,700	29,200
2018 Balance (projected)	-4,600	-4,300	-7,700	-16,600
2017-2018 Balance (projected)	1,000	5,600	6,000	12,600
Remaining Compact Compliance Volume (RCCV)	-4,100	-4,600	-600	-9,300

Current Projection: 2014-2018 Balance at Hardy with Management Actions

	Total
2014-2017 Balance (final)	114,000
2018 Balance (projected)	-3,400
2014-2018 Balance (projected)	110,600
Remaining Compact Compliance Volume (RCCV)	-9,300

Early Dry-Year Forecast (2019)

Dry-Year Forecast

Year	Item	Information Source
Forecast Year T+1 (Coming Irrigation Season)	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

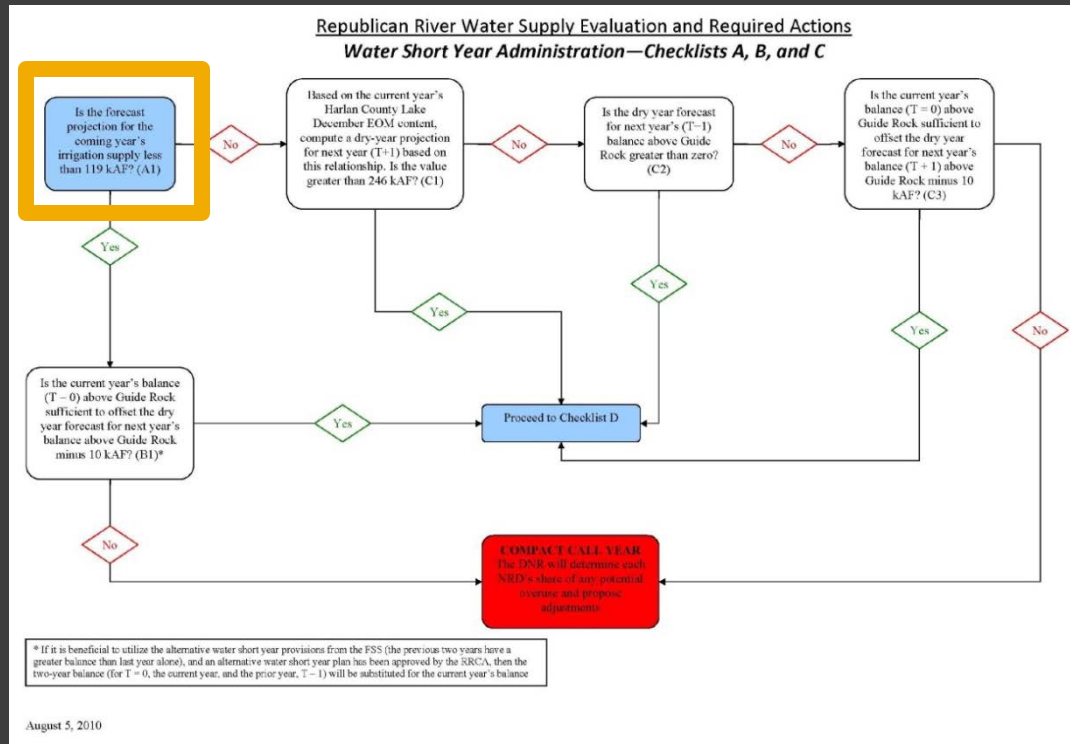
Year	Guide Rock Balance (AF)
T=0 (2018, projected)	-16,600
T=+1 (2019, early forecast)	-34,500
2-Year Forecast Balance	-51,100

Year	Hardy Balance (AF)
T=-3 to 0 (2015-2018, projected)	72,500
T=+1 (2019, early forecast)	-28,600
5-Year Forecast Balance	43,900

Compact Call Year Evaluation: Checklist A. Water Short Year Test

Is the forecast projection for the coming year's irrigation supply less than 119 kAF?

No.
Proceed to Checklist C.

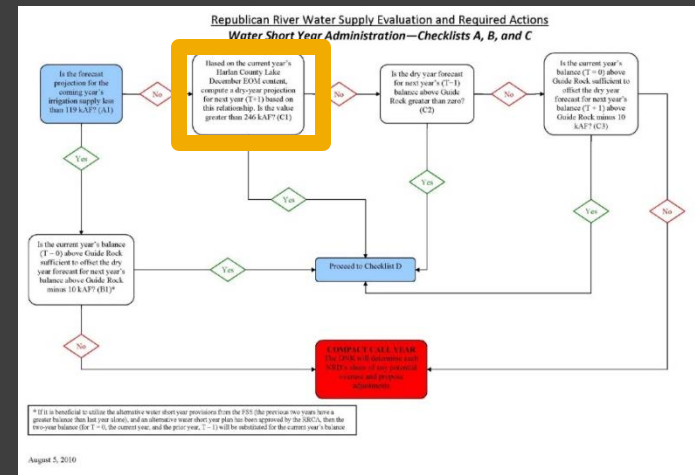


Compact Call Year Evaluation: Checklist C. Early Warning System for WSY Compliance

C1. When HCL declines from one year to the next, the December EOM content is about 80% of what it was last year. A December EOM of 246 kAF provides a high level of confidence that the coming year (T+1, 2019) will not be a WSY. Based on the current year's (T=0, 2018) HCL December EOM content, compute a dry-year projection for next year (T+1, 2019) based on this relationship. Is the value greater than 246 kAF?

No. Advance to next question.

We are projecting the HCL December EOM 2018 content to be 244,000 AF.

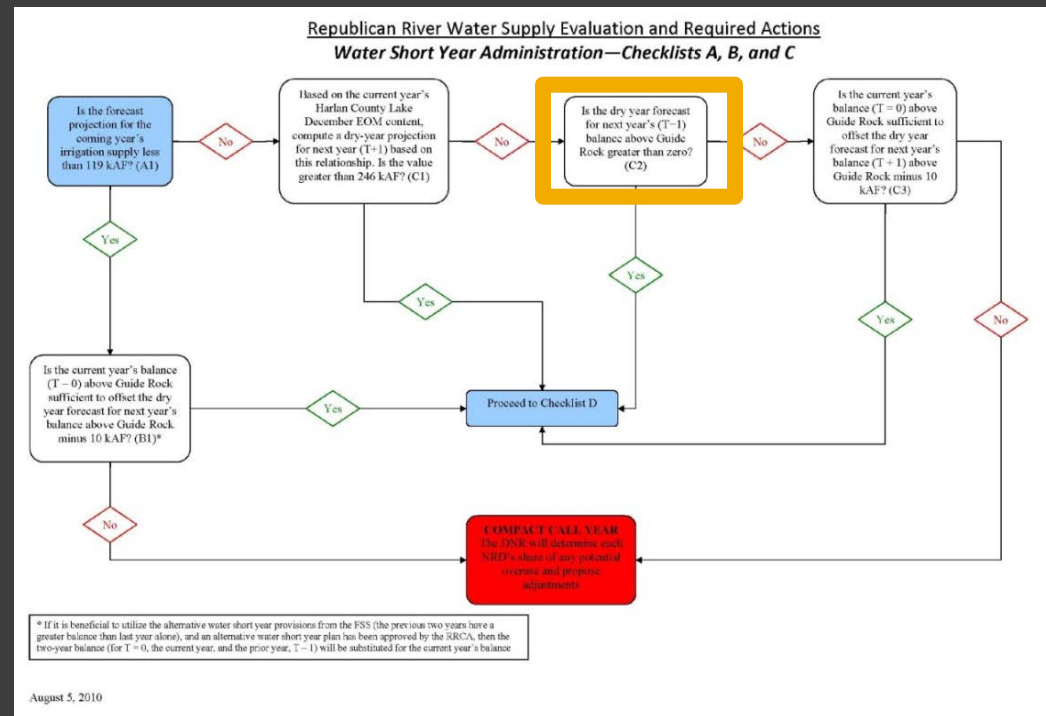


Compact Call Year Evaluation: Checklist C. Early Warning System for WSY Compliance

C2. Is the dry year forecast for next year's (T+1, 2019) balance upstream of Guide Rock greater than zero?

No. Advance to next question.

Year	Guide Rock Balance (AF)
T=+1 (2019, early forecast)	-34,500

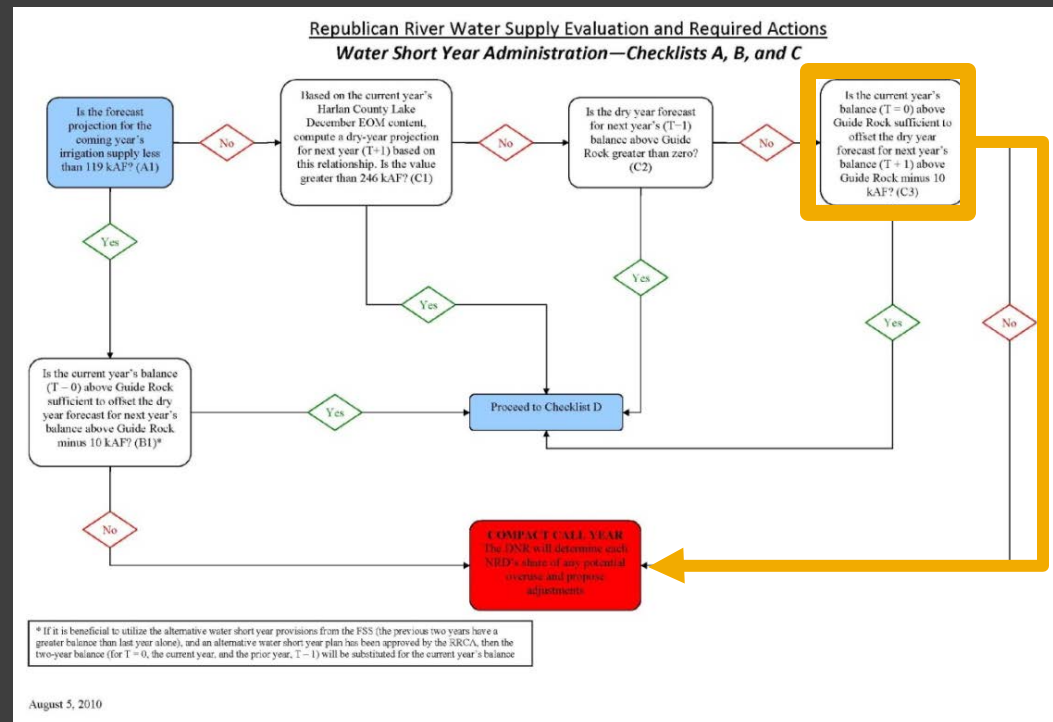


Compact Call Year Evaluation: Checklist C. Early Warning System for WSY Compliance

C3. Is the current year's balance (T=0, 2018) upstream of Guide Rock sufficient to offset the dry year forecast for next year's balance (T+1) upstream of Guide Rock minus 10 kAF?

**NO –
Compact Call Year**

Year	Guide Rock Balance (AF)
T=0 (2018, projected)	-16,600
T=+1 (2019, early forecast)	-34,500
2-Year Forecast Balance	-51,100



NRD-Specific Forecast Balances

NRD Annual Guide Rock Balance Forecast for Upcoming Year (2019)

	LRNRD	MRNRD	URNRD	Total
Allowable Depletion Distribution Percentage from IMPs	24.5%	31.1%	44.4%	100.0%
Allowable Groundwater Depletions	37,500	47,600	68,000	153,100
Projected Groundwater Depletions	48,500	57,900	81,200	187,600
2019 Forecast Balance (no action)	-11,000	-10,300	-13,200	-34,500
Current Year (2018) Balance	-4,600	-4,300	-7,700	-16,600
Total Forecast by NRD	-15,600	-14,700	-20,900	-51,100

Projected Obligations for Upcoming Year (2019)

	LRNRD	MRNRD	URNRD	Total
2018-2019 Balance (Forecast)	-15,600	-14,700	-20,900	-51,100
Remaining Compact Compliance Volume	-4,100	-4,600	-600	-9,300
Total Forecast Obligation	-19,700	-19,300	-21,500	-60,400

Summary

- Based on the preliminary forecast, the IMP checklist indicates that a **Compact Call Year** will be in place in 2019
- Preliminary approximate 2018 accounting balances:
 - Guide Rock: **-16,600 ac-ft**
 - Hardy: **-3,400 ac-ft**
- Preliminary dry-year forecast balance for 2019 currently approximated at **-34,500 ac-ft** at Guide Rock (-28,600 ac-ft at Hardy)
- If under 2-year accounting, total projected shortfall including Remaining Compact Compliance Volume for 2018-2019 of approximately **-60,400 ac-ft**
- Kansas did not request any water for delivery by June 1, 2019

Next Steps

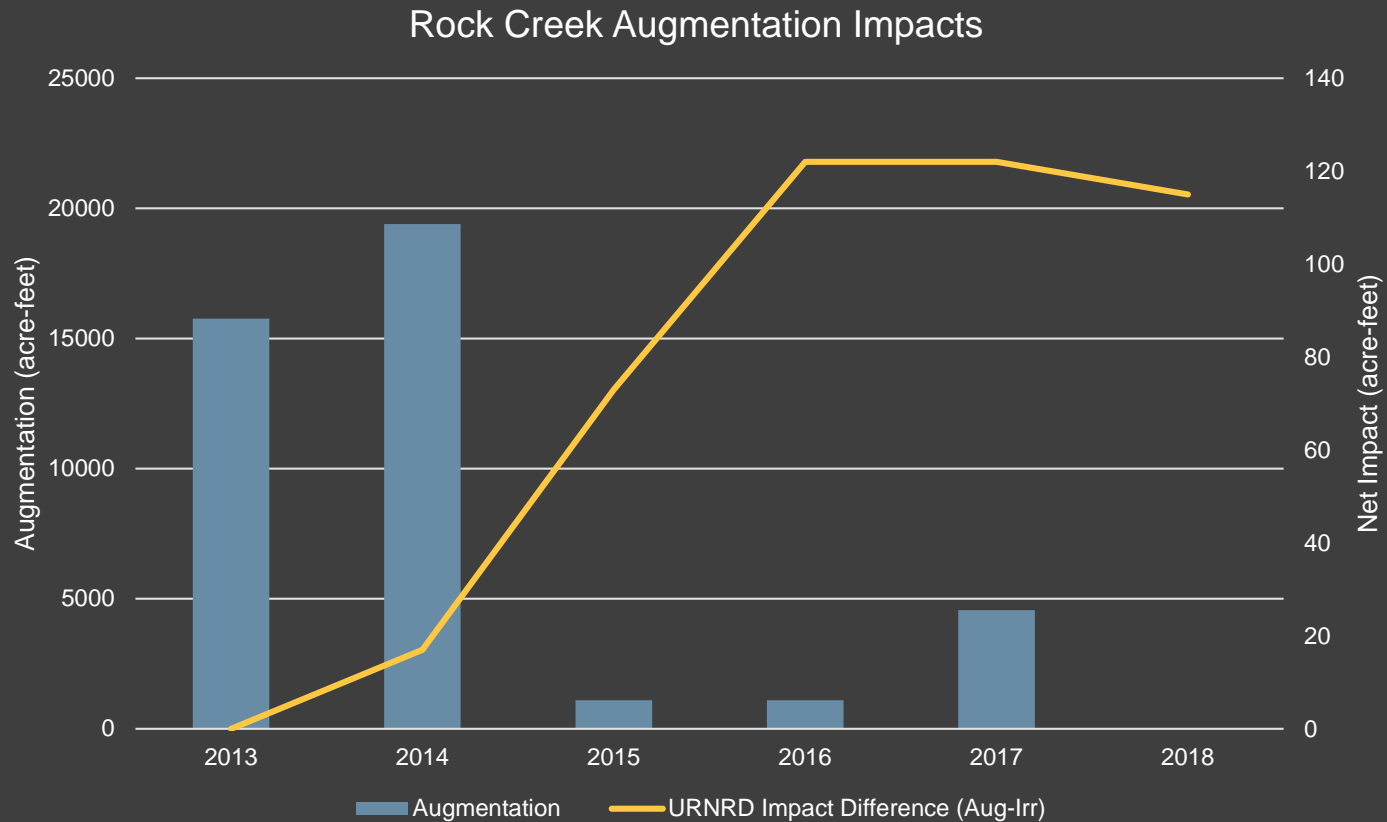
- The Department will complete its final forecast prior to January 1, 2019
 - Department will monitor 2-year accounting trigger
 - Department will issue Compact Call Year order
 - NRDs will identify means to address potential Compact shortfall, but no actions will be required prior to October 1, 2019
 - Department will reassess the necessity for management action late summer/post-irrigation 2019

Augmentation Impacts – IMP

Our IMPs state:

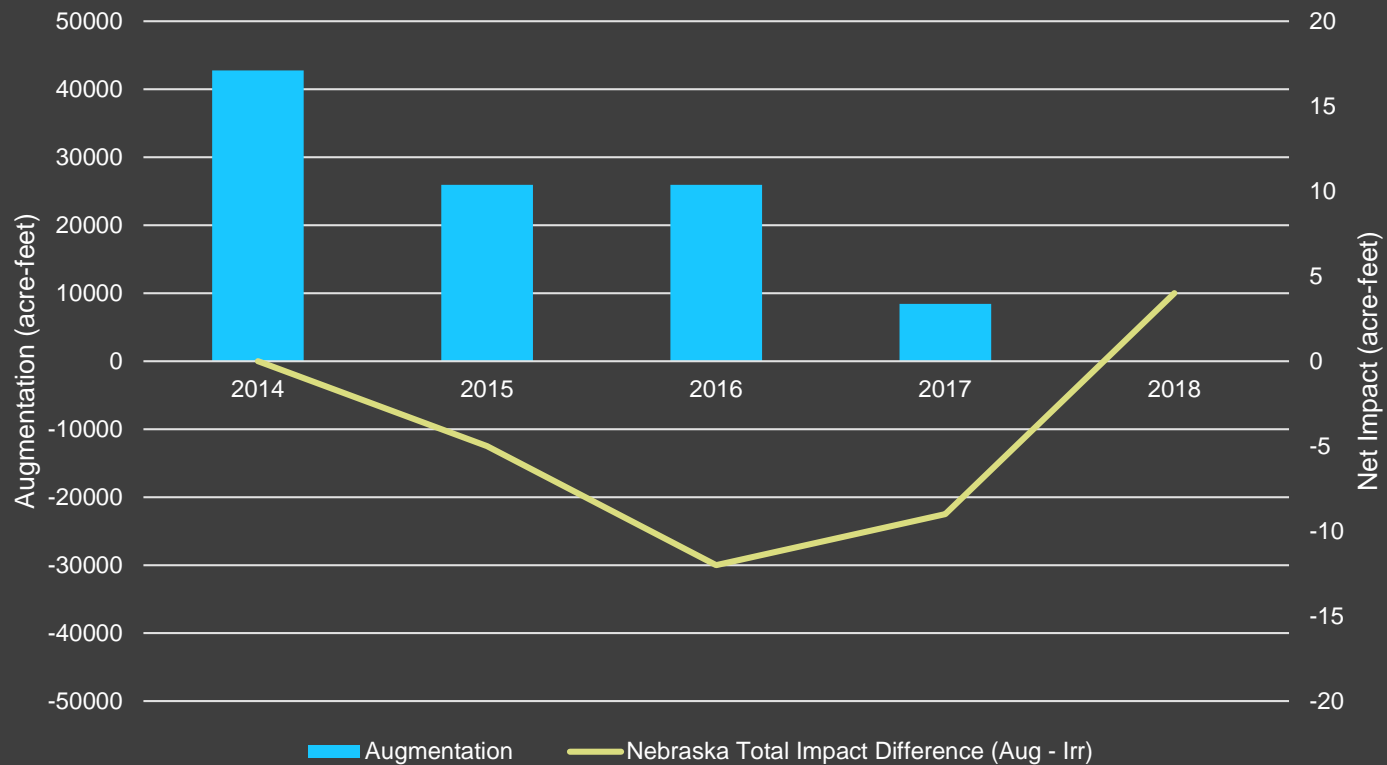
“...all new net depletions to streamflow that result from augmentation pumping (as calculated by the RRCA ground water model) will be mitigated to ensure protection of existing surface water appropriations.”

Augmentation Impacts – June 2018 run



AUGMENTATION – June 2018 run

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DEPT. OF NATURAL RESOURCES

301 Centennial
Mall South
4th Floor
PO Box 94676
Lincoln, NE
68509-4676

402-471-2363