

**Handouts for  
Upper Republican  
Natural Resources District  
Special Meeting  
July 13, 2006**



**Nebraska  
Department of Natural Resources**

## 2006 – 2045 Future Scenario Runs

The 2006 through 2045 future scenario runs are based on repeating 1981 through 2000 climate conditions for 2006 through 2025, and 2026 through 2045. Initial aquifer levels for this run are the 2005 preliminary model run final heads. Colorado and Kansas pumping and surface-water applications are based on 1981 through 2000 model inputs repeating for 2006 through 2025 and 2026 through 2045. Nebraska surface-water irrigation and groundwater-commingled pumping from 1981 through 2000 are repeated for the periods of 2006 through 2025, and 2026 through 2045. Precipitation, phreatophyte evapotranspiration and reservoir levels are similarly repeated for these two periods.

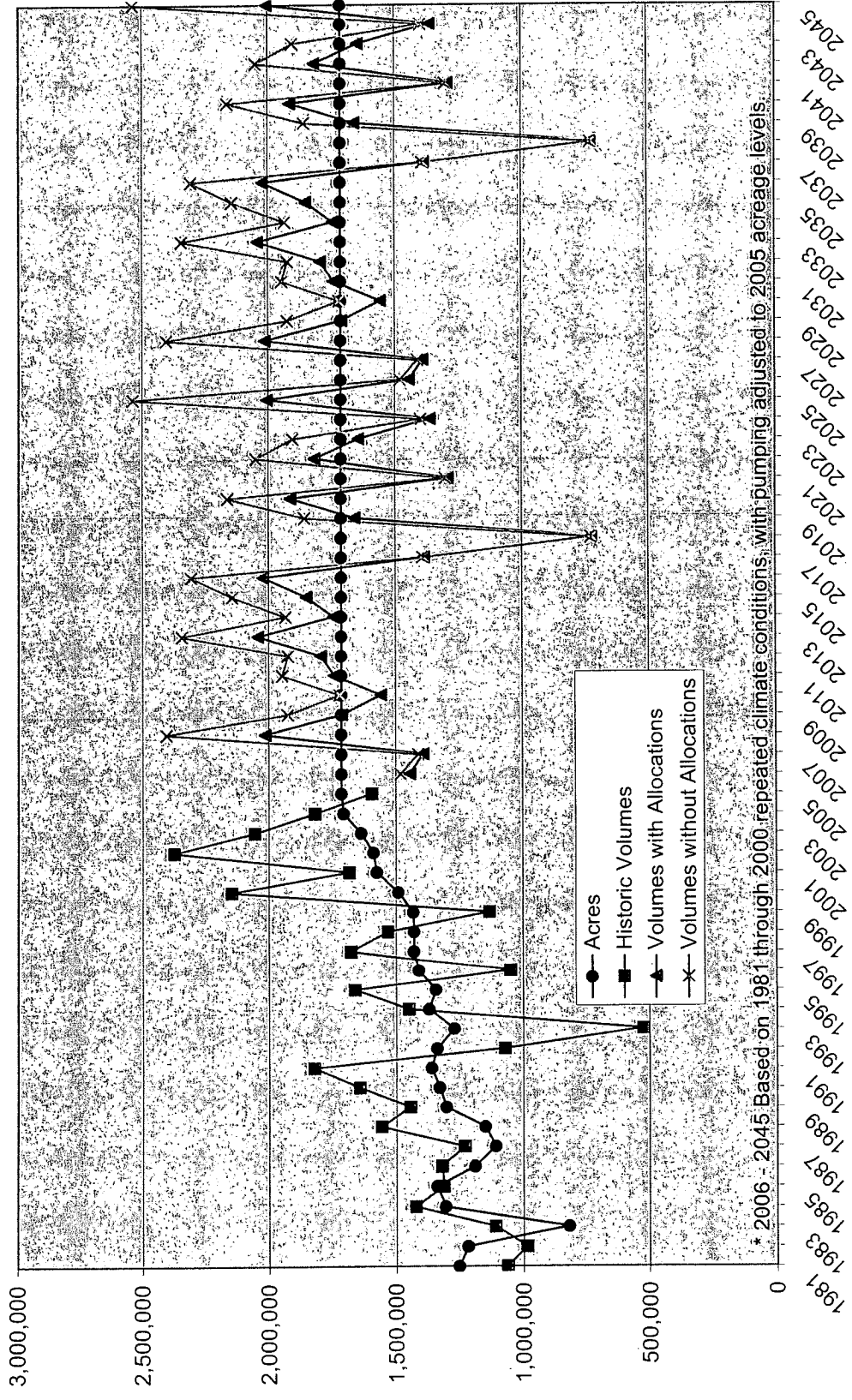
For 2006 through 2045, Nebraska groundwater-exclusive (GWEX) pumping is repeated for the two 20-year periods, 2006 through 2025, and 2026 through 2045. For each of the 20-year periods, GWEX acreage is held at the 2005 level of 1,715,535 acres. The 2006 through 2025 GWEX model-input files were created by multiplying the 2005 cell-by-cell model input file acreages by the county-specific depths found in each corresponding year's GWEX model input file; in this manner, acreages are held constant after 2005, and irrigation depths correspond to the precipitation conditions for each reference year.

In addition, adjustments were made to the depths of irrigation application to account for allocations agreed upon by the Lower, Middle, and Upper Republican NRDs. Irrigation depth was capped at 13.5 inches for the Upper Republican, 13 inches for the Middle Republican, 12 inches west of the inlet to Harlan Reservoir and 11 inches east of the inlet to Harlan Reservoir in the Lower Republican NRD. The irrigation in Harlan County was capped at 11.5 inches since approximately one-half of the county has an 11-inch allocation and the other half a 12-inch allocation.

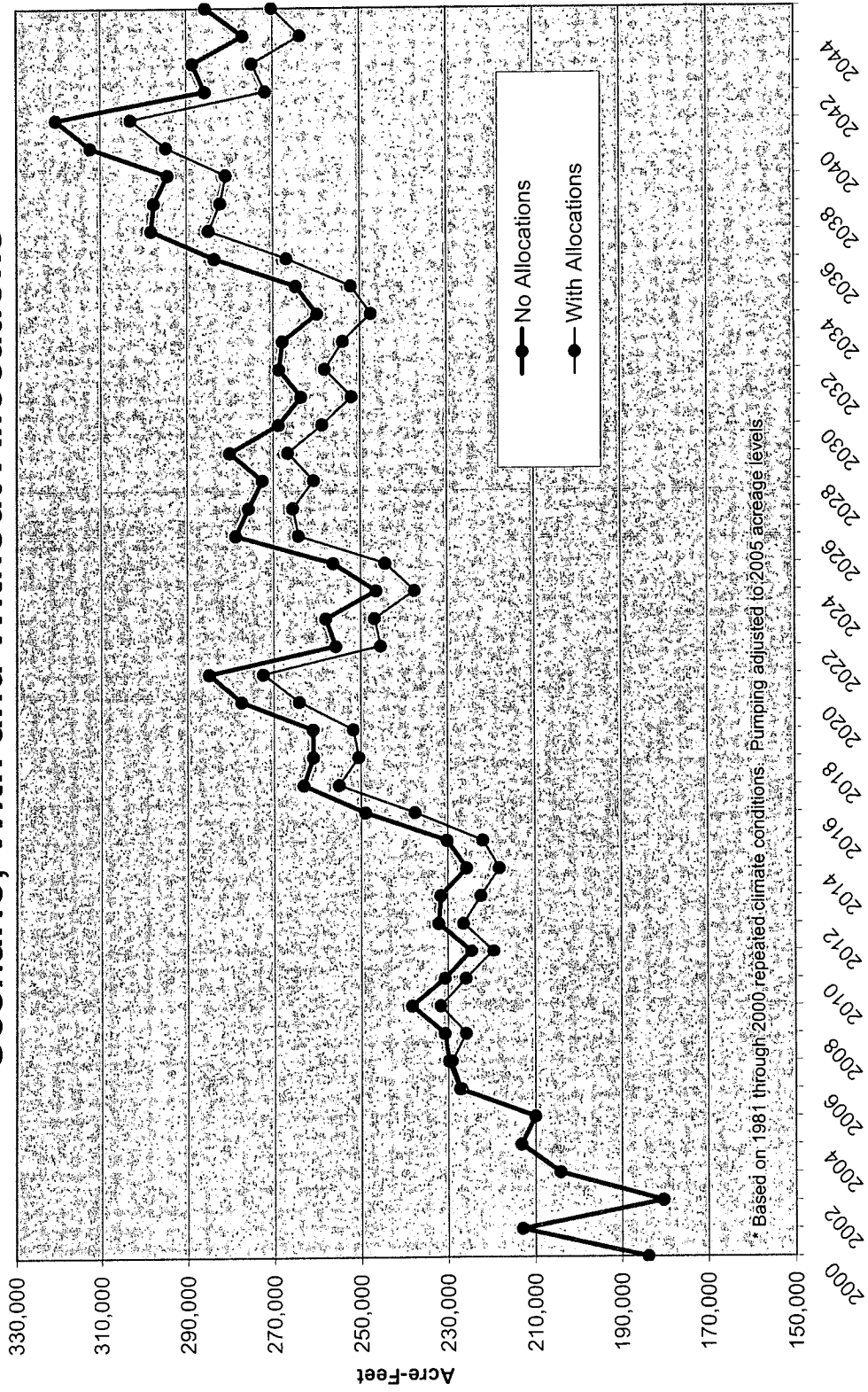
Descriptive acronyms used in the 2006 – 2045 model run charts are as follows:

- LR: Lower Republican NRD
- MR: Middle Republican NRD
- TB: Tri-Basin NRD
- UR: Upper Republican NRD
- QR25: CREP quick-response area 25% pumping reduction
- QR50: CREP quick-response area 50% pumping reduction
- QR100: CREP quick-response area 100% pumping reduction
- RED15: 15% reduction over the entire LR, MR, UR and TB NRD regions
- RED25: 25% reduction over the entire LR, MR, UR and TB NRD regions
- RED50: 50% reduction over the entire LR, MR, UR and TB NRD regions
- RED100: 100% reduction over the entire LR, MR, UR and TB NRD regions
- RED15QR25: 15% 4-NRD-region reduction plus a 25% reduction in the CREP quick-response area
- RED15QR50: 15% 4-NRD-region reduction plus a 50% reduction in the CREP quick-response area
- RED15QR100: 15% 4-NRD-region reduction plus a 100% reduction in the CREP quick-response area

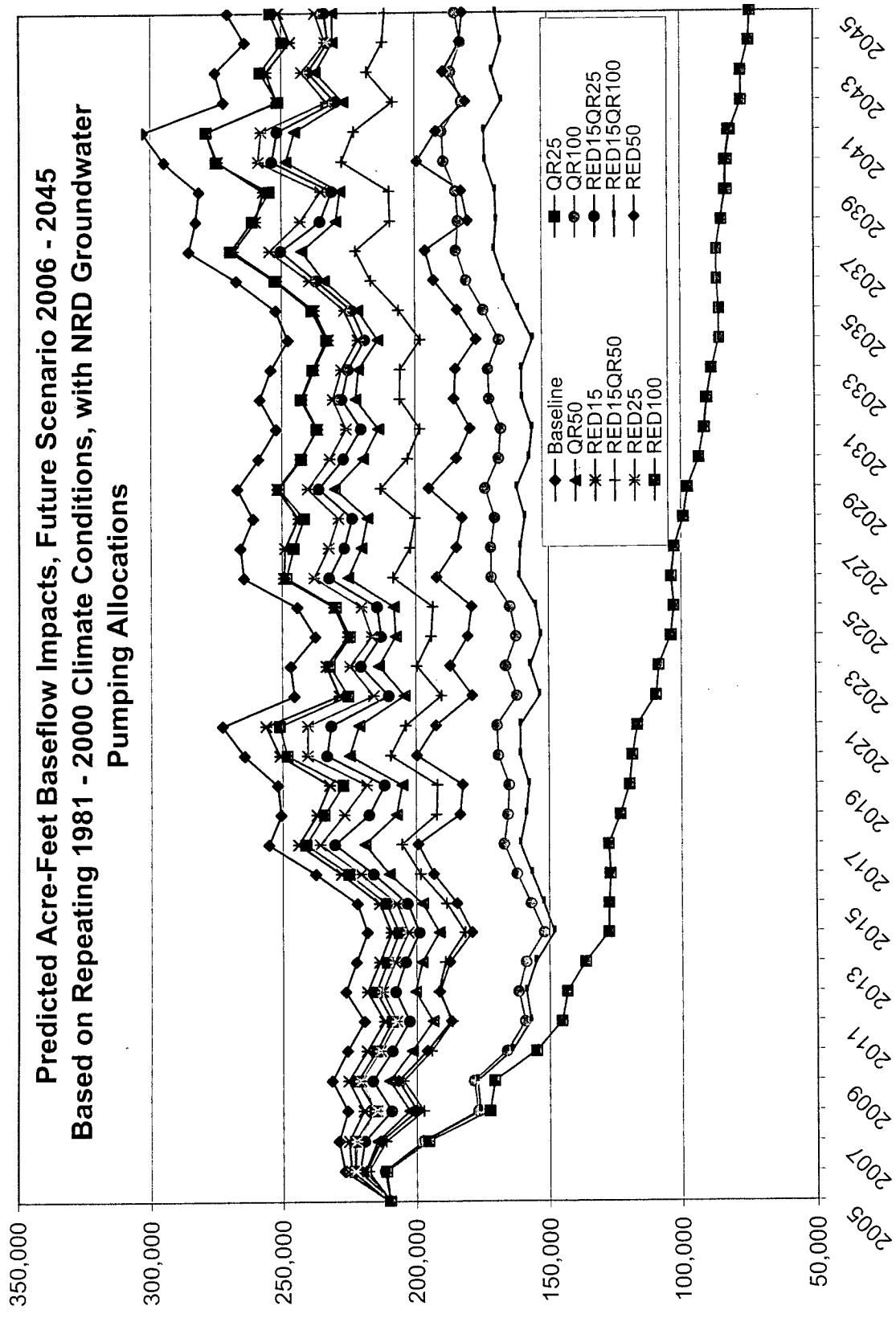
# Historic and Predicted Groundwater-Exclusive Acreage and Acre-Foot Pumping Volumes, 1981 through 2045



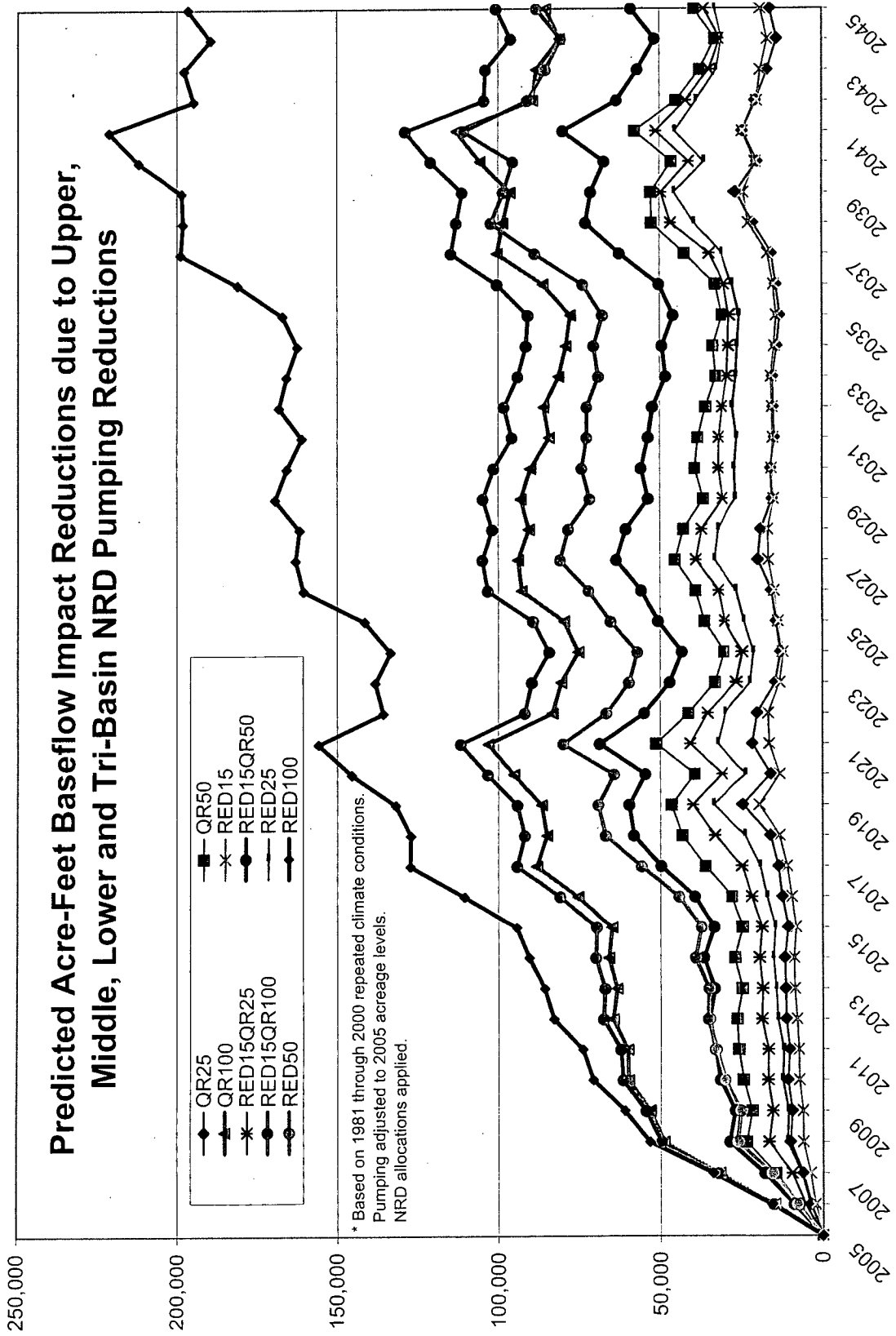
# Comparison of Baseline Impacts for 2006-2045 Scenario, With and Without Allocations



**Predicted Acre-Feet Baseflow Impacts, Future Scenario 2006 - 2045  
Based on Repeating 1981 - 2000 Climate Conditions, with NRD Groundwater  
Pumping Allocations**



# Predicted Acre-Foot Baseflow Impact Reductions due to Upper, Middle, Lower and Tri-Basin NRD Pumping Reductions



\* Based on 1981 through 2000 repeated climate conditions. Pumping adjusted to 2005 acreage levels. NRD allocations applied.

# Predicted Acre-Foot Baseflow Impacts Resulting from Upper Republican NRD Pumping Reductions

