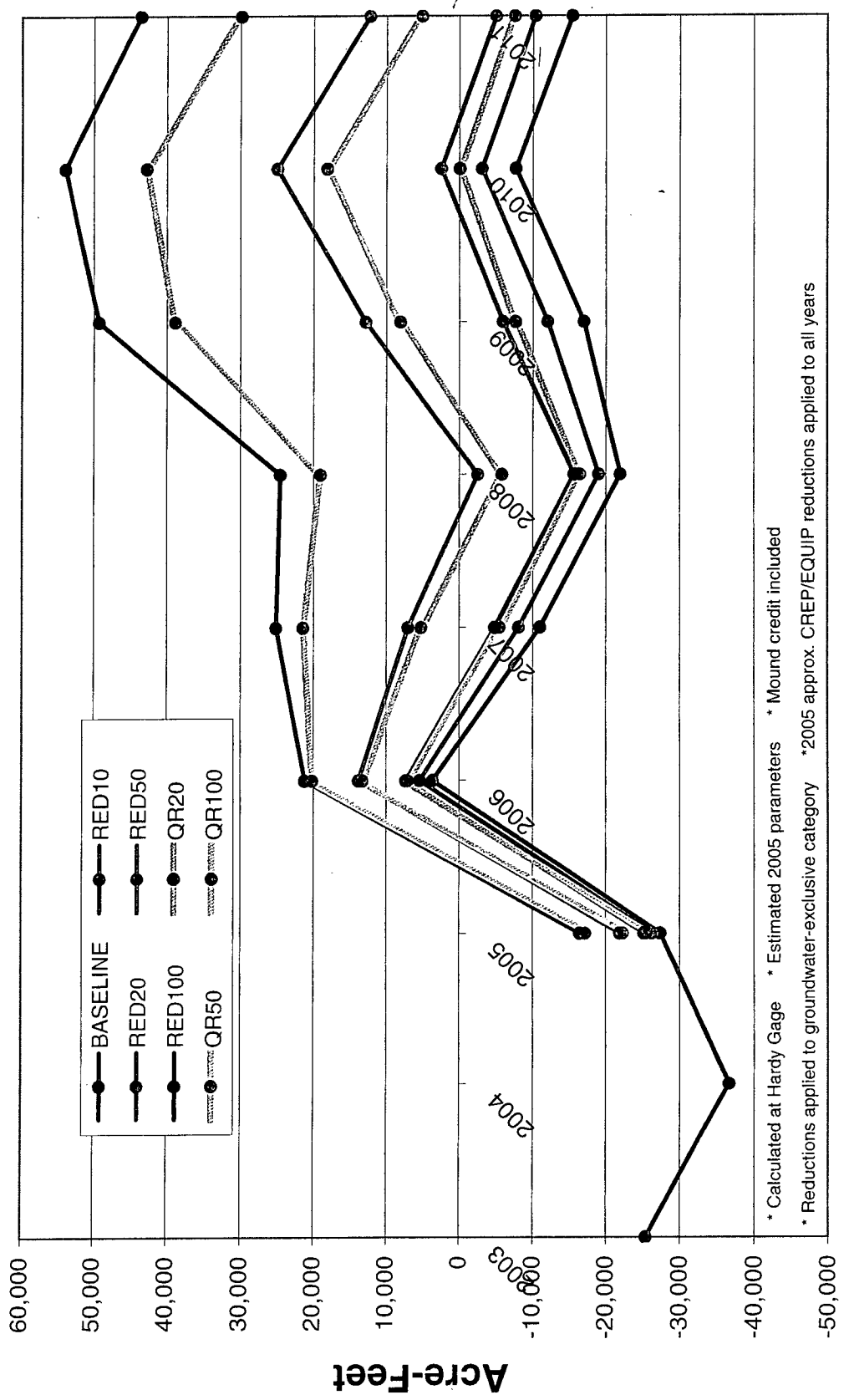


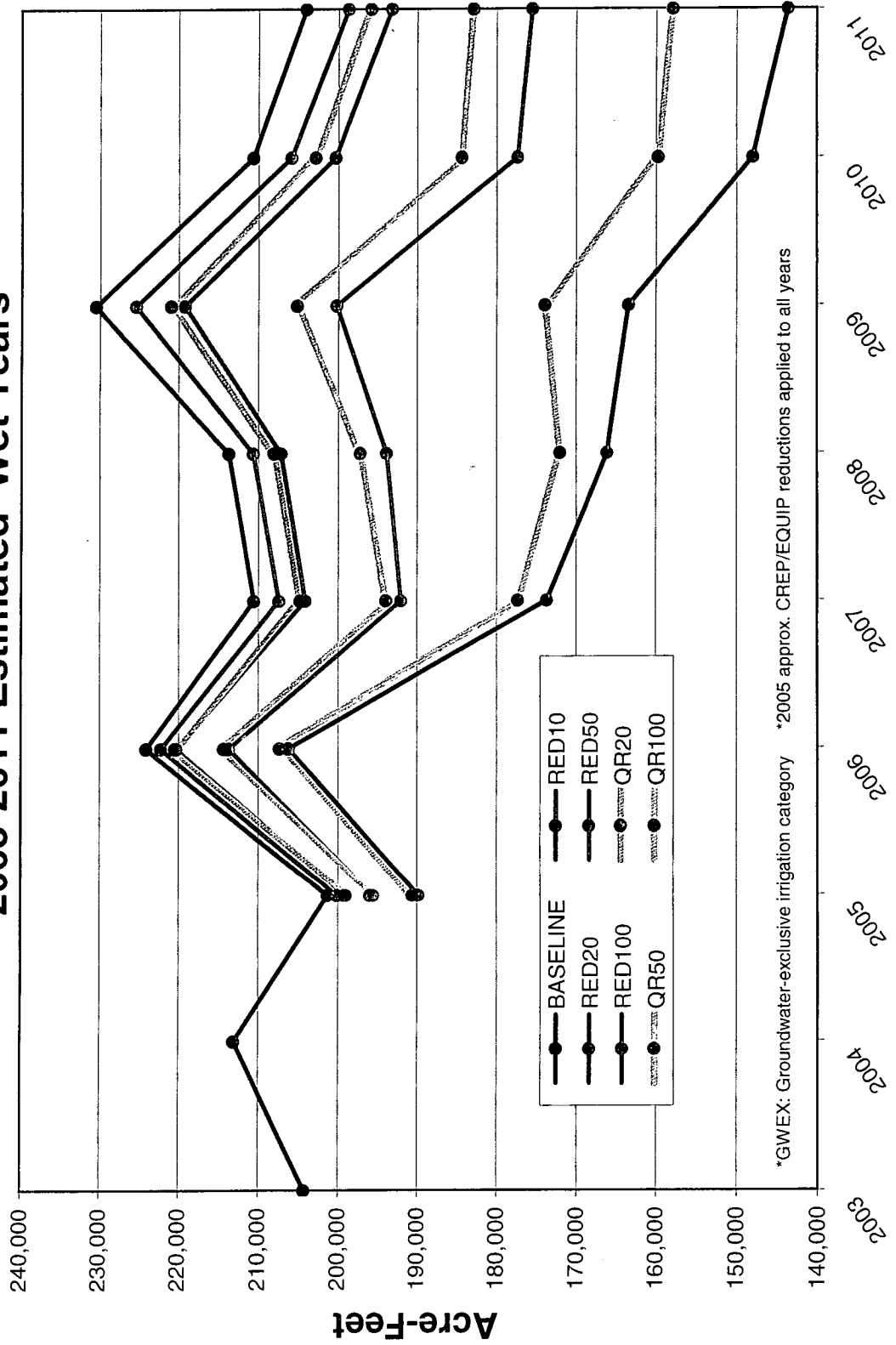
2005 SAME  
 2006 = 1993 wet an  
 2007 2004 wet

### NE Allocation Minus Consumptive Use, 'Wet-Year' Climate Conditions; Reductions for Lower, Middle and Upper Republican NRDs



\* Calculated at Hardy Gage \* Estimated 2005 parameters \* Mound credit included  
 \* Reductions applied to groundwater-exclusive category \*2005 approx. CREP/EQUIP reductions applied to all years

# GW Impacts, LR, MR, and UR Region GWEX Reductions, 2005-2011 Estimated 'Wet Years'



## **'WET YEARS' 2005 THROUGH 2011 MODEL SCENARIO**

This run was performed to calculate and analyze the stream impacts of a series of years with above-average precipitation conditions. These model runs are based on an estimate of 2005 parameters, followed by 1993 -1996 'Wet Years' parameters, followed by two years of average precipitation and associated parameters. The years 2005, and 2010 and 2011 use the same data as those used in the 'Average Years' runs.

In addition to the groundwater-exclusive (GWEX) acreage and volume estimates explained below, approximations were made of county-specific CREP and EQUIP program acreage reductions to date. The reductions were applied evenly to both the acreages and volumes of GWEX category irrigation in the quick-response areas of counties having acres registered in the CREP and EQUIP programs. The proportion of acres registered into these programs to the total irrigated acreages in the quick response area in each county was calculated. Then, the acres and volumes for all quick-response model grid cells (in counties where there were estimated CREP or EQUIP registered acreages) in the GWEX model input file were multiplied by (1 - this proportion). The adjustment was applied to all seven years of this model run. There were 70,000 acres reduced through this process. This estimation procedure was a best estimate using limited geographic data.

The **2005** parameters are as follows for the 'Wet Years' model run:

1990 precipitation; this year was chosen because like 2005, there was 13.5 inches of irrigation-season precipitation.

2004 Kansas and Colorado pumping and surface-water files

2005 canal seepage files as calculated using preliminary canal data

2004 surface water files (exclusive and commingled categories)

2004 groundwater-commingled pumping files

2004 evapotranspiration file

2004 reservoir levels

2004 municipal pumping files

2004 groundwater-exclusive category acres

2004 groundwater-exclusive category pumping multiplied by a factor of .851. This factor was determined by multiplying the ratio of the irrigation-season rainfall (May through August) in 2004 to the irrigation-season rainfall in 2005 by the pumping volumes in 2004, then multiplying this ratio by .95 to account for the 5% decrease in pumping agreed to by the NRDs in their Integrated Management Plans:

$$12.1''(2004) / 13.5''(2005) * .95 = .851$$

For **2006 through 2009**, pumping was based on the corresponding 1993 through 1996 pumping and precipitation. All files used for this run are as follows:

1993 through 1996 model precipitation files.

1993 through 1996 Kansas and Colorado surface-water and groundwater model files.

2004 Nebraska canal-seepage, GWCO, GWEX and SWEX irrigation files.

2004 evapotranspiration file

2004 reservoir levels

2004 municipal pumping files

2004 groundwater-exclusive category acres

GWEX Pumping: The 2004 GWEX file was modified to reflect the corresponding 1993 through 1996 depths of irrigation. County-specific ratios of each corresponding year's (1993=2006, 1994=2007, 1995=2008, 1996=2009) irrigation depth to the 2004 irrigation depths were calculated then multiplied by all records in the 2004 GWEX pumping file to adjust the irrigation volumes for the precipitation quantities for each future year (See 'WetYrsGWEX\_Adjust.mdb').

The **2010 and 2011** parameters are for average conditions, and are as follows:

1990 precipitation multiplied by ratio of average year irrigation-season precipitation (13.2") to the 1990 irrigation-season precipitation (13.5")

2004 Kansas and Colorado pumping and surface-water files

2004 canal seepage

2004 surface water files (exclusive and commingled categories)

2004 groundwater-commingled pumping files

2004 evapotranspiration file

2004 reservoir levels

2004 municipal pumping files

2004 groundwater-exclusive category acres

2004 groundwater-exclusive category pumping multiplied by a factor of .871. This factor was determined by multiplying the ratio of the irrigation-season rainfall (May through August) in 2004 to the average (1980 through 2005, excluding 1993) irrigation-season rainfall by the pumping volumes in 2004, then multiplying this ratio by .95 to account for the 5% decrease in pumping agreed to by the NRDs in their Integrated Management Plans:

$$12.1''(2004) / 13.2''(2005) * .95 = .871$$

### **Chart Definitions**

QR20: 20% Quick-Response area reduction.

QR50: 50% Quick-Response area reduction.

QR100: 100% Quick-Response area reduction.

RED10: 10% Reduction across the defined region.

RED20: 20% Reduction across the defined region.

RED50: 50% Reduction across the defined region.

RED100: 100% Reduction across the defined region.

AllRegRed: Reduction across entire model region, including outside the Republican Basin.

LR: Lower Republican NRD.

MR: Middle Republican NRD.

TB: Tri-Basin NRD.

UR: Upper Republican NRD.

3NRD: The LR, MR and UR region.

\* *OFFICIAL\_05-11WetYrs\_WithCREP\_Red\_EXP.doc, October 16, 2005*