

DRAFT TECHNICAL MEMORANDUM

To: Steve Walthour, General Manager, North Plains Groundwater Conservation District
From: Neil Deeds, INTERA
Date: March 16, 2016
RE: DRAFT GMA-1 Predictive Runs

1 INTRODUCTION

Four predictive runs were completed for GMA-1 with the TWDB High Plains Aquifer System GAM. These runs represent variations of the run described in the memo submitted to TWDB August 31st, 2015, titled “DRAFT GMA-1 Predictive Runs Performed Under TWDB Contract for Development of the High Plains Aquifer System Groundwater Availability Model.”

Four new runs were completed. The guidelines for these runs are provided by GMA-1 representatives. Variations in the scenarios are described below.

Run 2016.1: New initial pumping rates in the Ogallala Aquifer were set for all counties in North Plains GCD (NPGCD), along with target rates for year 2020 for four of the counties in NPGCD as follows (acre-feet per year):

| County | 2012 | 2013 | 2014 | 2015 | 2016 | 2020 |
|------------|---------|---------|---------|---------|---------|---------|
| Dallam | 371,965 | 399,272 | 393,624 | 314,899 | 400,000 | 390,000 |
| Hansford | 218,793 | 201,914 | 211,634 | 169,307 | 277,961 | |
| Hartley | 458,696 | 458,998 | 442,058 | 353,646 | 450,000 | 400,000 |
| Hutchinson | 72,230 | 69,716 | 73,992 | 59,194 | 74,000 | |
| Lipscomb | 55,572 | 42,519 | 48,791 | 39,033 | 55,000 | |
| Moore | 234,688 | 228,297 | 209,907 | 167,926 | 235,000 | 215,000 |
| Ochiltree | 109,213 | 98,280 | 106,278 | 85,022 | 115,000 | |
| Sherman | 348,012 | 346,685 | 361,336 | 289,069 | 365,000 | 400,000 |

In the same run, new 2070 drawdown targets were set for three counties in High Plains Water District (HPWD), and in Randall County where no district exists. Specifically, Armstrong (14’), Potter (11’), Randall (21’), and Randall-No GCD (21’).

As with the August 31st, 2015 run, Dockum targets were set as a fraction of available drawdown, specifically, NPGCD-west (0.40), Panhandle GCD (PGCD) (0.50), HPWD (0.50), No-GCD (0.50).

In Run 2016.1, the saturated thickness where pumping was curtailed was set to 30 feet.

Run 2016.2: Same as 2016.1, except saturated thickness where pumping was curtailed was set to 10 feet.

Run 2016.3: Same as Run 2016.1, except that some Dockum targets are now based on average drawdown after 50 years (in 2062). Specifically, Panhandle GCD (30'), HPWD (40'), Oldham County-No GCD (30'), Randall County – No GCD (40').

The Ogallala was treated the same as Run 2016.1.

Run 2016.4: Same as 2016.3, except saturated thickness where pumping was curtailed was set to 10 feet.

For all of these runs, pumping in GMA-2 was set to the 2012 estimated rate, multiplied by a factor of 1.5. Limited sensitivity analyses indicated that GMA-1 results were not very sensitive to GMA-2 pumping rates.

2 RESULTS

The results are provided in the form of tables for each of the runs. Tables 1 – 6 for each run are identical in format and content to Tables 1 – 6 provided in the August 31, 2015 memo. Note that tables are prefixed with the run number, e.g. Table 6, Run 4 is titled 2016.4.6. The run results are presented sequentially.

In most cases, targets were met. The fraction remaining goals for the Ogallala Aquifer (Table 1) were within 0.01 for all cases. The fraction remaining goals were also met for the Dockum Aquifer (Table 2) within 0.01 for all cases. The new drawdown goals for portions of counties in HPWD were met within one or two feet (Table 4) except in Potter County. Pumping was set to nearly zero, but drawdown exceeded 11 feet in all cases. The drawdown goals for Dockum were met for the Districts and counties specified.

The effect of decreasing the saturated thickness at which pumping was curtailed was to increase availability slightly in some counties. For example, in Dallam County in 2016 the target pumping was 400,000 acre-feet/year. When the minimum was 30', only 395,000 acre-feet/year was achieved, while a 10' minimum allowed the full 400,000 acre-feet/year to be achieved.

Table 2016.1.1: Groundwater in storage and fraction remaining by zone for the Ogallala Aquifer in GMA-1.

| Ogallala Zone | Groundwater In Storage (af) | | | | | | | Fraction Remaining from 2012 | | | | |
|-------------------------|-----------------------------|------------|------------|------------|------------|------------|------------|------------------------------|------|------|------|------|
| | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD - West | 58,258,886 | 54,744,394 | 48,754,920 | 39,318,583 | 32,109,285 | 26,993,778 | 23,384,113 | 0.84 | 0.67 | 0.55 | 0.46 | 0.40 |
| North Plains GCD - East | 68,850,807 | 67,881,893 | 64,430,190 | 57,030,843 | 49,808,488 | 42,768,448 | 34,552,698 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Hemphill County UWCD | 15,434,318 | 15,372,022 | 15,048,787 | 14,346,870 | 13,653,101 | 12,988,228 | 12,233,445 | 0.98 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | 76,865,219 | 75,962,435 | 71,217,735 | 62,076,829 | 53,726,195 | 46,245,903 | 38,426,808 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| High Plains UWCD No. 1 | 3,073,984 | 3,019,557 | 2,881,922 | 2,598,118 | 2,338,804 | 2,116,154 | 1,901,538 | 0.94 | 0.84 | 0.76 | 0.69 | 0.62 |
| No GCD | 9,635,730 | 9,479,316 | 8,843,921 | 7,660,755 | 6,642,722 | 5,802,760 | 5,017,554 | 0.92 | 0.79 | 0.69 | 0.60 | 0.52 |

Table 2016.1.2: Fraction remaining by zone for the Dockum Aquifer in GMA-1.

| Zone | Fraction Remaining from 2012 | | | | |
|-------------------------|------------------------------|------|------|------|------|
| | 2020 | 2030 | 2040 | 2050 | 2062 |
| North Plains GCD - West | 0.90 | 0.75 | 0.63 | 0.52 | 0.41 |
| Panhandle GCD | 0.91 | 0.78 | 0.68 | 0.59 | 0.50 |
| High Plains UWCD No. 1 | 0.88 | 0.77 | 0.67 | 0.59 | 0.50 |
| No GCD | 0.90 | 0.78 | 0.67 | 0.59 | 0.50 |

Table 2016.1.3: Available groundwater and average drawdown in the Rita Blanca Aquifer for the Dallam County in GMA-1.

| Rita Blanca County | Available Groundwater (afy) | | | | | | | Average Drawdown (ft) | | | | | | |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-----------------------|------|------|------|------|------|--|
| | 2015 ¹ | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | |
| Dallam | 6,197 | 6,207 | 6,197 | 6,177 | 6,145 | 6,151 | 5,914 | 13 | 27 | 39 | 47 | 53 | 57 | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.1.4: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| Ogallala | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------|-----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|------|------|------|------|------|
| County | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 305,394 | 395,833 | 382,326 | 281,008 | 220,018 | 160,754 | 97,119 | 65,050 | 15 | 29 | 40 | 47 | 52 | 54 |
| Hansford | 169,191 | 276,822 | 275,769 | 272,655 | 271,968 | 270,280 | 269,478 | 269,128 | 17 | 41 | 66 | 89 | 116 | 134 |
| Hartley | 353,307 | 450,493 | 398,675 | 271,523 | 212,904 | 154,435 | 90,846 | 58,543 | 20 | 37 | 49 | 58 | 64 | 65 |
| Hutchinson | 59,153 | 74,151 | 62,975 | 64,522 | 65,831 | 66,075 | 65,956 | 64,791 | 13 | 33 | 53 | 73 | 95 | 110 |
| Lipscomb | 39,006 | 55,112 | 267,540 | 266,710 | 267,370 | 266,591 | 266,556 | 266,546 | 12 | 34 | 55 | 75 | 99 | 115 |
| Moore | 167,811 | 235,480 | 215,441 | 172,620 | 139,703 | 105,016 | 67,650 | 47,446 | 20 | 41 | 57 | 69 | 77 | 80 |
| Ochiltree | 84,963 | 115,225 | 244,446 | 243,931 | 244,670 | 244,050 | 244,085 | 244,094 | 13 | 37 | 61 | 84 | 112 | 130 |
| Sherman | 288,843 | 364,947 | 399,146 | 348,894 | 282,462 | 212,744 | 136,775 | 93,843 | 24 | 53 | 75 | 91 | 104 | 108 |
| District Total | 1,467,668 | 1,968,063 | 2,246,318 | 1,921,863 | 1,704,926 | 1,479,945 | 1,238,465 | 1,109,441 | | | | | | |
| Hemphill County UWCD | | | | | | | | | | | | | | |
| Hemphill | 21,935 | 55,176 | 54,535 | 54,409 | 54,609 | 54,501 | 54,539 | 54,557 | 4 | 11 | 18 | 25 | 33 | 38 |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 7,495 | 57,669 | 58,142 | 53,413 | 48,300 | 43,459 | 38,076 | 34,777 | 6 | 16 | 25 | 34 | 42 | 47 |
| Carson | 129,714 | 181,368 | 192,661 | 184,263 | 170,395 | 153,767 | 134,054 | 121,448 | 12 | 29 | 44 | 57 | 71 | 79 |
| Donley | 39,476 | 69,404 | 75,012 | 76,288 | 73,162 | 67,872 | 60,901 | 56,275 | 5 | 13 | 21 | 27 | 33 | 37 |
| Gray | 41,540 | 171,475 | 181,601 | 175,267 | 163,099 | 148,713 | 131,744 | 121,136 | 9 | 25 | 40 | 53 | 66 | 74 |
| Hutchinson | 74 | 10,106 | 15,777 | 16,740 | 15,197 | 13,324 | 11,454 | 10,171 | 14 | 41 | 67 | 91 | 115 | 129 |
| Potter | 7,349 | 15,775 | 17,014 | 15,818 | 14,480 | 13,181 | 11,635 | 10,670 | 3 | 7 | 10 | 13 | 17 | 18 |
| Roberts | 79,284 | 359,716 | 431,798 | 455,129 | 428,388 | 390,246 | 342,747 | 311,054 | 20 | 55 | 87 | 117 | 148 | 166 |
| Wheeler | 13,534 | 114,844 | 130,782 | 138,810 | 137,761 | 132,311 | 123,308 | 116,837 | 8 | 23 | 35 | 47 | 59 | 66 |
| District Total | 318,466 | 980,357 | 1,102,787 | 1,115,728 | 1,050,782 | 962,873 | 853,919 | 782,368 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.1.4 continued: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| High Plains Water District | | | | | | | | | | | | | | |
|-----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---|----|----|----|----|----|
| Armstrong | 1,073 | 1,262 | 2,017 | 1,891 | 1,781 | 1,641 | 1,291 | 1,050 | 2 | 6 | 9 | 11 | 14 | 15 |
| Potter | 149 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 4 | 7 | 10 | 13 | 15 |
| Randall | 26,175 | 32,084 | 33,571 | 31,504 | 28,589 | 25,322 | 21,657 | 19,554 | 3 | 8 | 12 | 16 | 19 | 21 |
| District Total | 27,397 | 33,349 | 35,591 | 33,399 | 30,374 | 26,966 | 22,951 | 20,607 | | | | | | |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 240 | 18,432 | 19,581 | 17,637 | 14,563 | 11,140 | 7,448 | 5,236 | 5 | 12 | 18 | 22 | 24 | 24 |
| Hutchinson | 5,643 | 18,853 | 16,492 | 14,432 | 13,390 | 12,973 | 13,170 | 14,395 | 6 | 16 | 25 | 34 | 44 | 51 |
| Moore | 2,237 | 8,167 | 8,956 | 8,597 | 7,612 | 6,185 | 4,530 | 3,584 | 5 | 11 | 15 | 18 | 20 | 21 |
| Oldham | 13,775 | 40,879 | 44,720 | 40,191 | 33,473 | 26,065 | 18,397 | 15,907 | 3 | 7 | 10 | 12 | 13 | 14 |
| Randall | 18,039 | 23,890 | 24,894 | 23,944 | 21,952 | 19,504 | 16,550 | 14,684 | 3 | 8 | 12 | 16 | 19 | 21 |
| Total | 39,934 | 110,221 | 114,643 | 104,801 | 90,990 | 75,867 | 60,095 | 53,806 | | | | | | |
| GMA-1 Total | 1,875,400 | 3,147,166 | 3,553,874 | 3,230,200 | 2,931,681 | 2,600,152 | 2,229,969 | 2,020,779 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.1.5: Available groundwater and average drawdown in the Dockum Aquifer for the counties comprising GMA-1.

| Dockum | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------------|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------|------|------|------|------|------|
| County | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 2,755 | 13,955 | 13,952 | 13,909 | 13,945 | 13,906 | 13,905 | 13,905 | 30 | 76 | 117 | 154 | 192 | 213 |
| Hartley | 1,793 | 12,807 | 11,405 | 10,555 | 10,345 | 10,352 | 10,681 | 11,104 | 21 | 50 | 76 | 99 | 126 | 142 |
| Moore | 1,604 | 4,972 | 4,719 | 4,442 | 4,416 | 4,330 | 4,177 | 4,076 | 9 | 21 | 31 | 39 | 48 | 52 |
| Sherman | 484 | 125 | 125 | 124 | 125 | 124 | 90 | 85 | 16 | 36 | 51 | 62 | 70 | 73 |
| District Total | 6,636 | 31,859 | 30,201 | 29,030 | 28,831 | 28,712 | 28,853 | 29,170 | | | | | | |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 138 | 7,858 | 9,906 | 12,495 | 13,315 | 13,442 | 13,152 | 12,842 | 5 | 14 | 23 | 30 | 39 | 44 |
| Carson | 29 | 73 | 94 | 150 | 194 | 235 | 282 | 313 | 7 | 16 | 25 | 33 | 41 | 45 |
| Potter | 914 | 44,474 | 54,040 | 54,323 | 51,441 | 47,922 | 43,830 | 41,202 | 5 | 14 | 22 | 29 | 37 | 42 |
| District Total | 1,081 | 52,405 | 64,040 | 66,968 | 64,950 | 61,599 | 57,264 | 54,357 | | | | | | |
| High Plains Water District | | | | | | | | | | | | | | |
| Armstrong | 33 | 100 | 57 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 9 | 15 | 22 | 26 |
| Potter | 434 | 17 | 12 | 0 | 0 | 0 | 0 | 0 | 3 | 11 | 20 | 30 | 40 | 47 |
| Randall | 1,597 | 945 | 1,317 | 1,628 | 1,777 | 1,866 | 1,937 | 1,973 | 7 | 15 | 22 | 29 | 37 | 41 |
| District Total | 2,064 | 1,062 | 1,386 | 1,628 | 1,777 | 1,866 | 1,937 | 1,973 | | | | | | |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 226 | 44,750 | 45,955 | 46,482 | 46,751 | 46,518 | 46,138 | 45,697 | 10 | 30 | 49 | 68 | 89 | 103 |
| Moore | 0 | 242 | 440 | 603 | 545 | 533 | 522 | 505 | 5 | 13 | 20 | 25 | 31 | 34 |
| Oldham | 1,128 | 254,584 | 295,905 | 294,702 | 276,446 | 254,367 | 228,150 | 212,059 | 9 | 27 | 45 | 60 | 77 | 86 |
| Randall | 1,006 | 9,875 | 14,074 | 17,659 | 18,658 | 18,753 | 18,448 | 18,054 | 8 | 19 | 29 | 38 | 47 | 53 |
| Total | 2,360 | 309,451 | 356,374 | 359,446 | 342,400 | 320,171 | 293,258 | 276,315 | | | | | | |
| GMA-1 Total | 12,141 | 394,777 | 452,001 | 457,072 | 437,958 | 412,348 | 381,312 | 361,815 | | | | | | |

Table 2016.1.6: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala County | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------|-----------------------------|-------------|-------------|------------|------------|------------|------------|------------|------------------------------|------|------|------|------|
| | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD | | | | | | | | | | | | | |
| Dallam | 14,671,925 | 13,780,883 | 12,194,040 | 9,810,080 | 8,033,504 | 6,810,347 | 6,004,835 | 5,788,831 | 0.83 | 0.67 | 0.55 | 0.46 | 0.41 |
| Hansford | 23,999,740 | 23,499,747 | 22,254,715 | 19,723,282 | 17,226,621 | 14,796,746 | 11,980,003 | 10,161,126 | 0.93 | 0.82 | 0.72 | 0.62 | 0.50 |
| Hartley | 16,109,356 | 14,899,515 | 12,934,107 | 10,351,058 | 8,422,630 | 7,086,251 | 6,206,509 | 5,986,101 | 0.80 | 0.64 | 0.52 | 0.44 | 0.39 |
| Hutchinson | 6,283,204 | 6,138,287 | 5,856,123 | 5,224,580 | 4,564,721 | 3,918,708 | 3,183,164 | 2,722,310 | 0.93 | 0.83 | 0.73 | 0.62 | 0.51 |
| Lipscomb | 17,979,150 | 17,880,482 | 16,931,538 | 14,901,331 | 13,006,665 | 11,179,281 | 9,040,585 | 7,636,013 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Moore | 9,531,217 | 9,010,018 | 8,062,275 | 6,603,459 | 5,452,417 | 4,616,974 | 3,997,846 | 3,782,025 | 0.85 | 0.69 | 0.57 | 0.48 | 0.42 |
| Ochiltree | 20,588,713 | 20,348,826 | 19,354,815 | 17,157,193 | 14,993,048 | 12,862,742 | 10,345,519 | 8,686,066 | 0.94 | 0.83 | 0.73 | 0.62 | 0.50 |
| Sherman | 17,946,388 | 17,048,100 | 15,409,446 | 12,431,301 | 10,107,130 | 8,413,865 | 7,138,841 | 6,673,077 | 0.86 | 0.69 | 0.56 | 0.47 | 0.40 |
| District Total | 127,109,693 | 122,605,858 | 112,997,059 | 96,202,284 | 81,806,736 | 69,684,914 | 57,897,302 | 51,435,549 | 0.89 | 0.76 | 0.64 | 0.55 | 0.46 |
| Hemphill County UWCD | | | | | | | | | | | | | |
| Hemphill | 15,434,318 | 15,372,022 | 15,048,787 | 14,346,870 | 13,653,101 | 12,988,228 | 12,233,445 | 11,757,736 | 0.98 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | | | | | | | | | | | | | |
| Armstrong | 4,418,838 | 4,390,635 | 4,102,863 | 3,567,290 | 3,087,687 | 2,662,598 | 2,222,312 | 1,969,163 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| Carson | 14,900,617 | 14,533,317 | 13,644,490 | 11,910,848 | 10,329,770 | 8,924,001 | 7,469,828 | 6,634,766 | 0.92 | 0.80 | 0.69 | 0.60 | 0.50 |
| Donley | 4,372,716 | 4,295,059 | 4,022,028 | 3,503,564 | 3,038,977 | 2,634,834 | 2,226,949 | 1,998,735 | 0.92 | 0.80 | 0.69 | 0.60 | 0.51 |
| Gray | 13,723,357 | 13,607,295 | 12,765,177 | 11,144,748 | 9,666,519 | 8,347,311 | 6,971,036 | 6,172,961 | 0.93 | 0.81 | 0.70 | 0.61 | 0.51 |
| Hutchinson | 877,413 | 870,844 | 820,953 | 715,416 | 614,210 | 521,737 | 426,395 | 372,014 | 0.94 | 0.82 | 0.70 | 0.59 | 0.49 |
| Potter | 1,610,450 | 1,579,081 | 1,484,391 | 1,308,250 | 1,153,425 | 1,019,324 | 883,063 | 806,067 | 0.92 | 0.81 | 0.72 | 0.63 | 0.55 |
| Roberts | 29,922,260 | 29,671,432 | 27,858,680 | 24,288,565 | 20,980,065 | 17,981,566 | 14,809,145 | 12,946,618 | 0.93 | 0.81 | 0.70 | 0.60 | 0.49 |
| Wheeler | 7,039,568 | 7,014,771 | 6,519,137 | 5,638,114 | 4,855,500 | 4,154,476 | 3,418,004 | 2,986,946 | 0.93 | 0.80 | 0.69 | 0.59 | 0.49 |
| District Total | 76,865,219 | 75,962,434 | 71,217,719 | 62,076,795 | 53,726,153 | 46,245,847 | 38,426,732 | 33,887,270 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |

Table 2016.1.6 continued: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------------------|------|------|------|------|
| County | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| High Plains Water District | | | | | | | | | | | | | |
| Armstrong | 169,520 | 164,755 | 153,843 | 131,603 | 112,390 | 96,259 | 81,634 | 74,965 | 0.91 | 0.78 | 0.66 | 0.57 | 0.48 |
| Potter | 334,379 | 331,599 | 325,095 | 308,497 | 291,018 | 274,087 | 255,490 | 244,401 | 0.97 | 0.92 | 0.87 | 0.82 | 0.76 |
| Randall | 2,570,085 | 2,523,203 | 2,402,984 | 2,158,018 | 1,935,396 | 1,745,808 | 1,564,414 | 1,468,339 | 0.93 | 0.84 | 0.75 | 0.68 | 0.61 |
| District Total | 3,073,984 | 3,019,557 | 2,881,922 | 2,598,118 | 2,338,804 | 2,116,154 | 1,901,538 | 1,787,705 | 0.94 | 0.85 | 0.76 | 0.69 | 0.62 |
| No GCD | | | | | | | | | | | | | |
| Hartley | 908,097 | 899,854 | 801,450 | 638,283 | 518,099 | 437,983 | 388,074 | 377,474 | 0.88 | 0.70 | 0.57 | 0.48 | 0.43 |
| Hutchinson | 3,937,385 | 3,879,960 | 3,676,579 | 3,241,341 | 2,810,386 | 2,400,961 | 1,946,584 | 1,669,518 | 0.93 | 0.82 | 0.71 | 0.61 | 0.49 |
| Moore | 492,564 | 478,653 | 428,075 | 344,609 | 285,123 | 244,720 | 216,937 | 208,673 | 0.87 | 0.70 | 0.58 | 0.50 | 0.44 |
| Oldham | 2,031,746 | 1,998,077 | 1,813,777 | 1,509,899 | 1,284,628 | 1,135,291 | 1,045,112 | 1,019,117 | 0.89 | 0.74 | 0.63 | 0.56 | 0.51 |
| Randall | 2,265,938 | 2,221,861 | 2,118,839 | 1,919,705 | 1,738,421 | 1,579,275 | 1,418,303 | 1,328,893 | 0.94 | 0.85 | 0.77 | 0.70 | 0.63 |
| Total | 9,635,730 | 9,478,405 | 8,838,720 | 7,653,837 | 6,636,657 | 5,798,230 | 5,015,010 | 4,603,675 | 0.92 | 0.79 | 0.69 | 0.60 | 0.52 |
| GMA-1 Total | 232,118,944 | 226,438,276 | 210,984,207 | 182,877,904 | 158,161,451 | 136,833,373 | 115,474,027 | 103,471,935 | 0.91 | 0.79 | 0.68 | 0.59 | 0.50 |

Table 2016.2.1: Groundwater in storage and fraction remaining by zone for the Ogallala Aquifer in GMA-1.

| Ogallala Zone | Groundwater In Storage (af) | | | | | | | Fraction Remaining from 2012 | | | | |
|-------------------------|-----------------------------|------------|------------|------------|------------|------------|------------|------------------------------|------|------|------|------|
| | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD - West | 58,258,886 | 54,721,246 | 48,547,547 | 39,061,115 | 31,768,513 | 26,549,871 | 22,822,249 | 0.83 | 0.67 | 0.55 | 0.46 | 0.39 |
| North Plains GCD - East | 68,850,807 | 67,867,342 | 64,397,191 | 57,006,381 | 49,791,027 | 42,757,393 | 34,549,107 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Hemphill County UWCD | 15,434,318 | 15,372,022 | 15,048,240 | 14,345,671 | 13,651,680 | 12,986,712 | 12,231,878 | 0.97 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | 76,865,219 | 75,959,418 | 71,199,970 | 62,041,186 | 53,681,569 | 46,195,501 | 38,370,632 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| High Plains UWCD No. 1 | 3,073,984 | 3,018,303 | 2,879,354 | 2,593,481 | 2,331,406 | 2,103,911 | 1,881,662 | 0.94 | 0.84 | 0.76 | 0.68 | 0.61 |
| No GCD | 9,635,730 | 9,472,283 | 8,820,458 | 7,615,092 | 6,577,161 | 5,715,745 | 4,901,652 | 0.92 | 0.79 | 0.68 | 0.59 | 0.51 |

Table 2016.2.2: Fraction remaining by zone for the Dockum Aquifer in GMA-1.

| Zone | Fraction Remaining from 2012 | | | | |
|-------------------------|------------------------------|------|------|------|------|
| | 2020 | 2030 | 2040 | 2050 | 2062 |
| North Plains GCD - West | 0.90 | 0.75 | 0.62 | 0.51 | 0.40 |
| Panhandle GCD | 0.91 | 0.78 | 0.68 | 0.59 | 0.50 |
| High Plains UWCD No. 1 | 0.88 | 0.77 | 0.67 | 0.59 | 0.50 |
| No GCD | 0.90 | 0.78 | 0.67 | 0.59 | 0.50 |

Table 2016.2.3: Available groundwater and average drawdown in the Rita Blanca Aquifer for the Dallam County in GMA-1.

| Rita Blanca County | Available Groundwater (afy) | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-----------------------|------|------|------|------|------|
| | 2015 ¹ | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| Dallam | 6,197 | 6,207 | 6,197 | 6,177 | 6,145 | 6,151 | 5,914 | 13 | 27 | 39 | 47 | 53 | 57 |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.2.4: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| Ogallala | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------|-----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|------|------|------|------|------|
| County | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 312,426 | 400,754 | 390,609 | 288,941 | 229,601 | 170,226 | 104,708 | 71,048 | 15 | 30 | 41 | 49 | 54 | 56 |
| Hansford | 169,191 | 276,822 | 275,769 | 272,655 | 271,968 | 270,280 | 269,478 | 269,128 | 17 | 41 | 66 | 89 | 116 | 134 |
| Hartley | 353,403 | 450,899 | 400,792 | 273,444 | 215,857 | 157,979 | 94,199 | 61,301 | 20 | 37 | 50 | 59 | 65 | 66 |
| Hutchinson | 59,153 | 74,151 | 62,975 | 64,522 | 65,831 | 66,075 | 65,956 | 64,791 | 13 | 33 | 53 | 73 | 95 | 110 |
| Lipscomb | 39,006 | 55,112 | 267,540 | 266,710 | 267,370 | 266,591 | 266,556 | 266,547 | 12 | 34 | 55 | 75 | 99 | 115 |
| Moore | 167,811 | 235,482 | 215,441 | 172,621 | 139,709 | 105,042 | 67,695 | 47,491 | 20 | 41 | 57 | 69 | 77 | 80 |
| Ochiltree | 84,963 | 115,225 | 244,446 | 243,931 | 244,670 | 244,050 | 244,085 | 244,094 | 13 | 37 | 61 | 84 | 112 | 130 |
| Sherman | 288,843 | 364,947 | 399,146 | 348,920 | 282,538 | 212,885 | 136,920 | 93,946 | 24 | 53 | 75 | 91 | 104 | 108 |
| District Total | 1,474,796 | 1,973,392 | 2,256,718 | 1,931,744 | 1,717,544 | 1,493,128 | 1,249,597 | 1,118,346 | | | | | | |
| Hemphill County UWCD | | | | | | | | | | | | | | |
| Hemphill | 21,935 | 55,302 | 54,761 | 54,640 | 54,815 | 54,684 | 54,701 | 54,709 | 4 | 11 | 18 | 25 | 33 | 38 |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 7,495 | 57,976 | 58,602 | 53,821 | 48,652 | 43,762 | 38,349 | 35,065 | 6 | 16 | 26 | 34 | 42 | 47 |
| Carson | 129,825 | 181,423 | 192,719 | 184,317 | 170,443 | 153,808 | 134,089 | 121,481 | 12 | 29 | 44 | 57 | 71 | 79 |
| Donley | 39,491 | 70,819 | 76,925 | 78,237 | 74,944 | 69,493 | 62,383 | 57,704 | 5 | 14 | 21 | 27 | 33 | 37 |
| Gray | 41,540 | 171,664 | 182,087 | 175,968 | 163,729 | 149,267 | 132,280 | 121,649 | 9 | 25 | 40 | 53 | 66 | 74 |
| Hutchinson | 74 | 10,106 | 15,777 | 16,740 | 15,197 | 13,324 | 11,454 | 10,171 | 14 | 41 | 67 | 91 | 115 | 129 |
| Potter | 7,789 | 16,399 | 17,742 | 16,538 | 15,141 | 13,791 | 12,205 | 11,216 | 3 | 7 | 11 | 14 | 17 | 19 |
| Roberts | 79,284 | 359,716 | 431,798 | 455,129 | 428,388 | 390,246 | 342,747 | 311,054 | 20 | 55 | 87 | 117 | 148 | 166 |
| Wheeler | 13,711 | 116,334 | 133,554 | 141,727 | 140,359 | 134,609 | 125,426 | 119,017 | 9 | 23 | 36 | 47 | 59 | 66 |
| District Total | 319,209 | 984,437 | 1,109,204 | 1,122,477 | 1,056,853 | 968,300 | 858,933 | 787,357 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.2.4 continued: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| High Plains Water District | | | | | | | | | | | | | | |
|-----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---|----|----|----|----|----|
| Armstrong | 1,202 | 1,416 | 2,206 | 2,058 | 1,921 | 1,781 | 1,547 | 1,320 | 3 | 6 | 9 | 12 | 15 | 16 |
| Potter | 149 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 4 | 7 | 10 | 13 | 15 |
| Randall | 26,384 | 32,126 | 33,612 | 31,531 | 28,609 | 25,338 | 21,669 | 19,565 | 3 | 8 | 12 | 16 | 19 | 21 |
| District Total | 27,735 | 33,545 | 35,821 | 33,593 | 30,534 | 27,122 | 23,219 | 20,888 | | | | | | |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 240 | 19,027 | 20,442 | 18,744 | 15,874 | 12,548 | 8,677 | 6,182 | 5 | 13 | 19 | 23 | 25 | 26 |
| Hutchinson | 5,643 | 19,203 | 17,190 | 15,352 | 14,243 | 13,792 | 13,909 | 15,059 | 6 | 16 | 25 | 35 | 45 | 51 |
| Moore | 2,287 | 8,733 | 9,577 | 9,184 | 8,125 | 6,636 | 4,907 | 3,903 | 5 | 11 | 16 | 19 | 21 | 22 |
| Oldham | 15,466 | 42,643 | 47,439 | 43,216 | 36,618 | 29,576 | 22,202 | 19,137 | 3 | 7 | 11 | 13 | 14 | 15 |
| Randall | 18,143 | 23,890 | 24,894 | 23,950 | 21,969 | 19,529 | 16,578 | 14,711 | 3 | 8 | 12 | 16 | 19 | 21 |
| Total | 41,779 | 113,496 | 119,542 | 110,446 | 96,829 | 82,081 | 66,273 | 58,992 | | | | | | |
| GMA-1 Total | 1,885,454 | 3,160,172 | 3,576,046 | 3,252,900 | 2,956,575 | 2,625,315 | 2,252,723 | 2,040,292 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.2.5: Available groundwater and average drawdown in the Dockum Aquifer for the counties comprising GMA-1.

| Dockum County | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------------|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------|------|------|------|------|------|
| | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 2,755 | 13,955 | 13,952 | 13,909 | 13,945 | 13,906 | 13,905 | 13,905 | 30 | 77 | 118 | 154 | 192 | 214 |
| Hartley | 1,793 | 12,807 | 11,405 | 10,555 | 10,345 | 10,352 | 10,681 | 11,104 | 21 | 50 | 76 | 100 | 126 | 143 |
| Moore | 1,604 | 4,972 | 4,719 | 4,442 | 4,416 | 4,330 | 4,177 | 4,076 | 9 | 21 | 31 | 39 | 48 | 52 |
| Sherman | 484 | 125 | 125 | 124 | 125 | 124 | 90 | 85 | 16 | 36 | 51 | 62 | 71 | 74 |
| District Total | 6,636 | 31,859 | 30,201 | 29,030 | 28,831 | 28,712 | 28,853 | 29,170 | | | | | | |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 138 | 7,858 | 9,930 | 12,545 | 13,372 | 13,497 | 13,204 | 12,893 | 5 | 14 | 23 | 30 | 39 | 44 |
| Carson | 29 | 73 | 94 | 150 | 194 | 235 | 282 | 313 | 7 | 16 | 25 | 33 | 41 | 45 |
| Potter | 914 | 44,483 | 54,049 | 54,330 | 51,447 | 47,927 | 43,833 | 41,205 | 5 | 14 | 22 | 29 | 37 | 42 |
| District Total | 1,081 | 52,414 | 64,073 | 67,025 | 65,013 | 61,659 | 57,319 | 54,411 | | | | | | |
| High Plains Water District | | | | | | | | | | | | | | |
| Armstrong | 33 | 100 | 57 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 9 | 15 | 22 | 26 |
| Potter | 434 | 17 | 12 | 0 | 0 | 0 | 0 | 0 | 3 | 11 | 20 | 30 | 40 | 47 |
| Randall | 1,597 | 945 | 1,317 | 1,628 | 1,777 | 1,866 | 1,937 | 1,973 | 7 | 15 | 22 | 29 | 37 | 41 |
| District Total | 2,064 | 1,062 | 1,386 | 1,628 | 1,777 | 1,866 | 1,937 | 1,973 | | | | | | |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 226 | 44,750 | 45,955 | 46,482 | 46,751 | 46,518 | 46,138 | 45,697 | 10 | 30 | 49 | 68 | 89 | 103 |
| Moore | 0 | 242 | 440 | 604 | 559 | 534 | 522 | 505 | 5 | 13 | 20 | 26 | 31 | 34 |
| Oldham | 1,128 | 254,610 | 295,931 | 294,725 | 276,465 | 254,382 | 228,161 | 212,069 | 9 | 27 | 45 | 60 | 77 | 87 |
| Randall | 1,006 | 9,875 | 14,074 | 17,659 | 18,658 | 18,753 | 18,448 | 18,054 | 8 | 19 | 29 | 38 | 47 | 53 |
| Total | 2,360 | 309,477 | 356,400 | 359,470 | 342,433 | 320,187 | 293,269 | 276,325 | | | | | | |
| GMA-1 Total | 12,141 | 394,812 | 452,060 | 457,153 | 438,054 | 412,424 | 381,378 | 361,879 | | | | | | |

Table 2016.2.6: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala County | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------|-----------------------------|-------------|-------------|------------|------------|------------|------------|------------|------------------------------|------|------|------|------|
| | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD | | | | | | | | | | | | | |
| Dallam | 14,671,925 | 13,764,050 | 12,148,396 | 9,699,361 | 7,839,988 | 6,528,591 | 5,633,248 | 5,373,455 | 0.83 | 0.66 | 0.53 | 0.44 | 0.38 |
| Hansford | 23,999,740 | 23,499,747 | 22,254,715 | 19,723,282 | 17,226,621 | 14,796,740 | 11,979,998 | 10,161,110 | 0.93 | 0.82 | 0.72 | 0.62 | 0.50 |
| Hartley | 16,109,356 | 14,899,163 | 12,928,123 | 10,329,793 | 8,375,696 | 7,004,810 | 6,080,714 | 5,834,322 | 0.80 | 0.64 | 0.52 | 0.43 | 0.38 |
| Hutchinson | 6,283,204 | 6,138,287 | 5,856,123 | 5,224,575 | 4,564,693 | 3,918,630 | 3,183,018 | 2,722,128 | 0.93 | 0.83 | 0.73 | 0.62 | 0.51 |
| Lipscomb | 17,979,150 | 17,880,482 | 16,931,538 | 14,901,331 | 13,006,665 | 11,179,281 | 9,040,573 | 7,635,996 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Moore | 9,531,217 | 9,010,017 | 8,062,150 | 6,602,935 | 5,451,228 | 4,614,515 | 3,992,825 | 3,774,728 | 0.85 | 0.69 | 0.57 | 0.48 | 0.42 |
| Ochiltree | 20,588,713 | 20,348,826 | 19,354,815 | 17,157,193 | 14,993,048 | 12,862,742 | 10,345,518 | 8,686,064 | 0.94 | 0.83 | 0.73 | 0.62 | 0.50 |
| Sherman | 17,946,388 | 17,048,016 | 15,408,878 | 12,429,026 | 10,101,601 | 8,401,955 | 7,115,462 | 6,641,657 | 0.86 | 0.69 | 0.56 | 0.47 | 0.40 |
| District Total | 127,109,693 | 122,588,588 | 112,944,738 | 96,067,496 | 81,559,540 | 69,307,264 | 57,371,356 | 50,829,460 | 0.89 | 0.76 | 0.64 | 0.55 | 0.45 |
| Hemphill County UWCD | | | | | | | | | | | | | |
| Hemphill | 15,434,318 | 15,372,022 | 15,048,240 | 14,345,671 | 13,651,680 | 12,986,712 | 12,231,878 | 11,756,148 | 0.97 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | | | | | | | | | | | | | |
| Armstrong | 4,418,838 | 4,390,635 | 4,102,032 | 3,565,672 | 3,085,617 | 2,660,203 | 2,219,437 | 1,965,778 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| Carson | 14,900,617 | 14,533,005 | 13,644,098 | 11,910,402 | 10,329,280 | 8,923,466 | 7,469,229 | 6,634,134 | 0.92 | 0.80 | 0.69 | 0.60 | 0.50 |
| Donley | 4,372,716 | 4,295,022 | 4,017,354 | 3,494,304 | 3,027,511 | 2,622,148 | 2,213,257 | 1,984,546 | 0.92 | 0.80 | 0.69 | 0.60 | 0.51 |
| Gray | 13,723,357 | 13,607,295 | 12,764,116 | 11,141,318 | 9,661,809 | 8,341,900 | 6,965,264 | 6,166,983 | 0.93 | 0.81 | 0.70 | 0.61 | 0.51 |
| Hutchinson | 877,413 | 870,844 | 820,948 | 715,369 | 614,095 | 521,569 | 426,200 | 371,818 | 0.94 | 0.82 | 0.70 | 0.59 | 0.49 |
| Potter | 1,610,450 | 1,576,900 | 1,480,355 | 1,302,786 | 1,147,444 | 1,013,074 | 876,655 | 799,650 | 0.92 | 0.81 | 0.71 | 0.63 | 0.54 |
| Roberts | 29,922,260 | 29,671,432 | 27,858,680 | 24,288,555 | 20,980,020 | 17,981,436 | 14,808,901 | 12,946,272 | 0.93 | 0.81 | 0.70 | 0.60 | 0.49 |
| Wheeler | 7,039,568 | 7,014,285 | 6,512,387 | 5,622,780 | 4,835,793 | 4,131,705 | 3,391,689 | 2,957,511 | 0.93 | 0.80 | 0.69 | 0.59 | 0.48 |
| District Total | 76,865,219 | 75,959,418 | 71,199,970 | 62,041,186 | 53,681,569 | 46,195,501 | 38,370,632 | 33,826,692 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |

Table 2016.2.6 continued: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------------------|------|------|------|------|
| County | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| High Plains Water District | | | | | | | | | | | | | |
| Armstrong | 169,520 | 164,173 | 152,211 | 128,334 | 107,716 | 90,056 | 72,936 | 64,769 | 0.90 | 0.76 | 0.64 | 0.53 | 0.43 |
| Potter | 334,379 | 331,599 | 325,087 | 308,468 | 290,968 | 274,000 | 255,215 | 243,982 | 0.97 | 0.92 | 0.87 | 0.82 | 0.76 |
| Randall | 2,570,085 | 2,522,531 | 2,402,056 | 2,156,679 | 1,932,722 | 1,739,855 | 1,553,511 | 1,454,653 | 0.93 | 0.84 | 0.75 | 0.68 | 0.60 |
| District Total | 3,073,984 | 3,018,303 | 2,879,354 | 2,593,481 | 2,331,406 | 2,103,911 | 1,881,662 | 1,763,404 | 0.94 | 0.84 | 0.76 | 0.68 | 0.61 |
| No GCD | | | | | | | | | | | | | |
| Hartley | 908,097 | 899,854 | 799,197 | 631,298 | 505,285 | 418,444 | 361,687 | 349,020 | 0.88 | 0.70 | 0.56 | 0.46 | 0.40 |
| Hutchinson | 3,937,385 | 3,879,951 | 3,675,073 | 3,237,360 | 2,805,525 | 2,395,675 | 1,941,070 | 1,664,051 | 0.93 | 0.82 | 0.71 | 0.61 | 0.49 |
| Moore | 492,564 | 478,587 | 425,905 | 339,625 | 278,356 | 236,722 | 208,198 | 199,905 | 0.86 | 0.69 | 0.57 | 0.48 | 0.42 |
| Oldham | 2,031,746 | 1,992,342 | 1,801,739 | 1,487,419 | 1,249,965 | 1,086,120 | 973,034 | 934,961 | 0.89 | 0.73 | 0.62 | 0.53 | 0.48 |
| Randall | 2,265,938 | 2,221,549 | 2,118,544 | 1,919,390 | 1,738,030 | 1,578,784 | 1,417,663 | 1,328,153 | 0.93 | 0.85 | 0.77 | 0.70 | 0.63 |
| Total | 9,635,730 | 9,472,283 | 8,820,458 | 7,615,092 | 6,577,161 | 5,715,745 | 4,901,652 | 4,476,090 | 0.92 | 0.79 | 0.68 | 0.59 | 0.51 |
| GMA-1 Total | 232,118,944 | 226,410,614 | 210,892,760 | 182,662,926 | 157,801,356 | 136,309,133 | 114,757,180 | 102,651,794 | 0.91 | 0.79 | 0.68 | 0.59 | 0.49 |

Table 2016.3.1: Groundwater in storage and fraction remaining by zone for the Ogallala Aquifer in GMA-1.

| Ogallala Zone | Groundwater In Storage (af) | | | | | | | Fraction Remaining from 2012 | | | | |
|-------------------------|-----------------------------|------------|------------|------------|------------|------------|------------|------------------------------|------|------|------|------|
| | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD - West | 58,258,886 | 54,738,516 | 48,599,868 | 39,195,913 | 32,015,731 | 26,927,539 | 23,348,222 | 0.84 | 0.67 | 0.55 | 0.46 | 0.40 |
| North Plains GCD - East | 68,850,807 | 67,867,342 | 64,397,191 | 57,006,386 | 49,791,055 | 42,757,477 | 34,549,271 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Hemphill County UWCD | 15,434,318 | 15,372,022 | 15,048,787 | 14,346,870 | 13,653,101 | 12,988,228 | 12,233,445 | 0.98 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | 76,865,219 | 75,962,434 | 71,218,291 | 62,079,619 | 53,732,171 | 46,255,837 | 38,442,249 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| High Plains UWCD No. 1 | 3,073,984 | 3,019,557 | 2,881,872 | 2,597,740 | 2,337,910 | 2,114,689 | 1,899,473 | 0.94 | 0.84 | 0.76 | 0.69 | 0.62 |
| No GCD | 9,635,730 | 9,478,405 | 8,838,971 | 7,655,950 | 6,642,307 | 5,808,592 | 5,031,994 | 0.92 | 0.79 | 0.69 | 0.60 | 0.53 |

Table 2016.3.2: Fraction remaining by zone for the Dockum Aquifer in GMA-1.

| Zone | Fraction Remaining from 2012 | | | | |
|-------------------------|------------------------------|------|------|------|------|
| | 2020 | 2030 | 2040 | 2050 | 2062 |
| North Plains GCD - West | 0.90 | 0.75 | 0.63 | 0.52 | 0.41 |
| Panhandle GCD | 0.93 | 0.82 | 0.72 | 0.65 | 0.57 |
| High Plains UWCD No. 1 | 0.86 | 0.72 | 0.60 | 0.51 | 0.42 |
| No GCD | 0.94 | 0.86 | 0.79 | 0.74 | 0.68 |

Table 2016.3.3: Available groundwater and average drawdown in the Rita Blanca Aquifer for the Dallam County in GMA-1.

| Rita Blanca County | Available Groundwater (afy) | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-----------------------|------|------|------|------|------|
| | 2015 ¹ | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| Dallam | 6,197 | 6,207 | 6,197 | 6,177 | 6,145 | 6,151 | 5,914 | 13 | 27 | 39 | 47 | 53 | 57 |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.3.4: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| Ogallala | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------|-----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|------|------|------|------|------|
| County | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 305,394 | 395,833 | 382,326 | 281,008 | 220,018 | 160,754 | 97,119 | 65,050 | 15 | 29 | 40 | 47 | 52 | 54 |
| Hansford | 169,191 | 276,822 | 275,769 | 272,655 | 271,968 | 270,280 | 269,478 | 269,128 | 17 | 41 | 66 | 89 | 116 | 134 |
| Hartley | 353,307 | 450,493 | 398,675 | 271,523 | 212,904 | 154,435 | 90,846 | 58,544 | 20 | 37 | 49 | 58 | 64 | 65 |
| Hutchinson | 59,153 | 74,151 | 62,975 | 64,522 | 65,831 | 66,075 | 65,956 | 64,791 | 13 | 33 | 53 | 73 | 95 | 110 |
| Lipscomb | 39,006 | 55,112 | 267,540 | 266,710 | 267,370 | 266,591 | 266,556 | 266,546 | 12 | 34 | 55 | 75 | 99 | 115 |
| Moore | 167,811 | 235,480 | 215,441 | 172,620 | 139,703 | 105,016 | 67,650 | 47,446 | 20 | 41 | 57 | 69 | 77 | 80 |
| Ochiltree | 84,963 | 115,225 | 244,446 | 243,931 | 244,670 | 244,050 | 244,085 | 244,094 | 13 | 37 | 61 | 84 | 112 | 130 |
| Sherman | 288,843 | 364,947 | 399,146 | 348,894 | 282,462 | 212,744 | 136,775 | 93,843 | 24 | 53 | 75 | 91 | 104 | 108 |
| District Total | 1,467,668 | 1,968,063 | 2,246,318 | 1,921,863 | 1,704,926 | 1,479,945 | 1,238,465 | 1,109,442 | | | | | | |
| Hemphill County UWCD | | | | | | | | | | | | | | |
| Hemphill | 21,935 | 55,176 | 54,535 | 54,409 | 54,609 | 54,501 | 54,539 | 54,557 | 4 | 11 | 18 | 25 | 33 | 38 |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 7,495 | 57,669 | 58,142 | 53,413 | 48,302 | 43,461 | 38,080 | 34,782 | 6 | 16 | 25 | 34 | 42 | 47 |
| Carson | 129,714 | 181,368 | 192,661 | 184,263 | 170,395 | 153,767 | 134,054 | 121,448 | 12 | 29 | 44 | 57 | 71 | 79 |
| Donley | 39,476 | 69,404 | 75,012 | 76,288 | 73,162 | 67,872 | 60,901 | 56,275 | 5 | 13 | 21 | 27 | 33 | 37 |
| Gray | 41,540 | 171,475 | 181,601 | 175,267 | 163,099 | 148,713 | 131,744 | 121,136 | 9 | 25 | 40 | 53 | 66 | 74 |
| Hutchinson | 74 | 10,106 | 15,777 | 16,740 | 15,197 | 13,324 | 11,454 | 10,171 | 14 | 41 | 67 | 91 | 115 | 129 |
| Potter | 7,349 | 15,775 | 17,015 | 15,820 | 14,483 | 13,186 | 11,642 | 10,678 | 3 | 7 | 10 | 13 | 16 | 18 |
| Roberts | 79,284 | 359,716 | 431,798 | 455,129 | 428,388 | 390,246 | 342,747 | 311,054 | 20 | 55 | 87 | 117 | 148 | 166 |
| Wheeler | 13,534 | 114,844 | 130,782 | 138,810 | 137,761 | 132,311 | 123,308 | 116,837 | 8 | 23 | 35 | 47 | 59 | 66 |
| District Total | 318,466 | 980,357 | 1,102,788 | 1,115,730 | 1,050,787 | 962,880 | 853,930 | 782,381 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.3.4 continued: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| High Plains Water District | | | | | | | | | | | | | | |
|-----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---|----|----|----|----|----|
| Armstrong | 1,073 | 1,262 | 2,017 | 1,891 | 1,781 | 1,642 | 1,293 | 1,052 | 2 | 6 | 9 | 11 | 13 | 15 |
| Potter | 149 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 4 | 7 | 10 | 13 | 15 |
| Randall | 26,175 | 32,084 | 33,571 | 31,504 | 28,589 | 25,322 | 21,657 | 19,553 | 3 | 8 | 12 | 16 | 19 | 21 |
| District Total | 27,397 | 33,349 | 35,591 | 33,399 | 30,374 | 26,967 | 22,953 | 20,608 | | | | | | |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 240 | 18,432 | 19,581 | 17,638 | 14,566 | 11,147 | 7,457 | 5,246 | 5 | 12 | 18 | 22 | 24 | 24 |
| Hutchinson | 5,643 | 18,853 | 16,492 | 14,432 | 13,390 | 12,973 | 13,170 | 14,395 | 6 | 16 | 25 | 34 | 44 | 51 |
| Moore | 2,237 | 8,167 | 8,956 | 8,597 | 7,612 | 6,186 | 4,532 | 3,585 | 5 | 11 | 15 | 18 | 20 | 21 |
| Oldham | 13,775 | 40,879 | 44,721 | 40,203 | 33,517 | 26,224 | 18,628 | 16,173 | 3 | 7 | 10 | 12 | 13 | 14 |
| Randall | 18,039 | 23,890 | 24,894 | 23,944 | 21,952 | 19,504 | 16,550 | 14,684 | 3 | 8 | 12 | 16 | 19 | 21 |
| Total | 39,934 | 110,221 | 114,644 | 104,814 | 91,037 | 76,034 | 60,337 | 54,083 | | | | | | |
| GMA-1 Total | 1,875,400 | 3,147,166 | 3,553,876 | 3,230,215 | 2,931,733 | 2,600,327 | 2,230,224 | 2,021,071 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.3.5: Available groundwater and average drawdown in the Dockum Aquifer for the counties comprising GMA-1.

| Dockum County | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------------|-----------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|-----------------------|-----------|-----------|------------|------------|------------|
| | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 2,755 | 13,955 | 13,952 | 13,909 | 13,945 | 13,906 | 13,905 | 13,905 | 30 | 76 | 117 | 154 | 192 | 213 |
| Hartley | 1,793 | 12,807 | 11,405 | 10,555 | 10,345 | 10,352 | 10,681 | 11,104 | 21 | 50 | 76 | 99 | 126 | 142 |
| Moore | 1,604 | 4,972 | 4,719 | 4,442 | 4,416 | 4,330 | 4,177 | 4,076 | 9 | 21 | 31 | 39 | 47 | 52 |
| Sherman | 484 | 125 | 125 | 124 | 125 | 124 | 90 | 85 | 16 | 36 | 51 | 62 | 70 | 73 |
| District Total | 6,636 | 31,859 | 30,201 | 29,030 | 28,831 | 28,712 | 28,853 | 29,170 | 24 | 59 | 91 | 118 | 148 | 165 |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 138 | 5,658 | 7,150 | 9,023 | 9,614 | 9,704 | 9,493 | 9,270 | 5 | 13 | 20 | 27 | 34 | 38 |
| Carson | 29 | 53 | 68 | 108 | 140 | 169 | 203 | 225 | 6 | 15 | 23 | 30 | 37 | 42 |
| Potter | 914 | 32,021 | 38,909 | 39,112 | 37,037 | 34,504 | 31,557 | 29,665 | 4 | 10 | 16 | 21 | 26 | 29 |
| District Total | 1,081 | 37,732 | 46,127 | 48,243 | 46,791 | 44,377 | 41,253 | 39,160 | 4 | 11 | 18 | 24 | 30 | 34 |
| High Plains Water District | | | | | | | | | | | | | | |
| Armstrong | 33 | 166 | 96 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 7 | 11 | 15 | 18 |
| Potter | 434 | 29 | 21 | 0 | 0 | 0 | 0 | 0 | 3 | 9 | 16 | 24 | 32 | 37 |
| Randall | 1,597 | 1,575 | 2,195 | 2,714 | 2,961 | 3,111 | 3,228 | 3,289 | 9 | 19 | 28 | 36 | 44 | 49 |
| District Total | 2,064 | 1,770 | 2,312 | 2,714 | 2,961 | 3,111 | 3,228 | 3,289 | 8 | 16 | 24 | 32 | 40 | 44 |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 226 | 42,620 | 43,766 | 44,269 | 44,525 | 44,303 | 43,941 | 43,521 | 9 | 27 | 44 | 59 | 78 | 89 |
| Moore | 0 | 230 | 419 | 575 | 528 | 509 | 497 | 481 | 5 | 13 | 19 | 25 | 30 | 33 |
| Oldham | 1,128 | 111,290 | 129,354 | 128,828 | 120,848 | 111,196 | 99,735 | 92,701 | 4 | 11 | 18 | 24 | 30 | 34 |
| Randall | 1,006 | 6,320 | 9,007 | 11,302 | 11,941 | 12,002 | 11,806 | 11,555 | 7 | 15 | 24 | 31 | 40 | 45 |
| Total | 2,360 | 160,460 | 182,546 | 184,974 | 177,842 | 168,010 | 155,979 | 148,258 | 5 | 14 | 22 | 30 | 38 | 42 |
| GMA-1 Total | 12,141 | 231,821 | 261,186 | 264,961 | 256,425 | 244,210 | 229,313 | 219,877 | | | | | | |

Table 2016.3.6: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala County | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------|-----------------------------|-------------|-------------|------------|------------|------------|------------|------------|------------------------------|------|------|------|------|
| | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD | | | | | | | | | | | | | |
| Dallam | 14,671,925 | 13,780,883 | 12,194,040 | 9,810,080 | 8,033,504 | 6,810,347 | 6,004,835 | 5,788,831 | 0.83 | 0.67 | 0.55 | 0.46 | 0.41 |
| Hansford | 23,999,740 | 23,499,747 | 22,254,715 | 19,723,282 | 17,226,621 | 14,796,746 | 11,980,003 | 10,161,126 | 0.93 | 0.82 | 0.72 | 0.62 | 0.50 |
| Hartley | 16,109,356 | 14,899,515 | 12,934,107 | 10,351,061 | 8,422,648 | 7,086,288 | 6,206,581 | 5,986,224 | 0.80 | 0.64 | 0.52 | 0.44 | 0.39 |
| Hutchinson | 6,283,204 | 6,138,287 | 5,856,123 | 5,224,580 | 4,564,721 | 3,918,708 | 3,183,164 | 2,722,310 | 0.93 | 0.83 | 0.73 | 0.62 | 0.51 |
| Lipscomb | 17,979,150 | 17,880,482 | 16,931,538 | 14,901,331 | 13,006,665 | 11,179,281 | 9,040,585 | 7,636,013 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Moore | 9,531,217 | 9,010,018 | 8,062,275 | 6,603,471 | 5,452,449 | 4,617,039 | 3,997,965 | 3,782,185 | 0.85 | 0.69 | 0.57 | 0.48 | 0.42 |
| Ochiltree | 20,588,713 | 20,348,826 | 19,354,815 | 17,157,193 | 14,993,048 | 12,862,742 | 10,345,519 | 8,686,066 | 0.94 | 0.83 | 0.73 | 0.62 | 0.50 |
| Sherman | 17,946,388 | 17,048,100 | 15,409,446 | 12,431,301 | 10,107,130 | 8,413,865 | 7,138,841 | 6,673,077 | 0.86 | 0.69 | 0.56 | 0.47 | 0.40 |
| District Total | 127,109,693 | 122,605,858 | 112,997,059 | 96,202,299 | 81,806,786 | 69,685,016 | 57,897,493 | 51,435,832 | 0.89 | 0.76 | 0.64 | 0.55 | 0.46 |
| Hemphill County UWCD | | | | | | | | | | | | | |
| Hemphill | 15,434,318 | 15,372,022 | 15,048,787 | 14,346,870 | 13,653,101 | 12,988,228 | 12,233,445 | 11,757,736 | 0.98 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | | | | | | | | | | | | | |
| Armstrong | 4,418,838 | 4,390,635 | 4,103,026 | 3,568,023 | 3,089,254 | 2,665,255 | 2,226,580 | 1,974,623 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| Carson | 14,900,617 | 14,533,317 | 13,644,675 | 11,911,925 | 10,332,170 | 8,928,035 | 7,476,079 | 6,642,627 | 0.92 | 0.80 | 0.69 | 0.60 | 0.50 |
| Donley | 4,372,716 | 4,295,059 | 4,022,028 | 3,503,564 | 3,038,977 | 2,634,834 | 2,226,949 | 1,998,735 | 0.92 | 0.80 | 0.69 | 0.60 | 0.51 |
| Gray | 13,723,357 | 13,607,295 | 12,765,177 | 11,144,748 | 9,666,519 | 8,347,311 | 6,971,036 | 6,172,961 | 0.93 | 0.81 | 0.70 | 0.61 | 0.51 |
| Hutchinson | 877,413 | 870,844 | 820,953 | 715,416 | 614,210 | 521,737 | 426,395 | 372,014 | 0.94 | 0.82 | 0.70 | 0.59 | 0.49 |
| Potter | 1,610,450 | 1,579,081 | 1,484,615 | 1,309,264 | 1,155,476 | 1,022,623 | 888,061 | 812,250 | 0.92 | 0.81 | 0.72 | 0.63 | 0.55 |
| Roberts | 29,922,260 | 29,671,432 | 27,858,680 | 24,288,565 | 20,980,065 | 17,981,566 | 14,809,145 | 12,946,618 | 0.93 | 0.81 | 0.70 | 0.60 | 0.49 |
| Wheeler | 7,039,568 | 7,014,771 | 6,519,137 | 5,638,114 | 4,855,500 | 4,154,476 | 3,418,004 | 2,986,946 | 0.93 | 0.80 | 0.69 | 0.59 | 0.49 |
| District Total | 76,865,219 | 75,962,434 | 71,218,291 | 62,079,619 | 53,732,171 | 46,255,837 | 38,442,249 | 33,906,774 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |

Table 2016.3.6 continued: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------------------|------|------|------|------|
| County | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| High Plains Water District | | | | | | | | | | | | | |
| Armstrong | 169,520 | 164,755 | 153,845 | 131,624 | 112,464 | 96,421 | 81,947 | 75,389 | 0.91 | 0.78 | 0.66 | 0.57 | 0.48 |
| Potter | 334,379 | 331,599 | 325,095 | 308,518 | 291,084 | 274,221 | 255,742 | 244,751 | 0.97 | 0.92 | 0.87 | 0.82 | 0.76 |
| Randall | 2,570,085 | 2,523,203 | 2,402,932 | 2,157,598 | 1,934,362 | 1,744,047 | 1,561,784 | 1,465,153 | 0.93 | 0.84 | 0.75 | 0.68 | 0.61 |
| District Total | 3,073,984 | 3,019,557 | 2,881,872 | 2,597,740 | 2,337,910 | 2,114,689 | 1,899,473 | 1,785,293 | 0.94 | 0.85 | 0.76 | 0.69 | 0.62 |
| No GCD | | | | | | | | | | | | | |
| Hartley | 908,097 | 899,854 | 801,455 | 638,349 | 518,300 | 438,394 | 388,811 | 378,477 | 0.88 | 0.70 | 0.57 | 0.48 | 0.43 |
| Hutchinson | 3,937,385 | 3,879,960 | 3,676,579 | 3,241,343 | 2,810,387 | 2,400,962 | 1,946,585 | 1,669,519 | 0.93 | 0.82 | 0.71 | 0.61 | 0.49 |
| Moore | 492,564 | 478,653 | 428,082 | 344,643 | 285,201 | 244,851 | 217,142 | 208,931 | 0.87 | 0.70 | 0.58 | 0.50 | 0.44 |
| Oldham | 2,031,746 | 1,998,077 | 1,813,905 | 1,511,073 | 1,287,946 | 1,141,430 | 1,055,119 | 1,032,206 | 0.89 | 0.74 | 0.63 | 0.56 | 0.52 |
| Randall | 2,265,938 | 2,221,861 | 2,118,950 | 1,920,542 | 1,740,473 | 1,582,955 | 1,424,337 | 1,336,679 | 0.94 | 0.85 | 0.77 | 0.70 | 0.63 |
| Total | 9,635,730 | 9,478,405 | 8,838,971 | 7,655,950 | 6,642,307 | 5,808,592 | 5,031,994 | 4,625,812 | 0.92 | 0.79 | 0.69 | 0.60 | 0.52 |
| GMA-1 Total | 232,118,944 | 226,438,276 | 210,984,980 | 182,882,478 | 158,172,275 | 136,852,362 | 115,504,654 | 103,511,447 | 0.91 | 0.79 | 0.68 | 0.59 | 0.50 |

Table 2016.4.1: Groundwater in storage and fraction remaining by zone for the Ogallala Aquifer in GMA-1.

| Ogallala Zone | Groundwater In Storage (af) | | | | | | | Fraction Remaining from 2012 | | | | |
|-------------------------|-----------------------------|------------|------------|------------|------------|------------|------------|------------------------------|------|------|------|------|
| | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD - West | 58,258,886 | 54,721,246 | 48,547,548 | 39,061,131 | 31,768,557 | 26,549,974 | 22,822,441 | 0.83 | 0.67 | 0.55 | 0.46 | 0.39 |
| North Plains GCD - East | 68,850,807 | 67,867,342 | 64,397,191 | 57,006,381 | 49,791,027 | 42,757,393 | 34,549,107 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Hemphill County UWCD | 15,434,318 | 15,372,022 | 15,048,240 | 14,345,671 | 13,651,680 | 12,986,712 | 12,231,878 | 0.97 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | 76,865,219 | 75,959,418 | 71,200,546 | 62,044,019 | 53,687,648 | 46,205,621 | 38,386,403 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| High Plains UWCD No. 1 | 3,073,984 | 3,018,303 | 2,879,308 | 2,593,107 | 2,330,509 | 2,102,457 | 1,879,642 | 0.94 | 0.84 | 0.76 | 0.68 | 0.61 |
| No GCD | 9,635,730 | 9,472,283 | 8,820,712 | 7,617,290 | 6,583,147 | 5,727,197 | 4,921,246 | 0.92 | 0.79 | 0.68 | 0.60 | 0.51 |

Table 2016.4.2: Fraction remaining by zone for the Dockum Aquifer in GMA-1.

| Zone | Fraction Remaining from 2012 | | | | |
|-------------------------|------------------------------|------|------|------|------|
| | 2020 | 2030 | 2040 | 2050 | 2062 |
| North Plains GCD - West | 0.90 | 0.75 | 0.62 | 0.51 | 0.40 |
| Panhandle GCD | 0.93 | 0.82 | 0.72 | 0.65 | 0.57 |
| High Plains UWCD No. 1 | 0.86 | 0.72 | 0.60 | 0.51 | 0.42 |
| No GCD | 0.94 | 0.86 | 0.79 | 0.73 | 0.68 |

Table 2016.4.3: Available groundwater and average drawdown in the Rita Blanca Aquifer for the Dallam County in GMA-1.

| Rita Blanca County | Available Groundwater (afy) | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------|-----------------------------|-------|-------|-------|-------|-------|-------|-----------------------|------|------|------|------|------|
| | 2015 ¹ | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| Dallam | 6,197 | 6,207 | 6,197 | 6,177 | 6,145 | 6,151 | 5,914 | 13 | 27 | 39 | 47 | 53 | 57 |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.4.4: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| Ogallala | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------|-----------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-----------------------|------|------|------|------|------|
| County | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 312,426 | 400,754 | 390,609 | 288,941 | 229,601 | 170,226 | 104,708 | 71,048 | 15 | 30 | 41 | 49 | 54 | 56 |
| Hansford | 169,191 | 276,822 | 275,769 | 272,655 | 271,968 | 270,280 | 269,478 | 269,128 | 17 | 41 | 66 | 89 | 116 | 134 |
| Hartley | 353,403 | 450,899 | 400,792 | 273,444 | 215,857 | 157,979 | 94,199 | 61,301 | 20 | 37 | 50 | 59 | 65 | 66 |
| Hutchinson | 59,153 | 74,151 | 62,975 | 64,522 | 65,831 | 66,075 | 65,956 | 64,791 | 13 | 33 | 53 | 73 | 95 | 110 |
| Lipscomb | 39,006 | 55,112 | 267,540 | 266,710 | 267,370 | 266,591 | 266,556 | 266,547 | 12 | 34 | 55 | 75 | 99 | 115 |
| Moore | 167,811 | 235,482 | 215,441 | 172,621 | 139,709 | 105,042 | 67,695 | 47,491 | 20 | 41 | 57 | 69 | 77 | 80 |
| Ochiltree | 84,963 | 115,225 | 244,446 | 243,931 | 244,670 | 244,050 | 244,085 | 244,094 | 13 | 37 | 61 | 84 | 112 | 130 |
| Sherman | 288,843 | 364,947 | 399,146 | 348,920 | 282,538 | 212,885 | 136,920 | 93,946 | 24 | 53 | 75 | 91 | 104 | 108 |
| District Total | 1,474,796 | 1,973,392 | 2,256,718 | 1,931,744 | 1,717,544 | 1,493,128 | 1,249,597 | 1,118,346 | | | | | | |
| Hemphill County UWCD | | | | | | | | | | | | | | |
| Hemphill | 21,935 | 55,302 | 54,761 | 54,640 | 54,815 | 54,684 | 54,701 | 54,709 | 4 | 11 | 18 | 25 | 33 | 38 |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 7,495 | 57,976 | 58,602 | 53,821 | 48,653 | 43,765 | 38,353 | 35,069 | 6 | 16 | 26 | 34 | 42 | 47 |
| Carson | 129,825 | 181,423 | 192,719 | 184,317 | 170,443 | 153,808 | 134,089 | 121,481 | 12 | 29 | 44 | 57 | 71 | 79 |
| Donley | 39,491 | 70,819 | 76,925 | 78,237 | 74,944 | 69,493 | 62,383 | 57,704 | 5 | 14 | 21 | 27 | 33 | 37 |
| Gray | 41,540 | 171,664 | 182,087 | 175,968 | 163,729 | 149,267 | 132,280 | 121,649 | 9 | 25 | 40 | 53 | 66 | 74 |
| Hutchinson | 74 | 10,106 | 15,777 | 16,740 | 15,197 | 13,324 | 11,454 | 10,171 | 14 | 41 | 67 | 91 | 115 | 129 |
| Potter | 7,789 | 16,399 | 17,742 | 16,538 | 15,142 | 13,794 | 12,209 | 11,220 | 3 | 7 | 10 | 14 | 17 | 18 |
| Roberts | 79,284 | 359,716 | 431,798 | 455,129 | 428,388 | 390,246 | 342,747 | 311,054 | 20 | 55 | 87 | 117 | 148 | 166 |
| Wheeler | 13,711 | 116,334 | 133,554 | 141,727 | 140,359 | 134,609 | 125,426 | 119,017 | 9 | 23 | 36 | 47 | 59 | 66 |
| District Total | 319,209 | 984,437 | 1,109,204 | 1,122,477 | 1,056,855 | 968,306 | 858,941 | 787,365 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.4.4 continued: Available groundwater and average drawdown in the Ogallala Aquifer for the counties comprising GMA-1.

| High Plains Water District | | | | | | | | | | | | | | |
|-----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|---|----|----|----|----|----|
| Armstrong | 1,202 | 1,416 | 2,206 | 2,059 | 1,922 | 1,784 | 1,553 | 1,327 | 3 | 6 | 9 | 12 | 15 | 16 |
| Potter | 149 | 3 | 3 | 4 | 4 | 3 | 3 | 3 | 2 | 4 | 7 | 10 | 13 | 15 |
| Randall | 26,384 | 32,126 | 33,612 | 31,531 | 28,609 | 25,338 | 21,669 | 19,565 | 3 | 8 | 12 | 16 | 20 | 21 |
| District Total | 27,735 | 33,545 | 35,821 | 33,594 | 30,535 | 27,125 | 23,225 | 20,895 | | | | | | |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 240 | 19,027 | 20,442 | 18,744 | 15,877 | 12,553 | 8,685 | 6,191 | 5 | 13 | 19 | 23 | 25 | 26 |
| Hutchinson | 5,643 | 19,203 | 17,190 | 15,352 | 14,243 | 13,792 | 13,909 | 15,059 | 6 | 16 | 25 | 35 | 45 | 51 |
| Moore | 2,287 | 8,733 | 9,577 | 9,185 | 8,126 | 6,638 | 4,908 | 3,903 | 5 | 11 | 16 | 19 | 21 | 22 |
| Oldham | 15,466 | 42,643 | 47,439 | 43,228 | 36,678 | 29,684 | 22,423 | 19,467 | 3 | 7 | 11 | 13 | 14 | 15 |
| Randall | 18,143 | 23,890 | 24,894 | 23,950 | 21,969 | 19,529 | 16,578 | 14,711 | 3 | 8 | 12 | 16 | 19 | 21 |
| Total | 41,779 | 113,496 | 119,542 | 110,459 | 96,893 | 82,196 | 66,503 | 59,331 | | | | | | |
| GMA-1 Total | 1,885,454 | 3,160,172 | 3,576,046 | 3,252,914 | 2,956,642 | 2,625,439 | 2,252,967 | 2,040,646 | | | | | | |

¹2015 rates are identical to the last year of the calibrated model (2012) except in NPGCD where other rates were provided by NPGCD staff.

Table 2016.4.5: Available groundwater and average drawdown in the Dockum Aquifer for the counties comprising GMA-1.

| Dockum | Available Groundwater (afy) | | | | | | | | Average Drawdown (ft) | | | | | |
|-----------------------------------|-----------------------------|---------|---------|---------|---------|---------|---------|---------|-----------------------|------|------|------|------|------|
| County | 2015 | 2016 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 |
| North Plains GCD | | | | | | | | | | | | | | |
| Dallam | 2,755 | 13,955 | 13,952 | 13,909 | 13,945 | 13,906 | 13,905 | 13,905 | 30 | 77 | 118 | 154 | 192 | 214 |
| Hartley | 1,793 | 12,807 | 11,405 | 10,555 | 10,345 | 10,352 | 10,681 | 11,104 | 21 | 50 | 76 | 100 | 126 | 143 |
| Moore | 1,604 | 4,972 | 4,719 | 4,442 | 4,416 | 4,330 | 4,177 | 4,076 | 9 | 21 | 31 | 39 | 47 | 52 |
| Sherman | 484 | 125 | 125 | 124 | 125 | 124 | 90 | 85 | 16 | 36 | 51 | 62 | 71 | 74 |
| District Total | 6,636 | 31,859 | 30,201 | 29,030 | 28,831 | 28,712 | 28,853 | 29,170 | 24 | 59 | 91 | 119 | 148 | 166 |
| Panhandle GCD | | | | | | | | | | | | | | |
| Armstrong | 138 | 5,658 | 7,150 | 9,032 | 9,628 | 9,718 | 9,507 | 9,283 | 5 | 13 | 20 | 27 | 34 | 38 |
| Carson | 29 | 53 | 68 | 108 | 140 | 169 | 203 | 225 | 6 | 15 | 23 | 30 | 37 | 42 |
| Potter | 914 | 32,028 | 38,915 | 39,118 | 37,041 | 34,507 | 31,560 | 29,667 | 4 | 10 | 16 | 21 | 26 | 29 |
| District Total | 1,081 | 37,739 | 46,133 | 48,258 | 46,809 | 44,394 | 41,270 | 39,175 | 4 | 11 | 18 | 24 | 30 | 34 |
| High Plains Water District | | | | | | | | | | | | | | |
| Armstrong | 33 | 166 | 96 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 7 | 11 | 15 | 18 |
| Potter | 434 | 29 | 21 | 0 | 0 | 0 | 0 | 0 | 3 | 9 | 16 | 24 | 32 | 37 |
| Randall | 1,597 | 1,575 | 2,195 | 2,714 | 2,961 | 3,111 | 3,228 | 3,289 | 9 | 19 | 28 | 36 | 45 | 49 |
| District Total | 2,064 | 1,770 | 2,312 | 2,714 | 2,961 | 3,111 | 3,228 | 3,289 | 8 | 16 | 24 | 32 | 40 | 45 |
| No GCD | | | | | | | | | | | | | | |
| Hartley | 226 | 42,620 | 43,766 | 44,269 | 44,525 | 44,303 | 43,941 | 43,521 | 9 | 27 | 44 | 59 | 78 | 89 |
| Moore | 0 | 230 | 419 | 575 | 533 | 509 | 497 | 481 | 5 | 13 | 19 | 25 | 30 | 33 |
| Oldham | 1,128 | 111,301 | 129,364 | 128,837 | 120,854 | 111,201 | 99,739 | 92,704 | 4 | 11 | 18 | 24 | 30 | 34 |
| Randall | 1,006 | 6,320 | 9,007 | 11,302 | 11,941 | 12,002 | 11,806 | 11,555 | 7 | 15 | 24 | 31 | 40 | 45 |
| Total | 2,360 | 160,471 | 182,556 | 184,983 | 177,853 | 168,015 | 155,983 | 148,261 | 5 | 14 | 22 | 30 | 38 | 42 |
| GMA-1 Total | 12,141 | 231,839 | 261,202 | 264,985 | 256,454 | 244,232 | 229,334 | 219,895 | | | | | | |

Table 2016.4.6: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------|-----------------------------|--------------------|--------------------|-------------------|-------------------|-------------------|-------------------|-------------------|------------------------------|-------------|-------------|-------------|-------------|
| County | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| North Plains GCD | | | | | | | | | | | | | |
| Dallam | 14,671,925 | 13,764,050 | 12,148,396 | 9,699,361 | 7,839,988 | 6,528,591 | 5,633,248 | 5,373,455 | 0.83 | 0.66 | 0.53 | 0.44 | 0.38 |
| Hansford | 23,999,740 | 23,499,747 | 22,254,715 | 19,723,282 | 17,226,621 | 14,796,740 | 11,979,998 | 10,161,110 | 0.93 | 0.82 | 0.72 | 0.62 | 0.50 |
| Hartley | 16,109,356 | 14,899,163 | 12,928,123 | 10,329,796 | 8,375,710 | 7,004,854 | 6,080,793 | 5,834,433 | 0.80 | 0.64 | 0.52 | 0.43 | 0.38 |
| Hutchinson | 6,283,204 | 6,138,287 | 5,856,123 | 5,224,575 | 4,564,693 | 3,918,630 | 3,183,018 | 2,722,128 | 0.93 | 0.83 | 0.73 | 0.62 | 0.51 |
| Lipscomb | 17,979,150 | 17,880,482 | 16,931,538 | 14,901,331 | 13,006,665 | 11,179,281 | 9,040,573 | 7,635,996 | 0.94 | 0.83 | 0.72 | 0.62 | 0.50 |
| Moore | 9,531,217 | 9,010,017 | 8,062,151 | 6,602,948 | 5,451,258 | 4,614,574 | 3,992,938 | 3,774,890 | 0.85 | 0.69 | 0.57 | 0.48 | 0.42 |
| Ochiltree | 20,588,713 | 20,348,826 | 19,354,815 | 17,157,193 | 14,993,048 | 12,862,742 | 10,345,518 | 8,686,064 | 0.94 | 0.83 | 0.73 | 0.62 | 0.50 |
| Sherman | 17,946,388 | 17,048,016 | 15,408,878 | 12,429,026 | 10,101,601 | 8,401,955 | 7,115,462 | 6,641,658 | 0.86 | 0.69 | 0.56 | 0.47 | 0.40 |
| District Total | 127,109,693 | 122,588,588 | 112,944,739 | 96,067,512 | 81,559,584 | 69,307,367 | 57,371,548 | 50,829,734 | 0.89 | 0.76 | 0.64 | 0.55 | 0.45 |
| Hemphill County UWCD | | | | | | | | | | | | | |
| Hemphill | 15,434,318 | 15,372,022 | 15,048,240 | 14,345,671 | 13,651,680 | 12,986,712 | 12,231,878 | 11,756,148 | 0.97 | 0.93 | 0.88 | 0.84 | 0.79 |
| Panhandle GCD | | | | | | | | | | | | | |
| Armstrong | 4,418,838 | 4,390,635 | 4,102,197 | 3,566,408 | 3,087,197 | 2,662,896 | 2,223,787 | 1,971,376 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |
| Carson | 14,900,617 | 14,533,005 | 13,644,285 | 11,911,477 | 10,331,685 | 8,927,498 | 7,475,484 | 6,641,992 | 0.92 | 0.80 | 0.69 | 0.60 | 0.50 |
| Donley | 4,372,716 | 4,295,022 | 4,017,354 | 3,494,304 | 3,027,511 | 2,622,148 | 2,213,257 | 1,984,546 | 0.92 | 0.80 | 0.69 | 0.60 | 0.51 |
| Gray | 13,723,357 | 13,607,295 | 12,764,116 | 11,141,318 | 9,661,809 | 8,341,900 | 6,965,264 | 6,166,983 | 0.93 | 0.81 | 0.70 | 0.61 | 0.51 |
| Hutchinson | 877,413 | 870,844 | 820,948 | 715,369 | 614,095 | 521,569 | 426,200 | 371,818 | 0.94 | 0.82 | 0.70 | 0.59 | 0.49 |
| Potter | 1,610,450 | 1,576,900 | 1,480,579 | 1,303,808 | 1,149,538 | 1,016,469 | 881,821 | 806,053 | 0.92 | 0.81 | 0.71 | 0.63 | 0.55 |
| Roberts | 29,922,260 | 29,671,432 | 27,858,680 | 24,288,555 | 20,980,020 | 17,981,436 | 14,808,901 | 12,946,272 | 0.93 | 0.81 | 0.70 | 0.60 | 0.49 |
| Wheeler | 7,039,568 | 7,014,285 | 6,512,387 | 5,622,780 | 4,835,793 | 4,131,705 | 3,391,689 | 2,957,511 | 0.93 | 0.80 | 0.69 | 0.59 | 0.48 |
| District Total | 76,865,219 | 75,959,418 | 71,200,546 | 62,044,019 | 53,687,648 | 46,205,621 | 38,386,403 | 33,846,551 | 0.93 | 0.81 | 0.70 | 0.60 | 0.50 |

Table 2016.4.6 continued: Groundwater in storage and fraction remaining from 2012 in the Ogallala Aquifer for counties comprising GMA-1.

| Ogallala | Groundwater In Storage (af) | | | | | | | | Fraction Remaining from 2012 | | | | |
|-----------------------------------|-----------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|------------------------------|------|------|------|------|
| County | 2012 | 2015 | 2020 | 2030 | 2040 | 2050 | 2062 | 2070 | '20 | '30 | '40 | '50 | '62 |
| High Plains Water District | | | | | | | | | | | | | |
| Armstrong | 169,520 | 164,173 | 152,213 | 128,358 | 107,796 | 90,234 | 73,281 | 65,244 | 0.90 | 0.76 | 0.64 | 0.53 | 0.43 |
| Potter | 334,379 | 331,599 | 325,088 | 308,489 | 291,034 | 274,134 | 255,469 | 244,334 | 0.97 | 0.92 | 0.87 | 0.82 | 0.76 |
| Randall | 2,570,085 | 2,522,531 | 2,402,007 | 2,156,260 | 1,931,679 | 1,738,089 | 1,550,892 | 1,451,487 | 0.93 | 0.84 | 0.75 | 0.68 | 0.60 |
| District Total | 3,073,984 | 3,018,303 | 2,879,308 | 2,593,107 | 2,330,509 | 2,102,457 | 1,879,642 | 1,761,065 | 0.94 | 0.84 | 0.76 | 0.68 | 0.61 |
| No GCD | | | | | | | | | | | | | |
| Hartley | 908,097 | 899,854 | 799,203 | 631,371 | 505,518 | 418,925 | 362,582 | 350,251 | 0.88 | 0.70 | 0.56 | 0.46 | 0.40 |
| Hutchinson | 3,937,385 | 3,879,951 | 3,675,073 | 3,237,360 | 2,805,526 | 2,395,676 | 1,941,072 | 1,664,052 | 0.93 | 0.82 | 0.71 | 0.61 | 0.49 |
| Moore | 492,564 | 478,587 | 425,912 | 339,662 | 278,442 | 236,871 | 208,438 | 200,207 | 0.86 | 0.69 | 0.57 | 0.48 | 0.42 |
| Oldham | 2,031,746 | 1,992,342 | 1,801,866 | 1,488,671 | 1,253,577 | 1,093,263 | 985,454 | 951,125 | 0.89 | 0.73 | 0.62 | 0.54 | 0.49 |
| Randall | 2,265,938 | 2,221,549 | 2,118,658 | 1,920,226 | 1,740,084 | 1,582,462 | 1,423,700 | 1,335,941 | 0.94 | 0.85 | 0.77 | 0.70 | 0.63 |
| Total | 9,635,730 | 9,472,283 | 8,820,712 | 7,617,290 | 6,583,147 | 5,727,197 | 4,921,246 | 4,501,576 | 0.92 | 0.79 | 0.68 | 0.59 | 0.51 |
| GMA-1 Total | 232,118,944 | 226,410,614 | 210,893,545 | 182,667,599 | 157,812,568 | 136,329,354 | 114,790,717 | 102,695,074 | 0.91 | 0.79 | 0.68 | 0.59 | 0.49 |