

Exhibit 2009 Groundwater Pumping Estimates

Table 1 - Acres Irrigated by Groundwater

| County (or portion of County in the Republican River Basin study area) | | | | | | | | | |
|--|----------|------------|---------|-------|----------|----------|------------|---------|---------|
| Item | Cheyenne | Kit Carson | Lincoln | Logan | Phillips | Sedgwick | Washington | Yuma | Total |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Sprinkler | 10,532 | 135,527 | 1,996 | 5,721 | 64,016 | 21,806 | 35,743 | 259,081 | 534,423 |
| Flood | 53 | 1,845 | 0 | 0 | 2,057 | 586 | 0 | 1,174 | 5,714 |
| Total | 10,585 | 137,372 | 1,996 | 5,721 | 66,073 | 22,392 | 35,743 | 260,254 | 540,137 |

Source: 2005 Aerial Photographs adjusted for CREP and EQIP programs

Table 2 - Efficiency Factors for Estimating Pumping in Colorado

| Year | Percent of CIR Met by Pumping (%) | Sprinkler Irrigation | | | Flood/Gated Pipe/Furrow Irrigation | | |
|------|-----------------------------------|-----------------------------|--------------------------------|---------------------------------|------------------------------------|------------------------------|---------------------------------|
| | | Maximum Farm Efficiency (%) | Pumping Lost to Spray Loss (%) | Pumping to Deep Percolation (%) | Maximum Farm Efficiency (%) | Net Surface Water Runoff (%) | Pumping to Deep Percolation (%) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| 2006 | 75% | 80% | 3% | 17% | 65% | 5% | 30% |

Sources:

- (2) Data from "150 Well Water Right Change Study" (See Table 5 of Helton & Williamsen memorandum entitled)
- (3) Estimated
- (4) Estimated
- (5) Calculated as 100% - Column(3) - Column(4)
- (6) Estimated
- (7) Initial surface water runoff is estimated to be 10%. Estimated that 5% deep percolates back into aquifer after it leaves the end of the field and 5% returns to the stream or is consumed.
- (8) Calculated as 100% - Column(6) - Column(7)

Table 3 - Crop Irrigation Requirement (units of inches)

| County (or portion of County in the Republican River Basin study area) | | | | | | | | | Weighted Average Using Acres in Table 1 |
|--|----------|------------|---------|-------|----------|----------|------------|-------|---|
| Year | Cheyenne | Kit Carson | Lincoln | Logan | Phillips | Sedgwick | Washington | Yuma | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 2006 | 17.15 | 13.47 | 12.18 | 16.95 | 16.82 | 16.91 | 15.98 | 13.60 | 14.35 |

Sources:

- Potential consumptive use estimated using the Hargreaves equation calibrated to the Penman-Monteith equation.
- Effective rainfall estimated using procedure outlined in TR-21.
- Crop mix from NASS data was used to weight the CIR for each county.
- See memorandum by Helton & Williamsen entitled "Crop Consumptive Use Requirements - Republican River Basin in Colorado" dated November 19, 2002.

Table 4 - Gain in Soil Moisture from Winter and Spring Precipitation (units of inches)

| County (or portion of County in the Republican River Basin study area) | | | | | | | | | Average |
|--|----------|------------|---------|-------|----------|----------|------------|------|---------|
| Year | Cheyenne | Kit Carson | Lincoln | Logan | Phillips | Sedgwick | Washington | Yuma | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 2006 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |

Sources:

- 1) "Republican River Basin Water Management Study - Working Paper - Farm Water Management", Steven J. Vandas, United States Bureau of Reclamation, March 1983
- 2) As a check on reasonableness
 - Average Monthly Precipitation for Yuma County in April and May = 4.8 inches
 - Average Monthly Consumptive Water Requirement for Corn Grain in Yuma County in April and May = 1.2 inches
 - Which results in 4.8" - 1.2" = 3.6" of precipitation that becomes surface water runoff, deep percolation, soil evaporation, or a gain to soil moisture storage.

Table 5 - Net Crop Irrigation Requirement (units in inches)

| County (or portion of County in the Republican River Basin study area) | | | | | | | | | Weighted Average Using Acres in Table 3 |
|--|----------|------------|---------|-------|----------|----------|------------|-------|---|
| Year | Cheyenne | Kit Carson | Lincoln | Logan | Phillips | Sedgwick | Washington | Yuma | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| 2006 | 15.15 | 11.47 | 10.18 | 14.95 | 14.82 | 14.91 | 13.98 | 11.60 | 12.35 |

Calculated as Table3 minus Table 4

Table 6 - Irrigation Groundwater Pumping (acre-feet)

| County (or portion of County in the Republican River Basin study area) | | | | | | | | | Total |
|--|----------|------------|---------|-------|----------|----------|------------|---------|---------|
| Year | Cheyenne | Kit Carson | Lincoln | Logan | Phillips | Sedgwick | Washington | Yuma | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Sprinkler | 12,463 | 121,481 | 1,587 | 6,682 | 74,127 | 25,396 | 39,032 | 234,717 | 515,486 |
| Flood | 78 | 2,035 | 0 | 0 | 2,931 | 840 | 0 | 1,309 | 7,192 |
| Total | 12,541 | 123,517 | 1,587 | 6,682 | 77,059 | 26,236 | 39,032 | 236,025 | 522,678 |

For each county pumping is calculated as

Sprinkler Pump = Sprinkler Irrig Acres (Table 1) x % CIR (Table 2, column2) x Net CIR/12 (Table 5) / Sprinkler Efficiency (Table2, column3)
 Flood Pump = Flood Irrig Acres (Table 1) x % CIR (Table 2, column2) x Net CIR/12 (Table 5) / Flood Efficiency (Table2, column6)

Table 7 - Recharge From Groundwater Pumping in Colorado (acre-feet)

| County (or portion of County in the Republican River Basin study area) | | | | | | | | | Total |
|--|----------|------------|---------|-------|----------|----------|------------|--------|--------|
| Year | Cheyenne | Kit Carson | Lincoln | Logan | Phillips | Sedgwick | Washington | Yuma | |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Sprinkler | 2,119 | 20,652 | 270 | 1,136 | 12,602 | 4,317 | 6,635 | 39,902 | 87,633 |
| Flood | 23 | 611 | 0 | 0 | 879 | 252 | 0 | 393 | 2,158 |
| Total | 2,142 | 21,262 | 270 | 1,136 | 13,481 | 4,569 | 6,635 | 40,294 | 89,790 |

For each county recharge is calculated as

Sprinkler Recharge = Sprinkler Pump (Table 6) x Sprinkler Pump to Deep Percolation (Table2, column5)
 Flood Recharge = Flood Pump (Table 6) x Flood Pump to Deep Percolation (Table2, column8)