# MARKET VALUE OF HUERFANO-CUCHARAS IRRIGATION COMPANY

Prepared for:

Two Rivers Water Company
2000 S. Colorado Boulevard
Annex Suite 200
Denver, CO 80222

Wright Water Engineers, Inc.

OCTOBER 2010

101-048.010

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# Market Value of Huerfano-Cucharas Irrigation Company

## SUMMARY OF SALIENT FACTS AND CONCLUSIONS

| | |
|---|---|
| Location | Huerfano and Pueblo Counties, Colorado. |
| Type of Report | Summary Appraisal |
| Client | Two Rivers Water Company<br>2000 South Colorado Boulevard, Annex Suite 200<br>Denver, CO 80222 |
| Valuation Date | March 2, 2010 and September 30, 2010 |
| Report Date | October 29, 2010 |
| Subject | Huerfano-Cucharas Irrigation Company assets including direct flow and storage water rights on the Cucharas and Huerfano Rivers, irrigation company infrastructure including storage reservoirs, diversion structures, irrigation canals and laterals, and rights-of-ways. |
| Purpose and Intended Use | Determine Market Value of Two Rivers Water Company ownership interest in the Huerfano-Cucharas Irrigation Company for year-end financial reporting, information for investors, internal decision making purposes, and for loan collateral if necessary. |
| Highest and Best Use | The highest and best use for the subject water rights is irrigation use. The highest and best use for the subject infrastructure is currently irrigation use. |
| Market Value | HCIC System as of March 2, 2010<br>**Water Rights**<br>Majority Ownership $ 4,994,400<br>Minority Ownership 3,995,600<br>Total $ 8,990,000<br>**Infrastructure**<br>Majority Ownership $ 8,439,000<br>Minority Ownership 6,767,000<br>Total Infrastructure $15,206,000<br>**Water Right and Infrastructure**<br>Majority Ownership $13,433,400<br>Minority Ownership 10,762,600<br>Total Water Rights and Infrastructure $24,196,000<br><br>HCIC System as of September 30, 2010<br>**Water Rights**<br>Majority Ownership $ 8,610,400<br>Minority Ownership 689,600<br>Total $ 9,300,000<br>**Infrastructure**<br>Majority Ownership $15,648,000<br>Minority Ownership 1,269,000<br>Total Infrastructure $16,917,000<br>**Water Right and Infrastructure**<br>Majority Ownership $24,258,400<br>Minority Ownership 1,958,600<br>Total Water Rights and Infrastructure $26,217,000 |

# 1.0 IDENTIFICATION OF HUERFANO-CUCHARAS IRRIGATION COMPANY ASSETS

The Two Rivers Water Company (Two Rivers) began acquiring ownership interest in the Huerfano-Cucharas Irrigation Company (HCIC), a mutual ditch company, in 2009 and as of March 2, 2010 had acquired a majority interest of 53.9 percent of HCIC. As of September 30, 2010, the Two Rivers ownership interest was 90.2 percent of the total shares. Two Rivers intends to rehabilitate the irrigation system to enhance agricultural production under the system and potentially develop alternative energy resources.

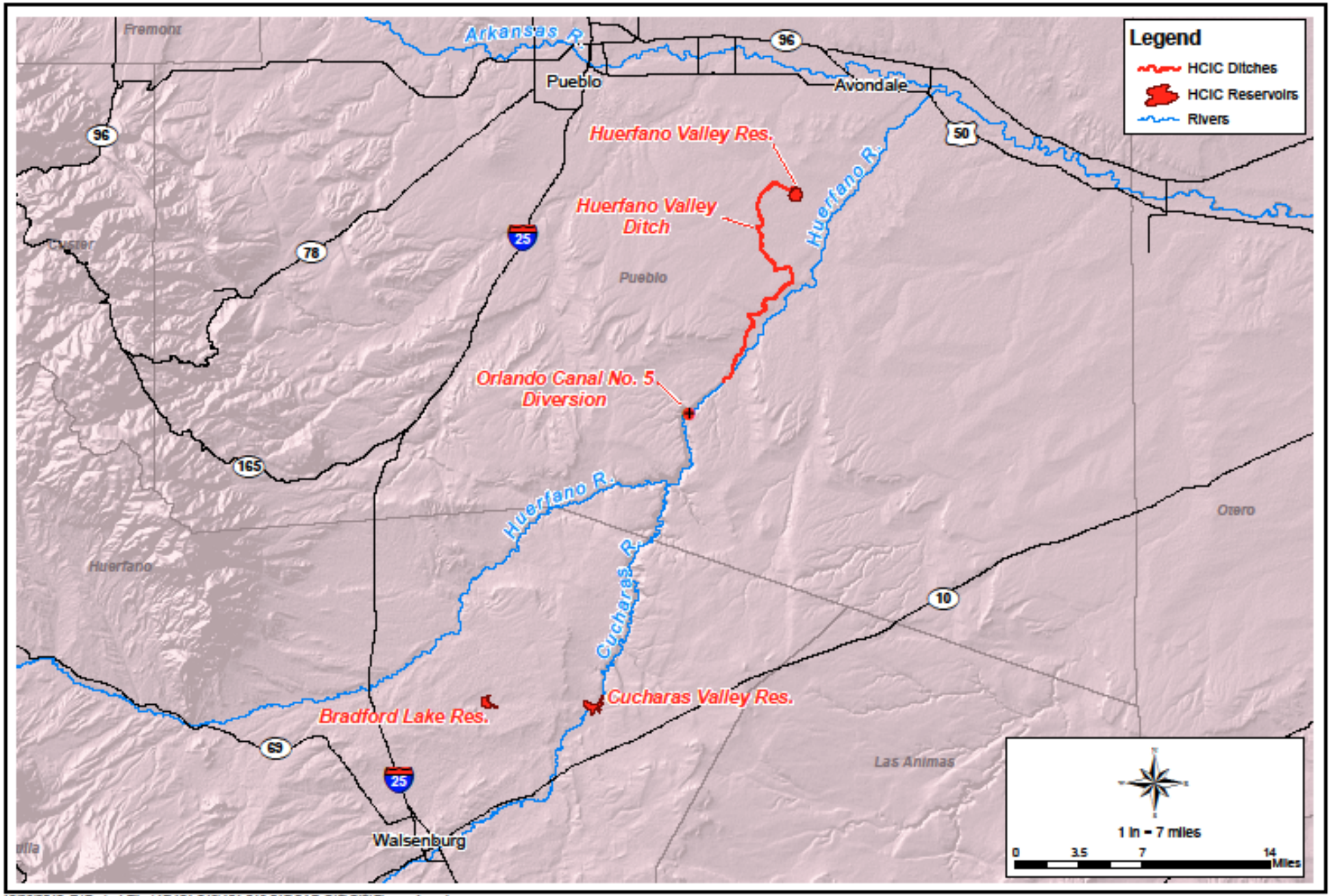
The assets of the HCIC include water rights for direct flow and storage, storage reservoirs, river diversion structures, canals and laterals with appurtenances, and rights-of-way for facilities.

## 1.1 WATER RIGHTS

The HCIC water rights are located in the Arkansas River State Engineers Office (SEO) Water Division 2. The HCIC water rights divert from the Cucharas River (Water District 79) and the Huerfano River (Water Districts 16 and 14). The Cucharas and Huerfano Rivers have their headwaters at the Continental Divide. The subject water rights are summarized in Table 1 in order of seniority, and the locations are shown on Figure 1.

**Table 1**
**Huerfano-Cucharas Irrigation Company Water Rights**

| WD | Water Right Name | Water Source | Adjudication Date | Appropriation Date | Amount |
|---|---|---|---|---|---|
| 14 | HUERFANO VALLEY DITCH | HUERFANO R. | 1898-02-23 | 1888-02-02 | 42.0 cfs |
| 14 | HUERFANO VALLEY RES | HUERFANO R. | 1898-02-23 | 1888-02-02 | 2,016.873 AF |
| 14 | HUERFANO VALLEY DITCH | HUERFANO R. | 1921-10-03 | 1905-05-01 | 18.0 cfs |
| 79 | BRADFORD LAKE RES | HUERFANO R. | 1921-10-03 | 1905-12-15 | 6,000.0 AF |
| 16 | CUCHARAS VALLEY RES | CUCHARAS R. | 1921-10-03 | 1906-03-14 | 31,958.0 AF<br>34,404.1 AF-Cond |
| 14 | ORLANDO CANAL NO 5 | HUERFANO R. | 1921-10-03 | 1906-10-19 | 172.0 cfs |

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WRIGHT WATER ENGINEERS, INC.
2490 W 26TH AVE 100A
DENVER, CO. 80211
(303) 480-1700

TWO RIVERS WATER COMPANY

# LOCATION OF HCIC WATER RIGHTS

| PROJECT NO. | FIGURE |
|---|---|
| 101-048.010 | 1 |

### 1.1.1 Huerfano Valley Ditch and Huerfano Valley Reservoir

The Huerfano Valley Ditch diverts from the Huerfano River in Section 21, Township 23 South, Range 63 West of the Sixth Principal Meridian in Pueblo County. The Huerfano Valley Ditch river diversion is located approximately 32 miles northeast of Walsenburg and 17 miles southeast of Pueblo. The water right decree amount for the first priority is 42 cubic feet per second (cfs), with 18 cfs in the second priority.

Lytle Water Solutions, LLC (Lytle) prepared a preliminary draft report, *Yield/Exchange Evaluation of Cucharas Reservoir and Huerfano Valley Ditch*, for the HCIC in November 2006. Wright Water Engineers, Inc. (WWE) is familiar with the work of Lytle and finds the firm's work to be reasonable. A summary of the reported figures for the Huerfano Valley Ditch is reflected in Table 2 below:

**Table 2**
**Huerfano Valley Ditch Summary of Lytle Analysis**

| | | |
|---|---|---|
| Annual diversion | | |
| Average 1980-2003 | 6,804 | acre-feet/year |
| Year 2002 | 0 | |
| Ditch loss | 8.65% | |
| Farm headgate diversion | 6,214 | acre-feet/year |
| Acres irrigated | 3,000 | acres |
| Cropping | 20% alfalfa, 80% pasture grasses | |
| Irrigation efficiency | 55% | |
| Evaporation loss | 5% | in Huerfano Valley Lake |
| Overall total efficiency | 50% | |
| | | |
| Estimated consumptive use | 3,107 | acre feet/year |

The average year estimated annual historic consumptive use is approximately 3,100 acre-feet.

The diversion records from the Colorado Decision Support System (CDSS) for the Huerfano Valley Ditch are also summarized in Table 3 on a monthly basis for a longer period of record with 66 years of diversion record through year 2009. The average annual diversion is approximately 6,400 acre-feet, with a maximum of 16,691 acre-feet in year 1957 and no diversion in the dry year of 2002.

**Table 3**
**Huerfano Valley Ditch Diversions, Water District 14, Structure ID 657**

| Water Year | Max Q | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1924 | 70 | 0 | 0 | 0 | 0 | 2249 | 2499 | 2583 | 315 | 363 | 129 | 0 | 0 | 8138 |
| 1942 | 125 | 0 | 0 | 0 | 0 | 28 | 1225 | 924 | 3146 | 1402 | 883 | 131 | 143 | 7881 |
| 1943 | 60 | 0 | 0 | 0 | 0 | 95 | 357 | 897 | 1492 | 1438 | 333 | 282 | 0 | 4893 |
| 1944 | 85 | 0 | 0 | 0 | 0 | 63 | 438 | 1482 | 3148 | 1418 | 2596 | 1204 | 0 | 10350 |
| 1945 | 125 | 0 | 0 | 0 | 0 | 0 | 95 | 2293 | 1664 | 2144 | 2172 | 1325 | 421 | 10114 |
| 1946 | 125 | 0 | 0 | 0 | 0 | 0 | 1394 | 1141 | 851 | 510 | 1135 | 1131 | 0 | 6161 |
| 1947 | 180 | 0 | 0 | 0 | 0 | 0 | 83 | 2142 | 3358 | 2132 | 1692 | 1170 | 50 | 10628 |
| 1948 | 128 | 0 | 0 | 0 | 0 | 0 | 688 | 3102 | 1676 | 3178 | 2216 | 1781 | 0 | 12641 |
| 1949 | 120 | 0 | 0 | 0 | 0 | 0 | 0 | 1194 | 3830 | 3065 | 2222 | 1874 | 40 | 12224 |
| 1950 | 87 | 0 | 0 | 0 | 0 | 0 | 859 | 811 | 309 | 1139 | 1507 | 1410 | 0 | 6035 |
| 1951 | 100 | 0 | 0 | 0 | 0 | 0 | 799 | 228 | 69 | 734 | 1323 | 633 | 0 | 3787 |
| 1952 | 100 | 0 | 0 | 0 | 0 | 0 | 407 | 984 | 3108 | 873 | 873 | 232 | 0 | 6476 |
| 1953 | 140 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 151 | 2487 | 1736 | 0 | 179 | 4552 |
| 1954 | 170 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 298 | 288 | 1369 | 0 | 0 | 1954 |
| 1955 | 125 | 0 | 0 | 0 | 0 | 0 | 0 | 1240 | 2424 | 4540 | 4356 | 357 | 369 | 13285 |
| 1956 | 120 | 0 | 0 | 0 | 0 | 0 | 50 | 2101 | 2235 | 2682 | 1448 | 0 | 0 | 3515 |
| 1957 | 150 | 0 | 0 | 0 | 0 | 0 | 159 | 2126 | 1498 | 5302 | 6278 | 1329 | 0 | 16691 |
| 1958 | 85 | 0 | 0 | 0 | 0 | 0 | 0 | 1392 | 3679 | 2612 | 3241 | 583 | 0 | 11508 |
| 1959 | 78 | 0 | 0 | 0 | 253 | 0 | 0 | 569 | 1233 | 948 | 1468 | 0 | 0 | 4471 |
| 1960 | 66 | 0 | 0 | 0 | 0 | 0 | 0 | 946 | 988 | 1367 | 0 | 135 | 171 | 3606 |
| 1961 | 121 | 0 | 0 | 0 | 278 | 307 | 411 | 2142 | 2797 | 2469 | 3546 | 1190 | 0 | 13141 |
| 1962 | 122 | 0 | 0 | 0 | 1200 | 0 | 0 | 1999 | 1839 | 1408 | 2124 | 0 | 387 | 8957 |
| 1963 | 100 | 0 | 0 | 0 | 198 | 0 | 0 | 0 | 0 | 0 | 1115 | 307 | 0 | 1621 |
| 1964 | 50 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 595 | 0 | 595 |
| 1966 | 96 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 920 | 1271 | 218 | 0 | 2413 |
| 1968 | 57 | 0 | 0 | 381 | 709 | 0 | 0 | 375 | 792 | 2682 | 3279 | 137 | 0 | 8354 |
| 1969 | 57 | 0 | 403 | 553 | 333 | 0 | 0 | 795 | 1696 | 2011 | 1190 | 700 | 980 | 8662 |
| 1970 | 96 | 527 | 0 | 0 | 999 | 57 | 1027 | 2241 | 554 | 100 | 694 | 1338 | 1262 | 8799 |
| 1971 | 60 | 127 | 121 | 221 | 0 | 24 | 0 | 366 | 0 | 189 | 0 | 0 | 0 | 1048 |
| 1972 | 78 | 0 | 0 | 0 | 391 | 0 | 0 | 0 | 0 | 26 | 94 | 184 | 0 | 695 |
| 1973 | 97 | 134 | 60 | 73 | 0 | 0 | 0 | 2741 | 2711 | 1510 | 1322 | 1095 | 0 | 9645 |
| 1974 | 82 | 0 | 0 | 0 | 453 | 24 | 0 | 1167 | 1029 | 105 | 335 | 37 | 39 | 3189 |
| 1975 | 109 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 70 | 514 | 387 | 0 | 0 | 972 |
| 1977 | 71 | 0 | 0 | 22 | 85 | 0 | 0 | 0 | 14 | 490 | 1231 | 0 | 277 | 2119 |
| 1978 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 1 | 305 | 96 | 0 | 0 | 420 |
| 1979 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 329 | 1295 | 158 | 0 | 0 | 0 | 1783 |
| 1980 | 65 | 0 | 0 | 0 | 0 | 0 | 51 | 1390 | 379 | 657 | 290 | 536 | 89 | 3391 |
| 1981 | 92 | 0 | 0 | 0 | 0 | 28 | 365 | 1647 | 1092 | 1430 | 566 | 182 | 1173 | 6483 |
| 1982 | 78 | 0 | 0 | 0 | 0 | 37 | 1276 | 673 | 208 | 1810 | 0 | 340 | 0 | 4345 |
| 1983 | 143 | 0 | 0 | 0 | 0 | 0 | 0 | 1775 | 3064 | 3450 | 2361 | 2064 | 328 | 13041 |
| 1984 | 115 | 1456 | 345 | 0 | 0 | 1534 | 175 | 1477 | 575 | 1810 | 368 | 2445 | 0 | 10184 |
| 1985 | 242 | 42 | 0 | 0 | 0 | 0 | 2076 | 5154 | 1458 | 2486 | 2149 | 0 | 0 | 13365 |
| 1986 | 190 | 484 | 0 | 581 | 605 | 119 | 712 | 1704 | 3152 | 1575 | 2023 | 785 | 0 | 11741 |
| 1987 | 117 | 512 | 0 | 0 | 0 | 0 | 3445 | 3036 | 3389 | 1612 | 2051 | 0 | 1178 | 15223 |
| 1988 | 102 | 0 | 0 | 0 | 0 | 736 | 182 | 419 | 268 | 1152 | 1727 | 526 | 0 | 5010 |
| 1989 | 98 | 0 | 0 | 843 | 520 | 1177 | 0 | 511 | 1282 | 575 | 0 | 0 | 0 | 4907 |
| 1990 | 5 | 0 | 0 | 0 | 1 | 6 | 3 | 0 | 133 | 0 | 0 | 0 | 0 | 143 |
| 1991 | 53 | 0 | 0 | 0 | 224 | 59 | 0 | 0 | 0 | 0 | 523 | 0 | 0 | 805 |
| 1992 | 105 | 1094 | 99 | 0 | 0 | 58 | 994 | 699 | 826 | 999 | 662 | 845 | 0 | 6275 |
| 1993 | 108 | 275 | 316 | 275 | 0 | 63 | 843 | 3847 | 1988 | 1365 | 2459 | 1622 | 633 | 13686 |
| 1994 | 64 | 0 | 0 | 0 | 0 | 0 | 828 | 1262 | 2990 | 3045 | 2404 | 0 | 230 | 10758 |
| 1995 | 75 | 0 | 0 | 0 | 367 | 360 | 759 | 1247 | 1714 | 2756 | 1145 | 964 | 1193 | 10505 |
| 1996 | 151 | 0 | 0 | 0 | 0 | 0 | 2006 | 3490 | 131 | 1254 | 2286 | 0 | 69 | 9237 |
| 1997 | 139 | 0 | 0 | 0 | 0 | 0 | 0 | 3129 | 1916 | 802 | 758 | 0 | 0 | 6605 |
| 1998 | 110 | 476 | 0 | 0 | 0 | 0 | 110 | 101 | 898 | 3076 | 614 | 25 | 464 | 5765 |
| 1999 | 74 | 0 | 0 | 0 | 0 | 0 | 0 | 421 | 2286 | 1161 | 1170 | 547 | 0 | 5585 |
| 2000 | 77 | 0 | 0 | 188 | 176 | 233 | 605 | 1468 | 1028 | 671 | 801 | 537 | 0 | 5708 |
| 2001 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 93 | 97 | 127 | 0 | 0 | 0 | 318 |
| 2002 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2003 | 49 | 0 | 0 | 0 | 0 | 0 | 0 | 88 | 271 | 3 | 0 | 12 | 0 | 375 |
| 2004 | 72 | 0 | 0 | 0 | 0 | 0 | 514 | 255 | 110 | 197 | 49 | 30 | 5 | 1159 |
| 2005 | 69 | 0 | 0 | 0 | 0 | 200 | 352 | 764 | 970 | 2007 | 344 | 0 | 37 | 4673 |
| 2006 | 153 | 0 | 213 | 144 | 95 | 3 | 347 | 773 | 0 | 135 | 399 | 11 | 0 | 2120 |
| 2007 | 111 | 0 | 0 | 0 | 0 | 175 | 508 | 2936 | 1801 | 1234 | 438 | 934 | 0 | 8027 |
| 2008 | 50 | 110 | 369 | 312 | 471 | 406 | 204 | 751 | 649 | 31 | 153 | 0 | 0 | 3456 |
| 2009 | 67 | 0 | 0 | 115 | 1056 | 81 | 182 | 1614 | 1170 | 534 | 13 | 0 | 5 | 4770 |
| Average | 96 | 79 | 29 | 56 | 127 | 123 | 410 | 1198 | 1244 | 1325 | 1203 | 482 | 147 | 6424 |

Water from Cucharas Reservoir diverted by the Huerfano Valley ditch is included in Table 3. For 13 of 24 years from 1984 through 2007, water was available from the Cucharas Reservoir for diversion by the Huerfano Ditch. The Cucharas Reservoir source ranged from 646 to 5741 acre-feet per year for the 13 years of recorded water diversion. The Huerfano Valley Reservoir has the same priority as the Huerfano Valley Ditch's first priority. The decree amount is just over 2,000 acre-feet. Records of storage content and releases for the Huerfano Valley Reservoir are somewhat sporadic, but there are years of more complete record, as shown in Figure 2.

### 1.1.2 Cucharas Reservoir (aka Orlando No. 5)

The Cucharas Reservoir dam is located in Section 30, Township 26 South, Range 64 West of the Sixth Principal Meridian, Huerfano County. The Cucharas Reservoir has an absolute storage right for 31,958 acre-feet and a conditional water right for an additional 34,404.1 acre-feet. Cucharas Reservoir is currently under restriction from the Colorado State Engineer Office due to dam safety concerns.

The Lytle report presents the results of a reservoir operations model study and, based on this study, estimates the average year yield of the Cucharas Reservoir to range from 1319 to 1411 acre-feet, depending on the stage elevation-area-storage capacity data. Figure 3 is a graph showing the Colorado Department of Water Resources (CDWR) stage elevation-area-storage data. The Cucharas Reservoir operation study used a total active storage area of just under 28,000 acre-feet, which was the approximate maximum reservoir storage content. With a storage volume of about 28,000 acre-feet, the water surface area is about 1500 acres (2.3 square miles). The results of the Lytle Cucharas Reservoir Operation study using CDWR data is summarized below in Table 4.

**Figure 2**
**Huerfano Valley Reservoir Water Storage Contents**

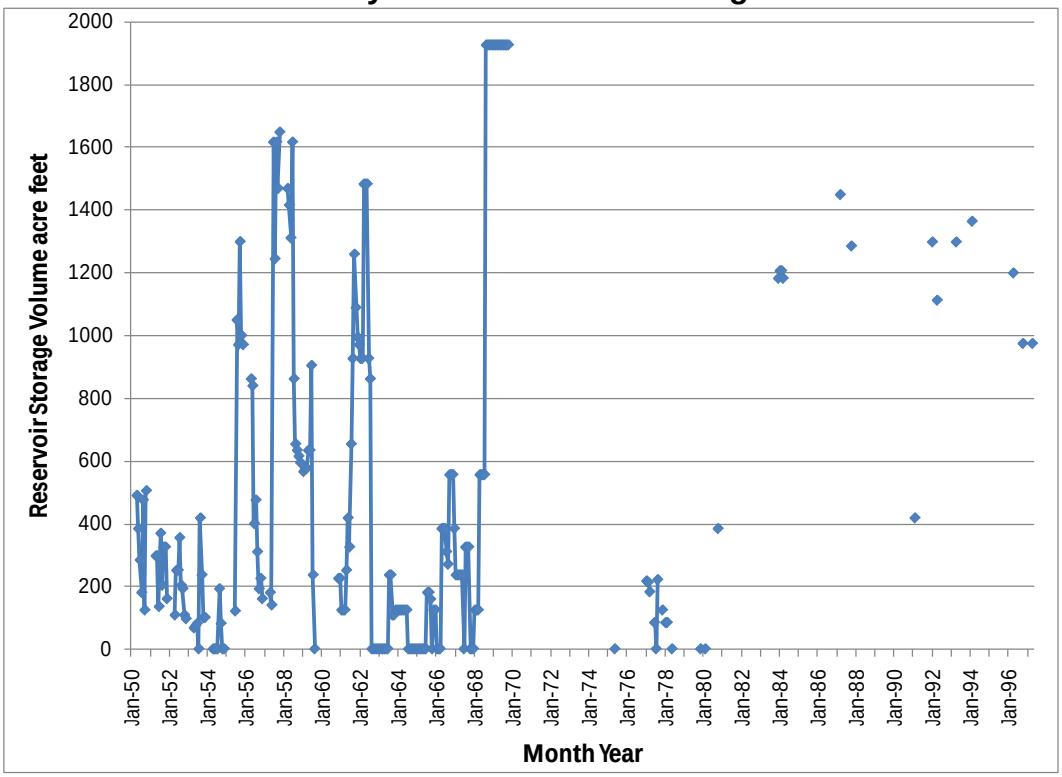



**Figure 3**
**Cucharas Reservoir Elevation-Stage-Capacity (CDWR Data)**

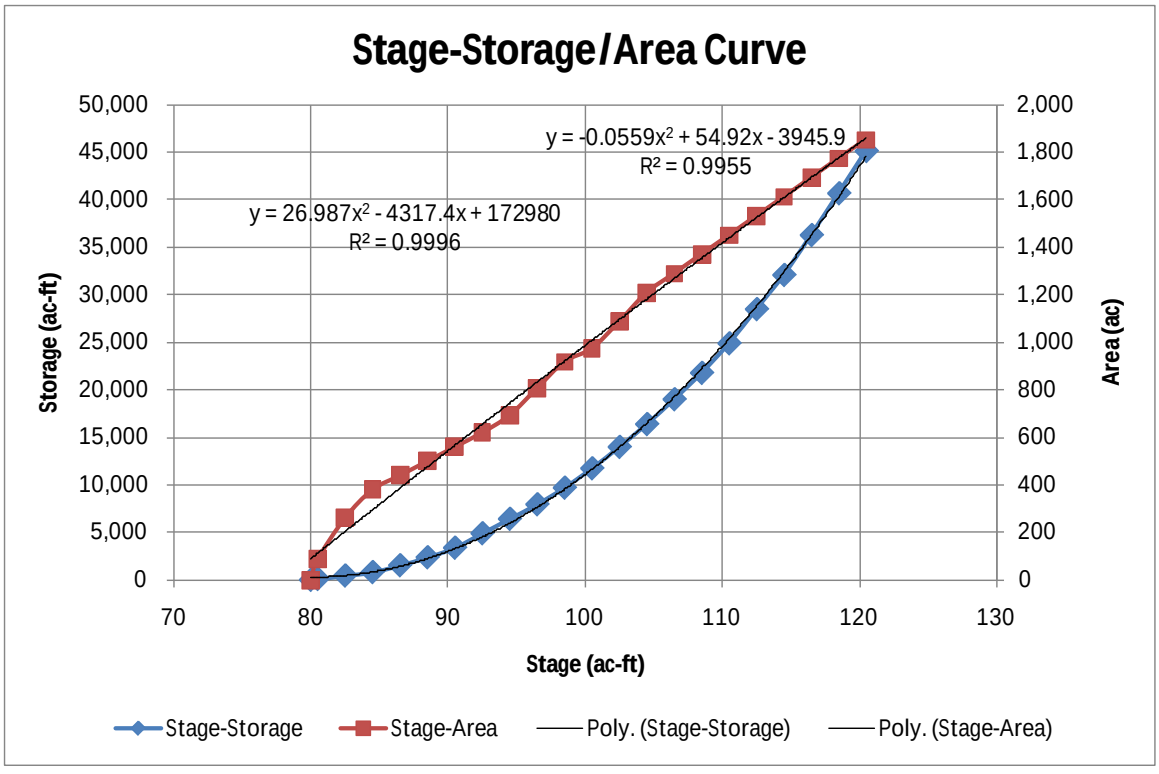


**Table 4**
**Lytle Cucharas Reservoir Operational Study Model Summary**

| Parameter | Annual Values in Acre-feet | | |
|---|---|---|---|
| | Minimum | Average | Maximum |
| Precipitation Gain | 0 | 752 | 2040 |
| Evaporation Loss | 0 | 1591 | 4147 |
| In Priority Inflow | 0 | 2564 | 27284 |
| Reservoir Yield | 0 | 1411 | 3533 |
| Net Reservoir Contents | 0 | 4641 | 21982 |
| Reservoir Spills | 0 | 0 | 0 |

The Lytle Report notes there is no firm yield from the Cucharas Reservoir.

### 1.1.3 Bradford Reservoir and Orlando Canal No. 5

The water rights for the Bradford Reservoir and for the Orlando Canal No. 5 are currently listed on the SEO Division 2 Abandonment List. A protest to the inclusion of the two rights on the Abandonment List will be filed, as Two Rivers does not have intent to abandon the water rights.

The Bradford Reservoir with a 6,000 acre-foot storage right is one day junior to the Orlando No. 2 Reservoir, which regularly receives water. Two Rivers is negotiating to purchase the Orlando No. 2 Reservoir water right, which will allow management of water between Orlando No. 2 and Bradford Reservoirs. The Bradford Reservoir location is advantageous in that it facilitates transfer of water from the Upper Huerfano River to the Cucharas basin.

## 1.2 Cucharas Reservoir Structure

The Cucharas Reservoir rock-fill dam original construction was completed in 1913 with a dam height of 100 feet. Through the years, the dam height was raised several times, and the current height is 135 feet according to the SEO Dam Safety inspection report. The dam length is 528 feet with a crest width of 15 feet. There is a 300-foot-wide ogee spillway on the left with an estimated capacity of 44,000 cfs. The upstream face of the dam is concrete, and in 1987, portions of the dam face and crest subsided and were repaired. Currently there are numerous holes in the crest of the dam. The downstream slope of the dam is 1.5 horizontal:1 vertical with no signs of instability noted. Seepage areas exist at the toe and along the outlet channel. There are an estimated 70 feet of sediment in the lower half of the reservoir.

The Cucharas Reservoir dam has been under storage restrictions from the SEO Dam Safety Branch since 1987 with storage restricted to below gage level 100 (providing about 20 feet depth of storage). The May 17, 2010 SEO Dam Safety inspection comment on the overall conditions follows:

> *The overall condition of the dam is poor with many uncertainties. Major rehabilitation is needed. Given the limited outlet capacity and large drainage area the dam continues to present a hazard. There is a standing notification from the SEO that a zero storage restriction followed by a breach order will be imposed by 10/1/2010 unless plans and specifications are prepared for the rehabilitation of the dam. The SEO has discussed with the owner and owner's engineer that the restriction and breach order may not be imposed at that time contingent upon the owner showing diligence to design and construct a safe structure at the site.*

Two Rivers retained GEI Consultants, who prepared *Preliminary Design Drawings for the Cucharas Dam Rehabilitation Project* and the *Final Cucharas Dam Rehabilitation Project Preliminary Design Report* dated March 2010. Three alternatives were considered in the preliminary design phase, with the recommended alternative being a downstream roller compacted concrete (RCC) dam. The plans call for a new dam to be constructed roughly 150 feet downstream of the existing dam. The proposed dam would have a RCC core with a 1.5 horizontal:1 vertical slope upstream and downstream but with a bench upstream extending into the existing dam embankment at the approximate level of existing sediment in the reservoir (elevation 5726). The spillway elevation proposed is 5766, and freeboard above the spillway of 18 feet.

The drainage area tributary to the Cucharas Reservoir is estimated at 646.5 square miles, with elevations ranging from 5700 to 12000 feet. The dam is a large, high-hazard dam class. Based on an Incremental Damage Assessment (IDA) the emergency spillway design flow is 162,500 cfs. The estimated cost for the dam rehabilitation is $26,743,000, which is roughly $650 per acre-foot, for roughly 41,200 acre-feet of storage.

## 1.3 Other HCIC Infrastructure

### 1.3.1 River Diversion Structures

The HCIC infrastructure includes two river diversion structures on the Huerfano River: the Huerfano Valley Ditch (HCIC Ditch) and Broadacre Ditch diversions structures. These structures include a diversion dam on the river and headgates to control flow into the irrigation ditch. Photograph 9 (end of report) is of the HCIC diversion dam on the Huerfano River.

### 1.3.2 Irrigation Ditches, Laterals and Turnouts

The irrigation ditches include the HCIC Ditch and the Broadacre Ditch systems. The ditch system quantities are described in Table 5:

**Table 5**
**Summary of HCIC Ditch Systems**

| System | | Quantity | Unit |
|---|---|---|---|
| **HCIC Ditch System** | | | |
| | HCIC Ditch | 120,214 | lf |
| | HCIC Laterals | 18,480 | lf |
| | HCIC Turnouts | 21 | each |
| | HCIC Ditch ROW (40 ft) | 110.4 | acres |
| | HCIC Lateral ROW (20 ft) | 8.5 | acres |
| | Six-Mile Creek Return | 5,280 | lf |
| **Broadacre Ditch System** | | | |
| | Broadacre Ditch System | 103,705 | lf |
| | Broadacre Turnouts | 15 | each |
| | Broadacre Easement (40 ft) | 95.2 | acres |

The Six Mile Creek Return is an important feature as it provides a connection of the HCIC system to the Arkansas River. The Six Mile Creek return crosses over the Bessemer Ditch, and Six Mile Creek then continues on to the north, joining the Arkansas River two miles west of Avondale.

### 1.3.3 Huerfano Valley Lake

Huerfano Valley Lake is a 2,000-acre-foot reservoir located about two-thirds the way down the HCIC Ditch system. Laterals extend from the lake and serve additional irrigated lands.

### 1.3.4 Bradford Lake

While Bradford Lake does not have recent storage records, its location is favorable in terms of providing a connection between the Huerfano River and the Cucharas River, enabling storage of Huerfano River water in the Cucharas Reservoir. As noted above, Two Rivers is purchasing the Orlando No. 2 Reservoir, which is one day senior to the Bradford Reservoir. With ownership of the Orlando No. 2 Reservoir, Two Rivers can manage and allocate water to the Bradford Reservoir.

## 1.4 Two Rivers HCIC Ownership

Two Rivers began purchasing, or closed on, shares in HCIC in September 2009. As of March 2, 2010, Two Rivers had purchased, or closed on, 3,196 shares, which is 53.9 percent or a majority of the total 5,932 ditch shares. Additional shares were acquired by Two Rivers, with a total of 5,392 shares acquired as of September 30, 2010, which is an ownership interest of 90.9 percent.

Table 6 is a summary of the water share purchases. The average transaction price per share was $1,931. The weighted average price (total purchase price of $10,809,008/5,392 shares) was $2,005 per share. Two Rivers currently has HCIC stock certificate numbers 407, 408, 409, 416, and 424 through 461 for a total of 4,296 shares. Other certificates not yet transferred to Two Rivers total 1,096 shares (Rinks – 876 shares; Martin – 100 shares, Sagstetter – 80 shares, and Staebell – 40 shares), bringing the total Two Rivers shares to 5,392 shares.

## 1.5 HCIC Yield per Share

The HCIC river diversion is approximately 1.15 acre-feet per share (6,804 acre-feet/5,932 shares). The historic consumptive use for HCIC, as determined by Lytle, is 1,307 acre-feet on average or 0.22 acre-feet per share (1,307 acre-feet/5,932 shares).

# Table 6
# Summary of Two Rivers HCIC Purchases

| | | | | |
|---|---|---|---|---|
| Shares Owned | 5,392.00 | March 2, 2010 Total Shares | 3,196.00 | 53.9% |
| Pending | | September 30, 2010 Shares | 5,392.0 | 90.9% |
| Others | 540.00 | | | |
| Total Shares | 5,932.00 | | | |

| Name | Total Purchase Price | Total Shares | Purchase Price per Share | Cash Paid | Note Carried @ 6% | Monthly Interest | Date of Note or purchase |
|---|---|---|---|---|---|---|---|
| Segar, Lane | $ 80,000 | 40.00 | $ 2,000 | $ 80,000 | $ - | $ - | 9/16/2009 |
| Roehrich, Kenneth | 1,509,000 | 754.50 | 2,000 | 93,000 | $ 1,675,000 | $ 8,375.00 | 9/17/2009 |
| Roehrich, Joan | 560,000 | 280.00 | 2,000 | 56,000 | 504,000 | 2,520 | 9/17/2009 |
| Jackie Dorenkamp & Mary Lou George | 880,000 | 440.00 | 2,000 | 88,000 | 792,000 | 3,960 | 1/28/2010 |
| Dorenkamp, Jeffrey & Jackie | 80,000 | 40.00 | 2,000 | 8,000 | 72,000 | 360 | 1/28/2010 |
| George, Sam & Marylou | 80,000 | 40.00 | 2,000 | 8,000 | 72,000 | 360 | 1/28/2010 |
| LPOP Ranch/Willie Faris | 246,660 | 123.33 | 2,000 | 24,666 | 221,994 | 1,110 | 1/29/2010 |
| Collins, Orris | 240,000 | 120.00 | 2,000 | 24,000 | 216,000 | 1,080 | 1/29/2010 |
| Martin, Dale & Carla | 204,000 | 102.00 | 2,000 | 20,400 | 183,600 | 918 | 1/29/2010 |
| Maez, Orlando & Marie | 200,000 | 100.00 | 2,000 | 20,000 | 180,000 | 900 | 1/29/2010 |
| Guardamondo, Tom & Laura | 160,000 | 80.00 | 2,000 | 16,000 | 144,000 | 720 | 1/29/2010 |
| Southern Colorado Land & Livestock Co | 10,000 | 5.00 | 2,000 | 1,000 | 9,000 | 45 | 1/29/2010 |
| Storm, Tom & Laura Jean | 136,000 | 68.00 | 2,000 | 13,600 | 122,400 | 612 | 2/1/2010 |
| Mackey, Kevin, Leah | 80,000 | 40.00 | 2,000 | 8,000 | 72,000 | 360 | 2/1/2010 |
| Mackey, Kevin, Leah & Buford | 33,340 | 16.67 | 2,000 | 3,340 | 30,000 | 150 | 2/1/2010 |
| Ballou, Frederick | 40,000 | 20.00 | 2,000 | 4,000 | 36,000 | 180 | 2/1/2010 |
| Gendjar, Kurt & Donna | 40,000 | 20.00 | 2,000 | 4,000 | 36,000 | 180 | 2/1/2010 |
| Canon National Bank | 315,000 | 268.00 | 1,175 | 315,000 | - | - | 2/2/2010 |
| Horton, Delores | 360,000 | 180.00 | 2,000 | 36,000 | 324,000 | 1,620 | 2/2/2010 |
| Cawlfield Estate | 180,000 | 90.00 | 2,000 | 18,000 | 162,000 | 810 | 2/2/2010 |
| Martinez, Robert & Adella | 92,000 | 46.00 | 2,000 | 9,200 | 82,800 | 414 | 2/2/2010 |
| Cawlfield, William | 80,000 | 40.00 | 2,000 | 8,000 | 72,000 | 360 | 2/2/2010 |
| Longan, Elizabeth | 80,000 | 40.00 | 2,000 | 8,000 | 72,000 | 360 | 2/2/2010 |
| Horton, John Paul | 15,000 | 7.50 | 2,000 | 1,500 | 13,500 | 68 | 2/2/2010 |
| Horton, Keith Michael | 15,000 | 7.50 | 2,000 | 1,500 | 13,500 | 68 | 2/2/2010 |
| Horton, Michael Paul | 15,000 | 7.50 | 2,000 | 1,500 | 13,500 | 68 | 2/2/2010 |
| Horton, McMillan | 15,000 | 7.50 | 2,000 | 1,500 | 13,500 | 68 | 2/2/2010 |
| Funk, Dale | 100,000 | 50.00 | 2,000 | 10,000 | 90,000 | 450 | 2/3/2010 |
| Vendetti, John | 30,000 | 15.00 | 2,000 | 3,000 | 27,000 | 135 | 2/3/2010 |
| St. Charles Mesa Water District | 135,000 | 67.50 | 2,000 | 13,500 | 121,500 | 608 | 2/5/2010 |
| Pullara, Peter | 20,800 | 20.00 | 1,040 | 20,800 | - | - | 2/5/2010 |
| Norman, Lilian | 40,000 | 20.00 | 2,000 | 4,000 | 36,000 | 180 | 2/5/2010 |
| Cortese, Ronald & Connie | 40,000 | 20.00 | 2,000 | 4,000 | 36,000 | 180 | 2/5/2010 |
| Greathouse, Peggy | 40,000 | 20.00 | 2,000 | 4,000 | 36,000 | 180 | 2/5/2010 |
| Jordan, Ty | 21,800 | 20.00 | 1,090 | 21,800 | - | - | 3/8/2010 |
| Johnston, Jack | 534,000 | 267.00 | 2,000 | 534,000 | - | - | 3/10/2010 |
| Kammerdiner, Lee | 1,306,000 | 653.00 | 2,000 | 130,600 | 1,175,400 | 5,877 | 3/16/2010 |
| Martin, Dale & Carla | 200,000 | 100.00 | 2,000 | 20,000 | 180,000 | 900 | 3/25/2010 |
| ArrowRock, LLC | 200,000 | 100.00 | 2,000 | 20,000 | 180,000 | 900 | 4/12/2010 |
| Kratzer, Robert & Eva | 120,000 | 60.00 | 2,000 | 12,000 | 108,000 | 540 | 4/27/2010 |
| Sagstetter, Lawrence & Cheryl | 186,818 | 80.00 | 2,335 | 20,000 | 166,818 | 834 | 9/1/2010 |
| Rinks, Michael & Velma | 2,045,460 | 876.00 | 2,335 | 204,546 | 1,840,914 | 9,205 | 9/30/2010 |
| Staebell, Jane 303-828-8846 | 43,130 | 40.00 | 1,078 | 43,130 | - | - | 9/13/2010 |
| TOTAL | $ 10,809,008 | 5,392.00 | | $ 1,937,582 | $ 9,130,426 | $ 45,652 | |
| Weighted Average Price per share | $ 2,005 | | $ 1,931 | 17.9% | | | |

| Other Shares | |
|---|---|
| Tiegs Family Trust | 135.00 |
| Bar Nothing Ranches, LLC | 175.00 |
| Hudler, Evelyn | 115.00 |
| Hudler, Russell | 115.00 |
| | 540.00 |
| | 5,932.00 |

## 1.6 Two Rivers Related Projects

In addition to the HCIC system, Two Rivers is acquiring other water interests that will use the HCIC infrastructure. Two Rivers is in negotiations with a coal bed methane operator with plans to generate an estimated 9,500 acre-feet per year of produced water. It is anticipated that passing the produced water through the Orlando No. 2 Reservoir and HCIC system will reduce the sodium absorption ratio (SAR) through dilution and interaction with the native soils before delivery (or transfer) to storage in Cucharas Reservoir. The Orlando No. 2 Reservoir is not an asset of the HCIC system but can physically be operated in conjunction with the HCIC facilities.

In particular, the Orlando No. 2 Reservoir is one day senior in priority to the Bradford Reservoir. With ownership of both reservoirs in control of Two Rivers, there will be increased operational management opportunities. The produced water is anticipated to provide additional water supply with firm yield that will be suitable for multiple uses in addition to irrigation. The connection of the HCIC system to the Bessemer Ditch and to the Arkansas River via the Six Mile Creek Return provides a high-capacity conveyance system to deliver water directly to the Arkansas River with opportunities to exchange the water upstream.

Two Rivers is in the process of preparing a Service Plan for the formation of a special district to provide water service to existing and proposed residential areas.

# 2.0 PURPOSE OF THE APPRAISAL

The purpose of the appraisal is to estimate the market value as of the effective dates of March 2, 2010 and September 30, 2010 of the Huerfano-Cucharas Irrigation Company, the market value of the Two Rivers majority ownership interests in HCIC, and the market value of the minority ownership in HCIC. Market value, as used herein, is defined as follows:

> **Market value** means the most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition are the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:

1. buyer and seller are typically motivated;
2. both parties are well informed or well advised and acting in what they consider their own best interests;
3. a reasonable time is allowed for exposure in the open market;
4. payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
5. the price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.[1]

## 3.0 INTENDED USERS AND INTENDED USE OF THE REPORT

The intended users of this report are Two Rivers, their accountant and counsel, investors, and the Colorado Water Conservation Board (CWCB). The intended use of the report is for year-end financial report, information for investors, internal decision making purposes, and for loan collateral, if necessary.

## 4.0 EXPOSURE TIME

Exposure time is defined as:

> *the estimated length of time the property interest being appraised would have been offered on the market prior to the hypothetical consummation of a sale at market value on the effective date of the appraisal; a retrospective opinion based on an analysis of past events assuming a competitive and open market.*

Based on our experience with water rights, it is our opinion that the estimated exposure time is 12 months for the subject water rights.

## 5.0 DATE OF VALUATION

The two dates of valuation are March 2, 2010 and September 30, 2010.

[1] *Title XI of the Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989.*

## 6.0 SCOPE OF THE VALUATION

This appraisal is reported in a summary format. The scope of work for this valuation has included the following tasks:

- Review water decrees.
- Review CDSS database information for subject water rights.
- A site visit was made on October 7, 2010.
- Review of HCIC consultant reports on water rights and yields, on replacement cost new of the irrigation company assets, and preliminary plans for the rehabilitation of the Cucharas Dam.
- Define neighborhood for market analyses.
- Summarize supply and demand for Division 2 as analyzed by the Arkansas Basin Roundtable studies.
- Consider highest and best use analysis of subject water rights and structures.
- Identify and analyze comparable transactions for the sales comparison approach. Adjustments to each transaction are made to make them comparable to the subject. The comparables search has been conducted by a review of WWE files of transactions, telephone interviews of water providers, and knowledgeable water professionals. A description of each transaction is provided. Adjustments include items such as time of sale, volume of transaction, location, reliability, and the "cost of getting to market." A table of the comparable transactions has been provided.
- Determine a replacement cost new less depreciation value for the subject facilities.
- Perform an income analysis for the subject water rights and facilities.
- Reconciliation process and development of opinion of value.

## 7.0 REGIONAL WATER SETTING

The subject water rights and infrastructure are located in Water Districts 14, 16, and 79 of Water Division 2, the Arkansas River Basin. Water Division 2 includes a total of 13 water districts and 18 counties. The "water neighborhood" for the subject rights is the central area of the Arkansas basin generally including Huerfano, Pueblo, Otero, Custer, Fremont, and El Paso Counties.

The Arkansas Basin Roundtable summarized water demand and supplies in the *Arkansas Basin Consumptive Use Water Needs Assessment: 2030* prepared by Applegate Group, Inc. in July 2008. The identified gross water demand shortfall for year 2030 was nearly 29,000 acre-feet, with 22,600 acre-feet shortfall in El Paso County. In 2004, the Statewide Water Supply Initiative (SWSI) presented identified projects and processes (IP&Ps) and the 2008 Update gave a status report on the IP&Ps. A major IP&P is the Southern Delivery System (SDS), which if not implemented, would add an estimated 40,000 acre-feet to the shortfall. The 2008 Update also identifies the need for 70,700 acre-feet storage by year 2030 with 54,500 acre-feet need for Colorado Springs Utilities, Florence, Pikes Peak Regional Water Authority, La Junta, Penrose Water District, Otero County, Pueblo Board of Water Works, and Crowley County.

In addition to the municipal and industrial (M&I) water demands, expansion of the mining industry is noted as possibly increasing water demand and the shortfall of supplies.

Based on the Arkansas Basin Roundtable studies, a demand exists for water rights and for storage.

## 8.0 HIGHEST AND BEST USE

The highest and best use of the subject water rights and infrastructure is defined as follows:

> *The reasonably probable and legal use of the water, which is physically possible, legally permissible, financially feasible, and that results in the highest value.*

### 8.1 Legally Feasible

The HCIC water rights are all currently decreed for irrigation use. Continued use for irrigation by the Huerfano Valley Ditch and the Huerfano Valley Reservoir is legally feasible. Because

HCIC does have historic consumptive use, it is reasonably probable that such historic consumptive use could be changed in use to allow other uses.

The Cucharas Reservoir is under a storage restriction, and it may not be legally feasible to continue to use the Cucharas Reservoir unless rehabilitation of the dam is performed. The Bradford Reservoir and the Orlando Canal No. 5 water rights have been listed on the SEO Abandonment list; however, Two Rivers is protesting the listing. The legal feasibility of using the Bradford Reservoir and Orlando Canal No. 5 will be pending results of the Abandonment protest.

The use of the HCIC infrastructure for the current use of irrigation is legally feasible.

## 8.2 Physically Possible

The continued use of the Huerfano Valley Ditch and Huerfano Valley Reservoir water rights for irrigation is physically possible. With the availability of the Six Mile Creek return, it is physically possible to deliver historic consumptive use credit water to the Arkansas River, where it may be exchanged to upstream users. The HCIC infrastructure provides a physical connection to the Arkansas River.

The Cucharas Reservoir is under a storage restriction, and long-term use of the Cucharas Reservoir is not physically possible without rehabilitation of the dam. The Bradford Reservoir and the Orlando Canal No. 5 would require rehabilitation work to make water deliveries physically possible.

## 8.3 Financially Feasible

There is ongoing irrigation of agricultural lands with the Huerfano Valley Ditch and Huerfano Valley Reservoir, which indicates that irrigation use is financially feasible. Cucharas Reservoir is also used for irrigation, but it will require rehabilitation prior to long-term use for irrigation. Because the water rights do not have a firm yield, the water rights are not attractive for municipal use or augmentation use where a dry year supply is generally necessary. For this reason, continued use of the water rights in irrigation appears to the financially feasible use at this time.

## 8.4 Maximally Productive

The maximally productive use of the subject water rights and infrastructure is the use which would provide the highest value and at this time is for continued irrigation use.

## 8.5 Highest and Best Use Conclusion

After considering the above, and data review and analysis, the highest and best use of the subject water rights and infrastructure is agricultural irrigation use.

Two Rivers is in the process of expanding its water system infrastructure and has prospects to obtain produced water from coal bed methane operations. This would be a new, firm-yield supply that would have significant value when joined with the HCIC infrastructure and its connectivity with the Arkansas River.

# 9.0 APPROACH TO VALUE

The appraisers considered three approaches to value. They are described as follows:

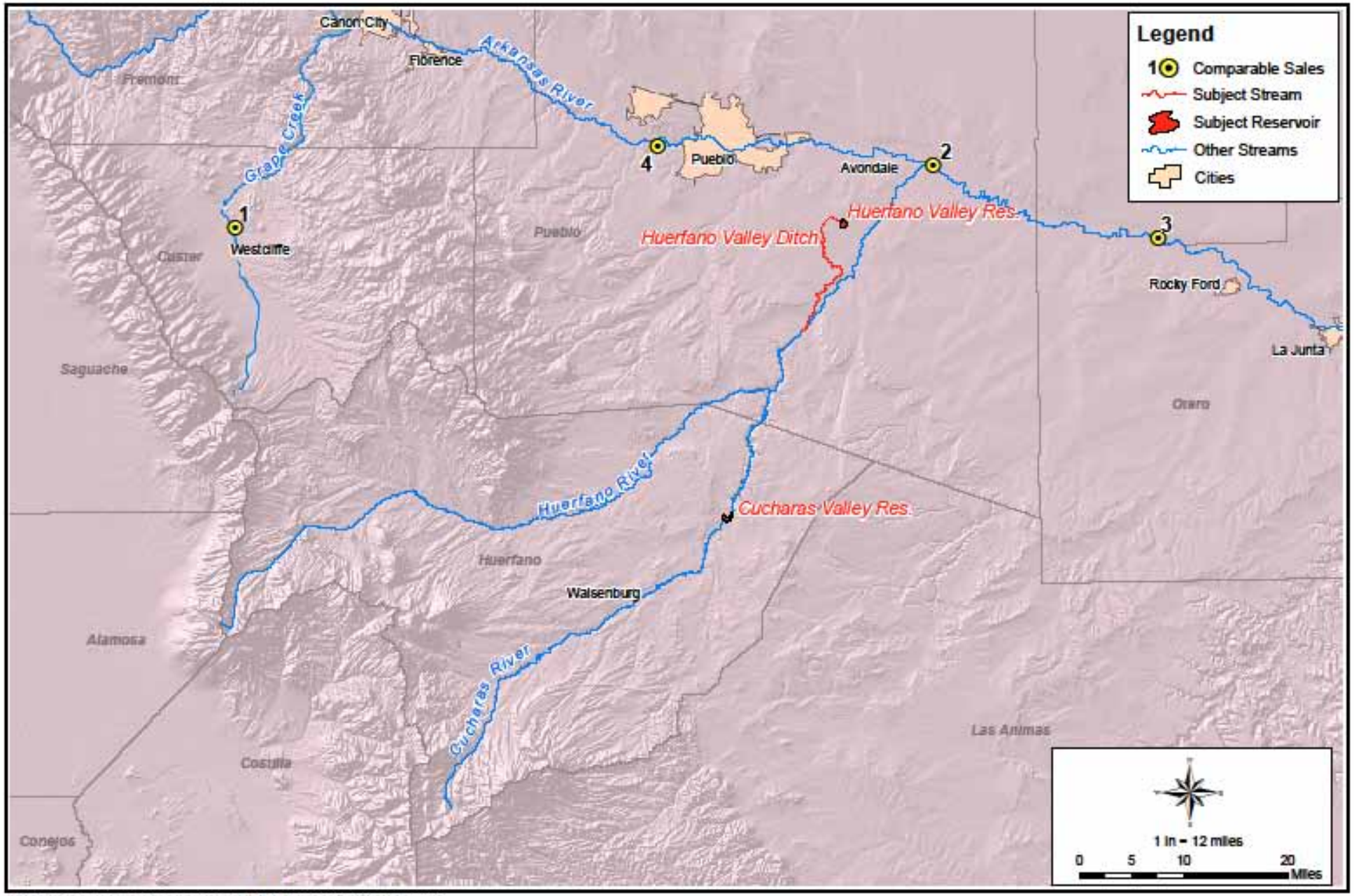
- In the **sales comparison approach**, the subject water right or water infrastructure is compared to other applicable recent sales. This method is most commonly used for water rights appraisals when adequate data is available. Data for generally comparable sales are used, and comparisons are made to demonstrate a probable price at which the subject water right would be priced on the market.

- In the **cost approach**, an estimated replacement cost of the water right or the water infrastructure as of the date of the appraisal is developed. Depreciation is deducted from the replacement cost to reflect the subject property. The net total represents the subject value indicated by the cost approach.

- In the **income capitalization approach**, the current potential income value for the water interest is shown. The prospective net operating income is estimated. An applicable capitalization method and appropriate capitalization rate are developed and used in computations that lead to an indication of value.

## 9.1 Sales Comparison Approach

The location of the subject water rights are shown on Figure 4 in red. The location of comparable sales is shown by a number on Figure 4. Tables 7.1 through 7.4 provide a summary of the water rights comparable sales. Water rights data including the Water District, structure ID number, adjudication date, appropriation date, and administration number are given for each comparable. Adjustments are made to the comparable sale to make the comparable similar to the subject. If the comparable has a characteristic that is superior to the subject water right, then a negative adjustment is made to the comparable. Vice versa, if the comparable is inferior to the subject water right, a positive adjustment is made to the comparable sale.




10/26/2010; Z:\Project Files\10\101-048\101-048.010\CAD-GIS\GIS\Figure_4.mxd

WWE
WRIGHT WATER ENGINEERS, INC.
2490 W 26TH AVE 100A
DENVER, CO. 80211
(303) 480-1700

TWO RIVERS WATER COMPANY

# LOCATION OF COMPARABLE SALES

| PROJECT NO. | FIGURE |
|---|---|
| 101-048.010 | 4 |

## Table 7.1
## Comparable Sale No. 1 – Hermit Basin

| | |
|---|---|
| Transaction No. | 1 |
| Water Right | A. Katzenstein Ditch No. 1 |
| Seller | Hermit Basin Lodge, LLC |
| Purchaser | Upper Arkansas Water Activity Enterprise |
| Date | March 19, 2010 |
| Streams | Middle Taylor Creek |
| Water District | 13 |
| County | Fremont |
| Diversion Location | Section 7, Township 22 S, Range 72 West 6th P.M. |
| Quantity | 70 AF court quantified average year CU |
| Purchase Price | $ 225,050 |
| Price per Acre Foot | $ 3,215 |
| Comments | A. Katzenstein Ditch No. 1 changed and included in augmenation plan in Case No. 95CW10 and as amended in Case No. 00CW42. |

Comparable Water Right -

| Name | Source | Struct ID | Amount | Adjudication Date | Appropriation Date | Administration Number |
|---|---|---|---|---|---|---|
| A. Katzenstein Ditch No. 1 | M. Taylor Creek | 7011 | 1.8600 | 03/12/1896 | 03/30/1873 | 8490.00000 |

| Adjustment | | | |
|---|---|---|---|
| Price in March 2010 | $ | 3,215 | per AF Court Quantified CU |
| Decree Use - All uses | | ($250) | Superior to Subject right for Irrigation |
| Location | | ($100) | Superior, higher in Basin |
| Dry Year Yield | | 0 | Similar |
| Other | | | |
| | $ | 2,865 | |
| Round to | $ | 2,900 | |

## Table 7.2
## Comparable Sale 2 – Woodmoor Rocky Ford Highline

| | | | | | |
|---|---|---|---|---|---|
| Transaction No. | 2 | | | | |
| Water Right | Rocky Ford Highline | | | | |
| Sellers | various shareholders | | | | |
| Purchaser | Woodmoor Water and Sanitation district | | | | |
| Stream | Arkansas | | | | |
| Water District | 14 | | | | |
| County | Pueblo | | | | |
| Diversion Location | Section 30, Township 22 South, Range 57 West 6th P.M. | | | | |
| Date | May-10 | 8-Apr-10 | Options | | |
| Quantity | 6.6 | 40 shares | 1.9% | ~2,400 | total shares |
| Average Yield | 16.7 | af CU per share estimated | | | |
| Dry Year:Avg Year | 50% | | | | |
| Price per Share | $ 43,000 | | | | |
| Price per af | 2,575 | average year | | | |
| Comments | | | | | |

Comparable Water Right -

| Name | Source | Struct ID | Amount | Adjudication Date | Appropriation Date | Administration Number |
|---|---|---|---|---|---|---|
| Rocky Ford Highline | Arkansas R | 542 | 40.0000 | 1896-03-23 | 1861-12-31 | 4383.00000 |
| | | | 0.6000 | 1896-03-23 | 1867-09-21 | 6473.00000 |
| | | | 16.0000 | 1896-03-23 | 1869-07-01 | 7122.00000 |
| | | | 30.0000 | 1896-03-23 | 1885-06-30 | 12965.00000 |
| | | | 2.0000 | 1896-03-23 | 1886-03-11 | 13219.00000 |
| | | | 380.5000 | 1896-03-23 | 1890-01-06 | 14616.00000 |
| | | | 32.5000 | 1905-04-08 | 1884-03-07 | 12485.00000 |

| Adjustment | | |
|---|---|---|
| Price in 2010 dollars | $ 2,575 | |
| Decree Use Irr | - | Similar |
| Location | 500 | Inferior, downstream between Manzanola and Rocky Ford |
| Seniority | (1,287) | Superior (-50%) |
| Other | 1,000 | Inferior, minority shareholder & change in Bylaws required to change water |
| Total Adjusted | $ 2,787 | |
| Rounded | $ 2,800 | |

# Table 7.3
# Comparable Sale – Woodmoor Holbrook

| | | | | | |
|---|---|---|---|---|---|
| Transaction No. | 3 | | | | |
| Water Right | Holbrook | | | | |
| Sellers | various shareholders | | | | |
| Purchaser | Woodmoor Water and Sanitation district | | | | |
| Stream | Arkansas | | | | |
| Water District | 17 | | | | |
| County | Otero | | | | |
| Diversion Location | Section 24, Township 22 South, Range 58 West 6th P.M. | | | | |
| Reservoir Location | Section 5, Township 23 South, Range 55 West 6th P.M | | | | |
| Date | Jun-10 | Option | | | |
| Quantity | 931.7 | shares | 5.8% | 16,003 | total shares |
| Average Yield | 800.0 | af CU per share estimated | | | |
| Dry Year:Avg Year | 40% | | | | |
| Price | $1,956,570 | | | | |
| Price per af | $ 2,446 | average year | | | |
| Comments | 700 | cfs SEO estimated ditch capacity | | | |
| | 7,472 | AF SEO estimated Reservoir capacity | | | |

Comparable Water Right -

| Name | Source | Struct ID | Amount | Adjudication Date | Previous Adjudication Date | Appropriation Date | Administration Number |
|---|---|---|---|---|---|---|---|
| Holbrook Canal | Arkansas R | 554 | 155.0 | 1905-04-08 | | 1889-09-25 | 14513.00000 |
| | | | 600.0 | 1905-04-08 | | 1892-03-02 | 15402.00000 |
| | | | 445.0 | 1905-04-08 | | 1893-08-30 | 15948.00000 |
| | | | 1200.0 | | | | |
| Holbrook Reservoir | | 3511 | 4247.0 | 1905-04-08 | | 1892-03-02 | 15402.00000 |
| | | | 2000.0 | 1927-02-03 | 1905-04-08 | 1903-10-10 | 20186.19640 |
| | | | 1196.0 | 1927-02-03 | 1905-04-08 | 1909-09-15 | 21807.00000 |
| | | | 7443.0 | | | | |

| Adjustment | | |
|---|---|---|
| Price in 2010 dollars | $ 2,446 | |
| Decree Use Irr | - | Similar |
| Location | 500 | Inferior, downstream between Manzanola and Rocky Ford |
| Seniority | (978) | Superior (-40%) |
| Other | 1,000 | Inferior, minority shareholder |
| Total Adjusted | $ 2,967 | |
| Rounded | $ 3,000 | |

## Table 7.4
## Comparable Sale 4 – PBWW Bessemer Ditch

| | | | |
|---|---|---|---|
| Transaction No. | 4 | | |
| Water Right | Bessemer | | |
| Sellers | shareholders | | |
| Offer | Pueblo Board of Water Works | | |
| Date | Closings began 2009, few closings pending | | |
| Stream | Arkansas River at Pueblo Dam | | |
| Water District | 14 | | |
| County | Pueblo | | |
| Quantity | ~5300 | shares | 19738.593 total shares |
| Average Yield | 1.5 | af CU per share | |
| Dry Year:Avg Year | 62% | | |
| Price per Share | $ 10,150 | | |
| Price per af | 6,767 | | |
| Comments | | | |

Comparable Water Right -

| Name | Source | Struct ID | Amount | Appropriation Date | Adjudication Date | Administration Number |
|---|---|---|---|---|---|---|
| Bessemer Ditch | Arkansas R | 533 | 2.0 cfs | 04/30/1861 | 03/23/1896 | 4109.00000 |
| | | | 20.0 cfs | 12/31/1861 | 03/23/1896 | 4383.00000 |
| | | | 3.74 cfs | 5/31/1864 | 03/23/1896 | 5265.00000 |
| | | | 3.0 cfs | 6/30/1866 | 03/23/1896 | 6025.00000 |
| | | | 2.5 cfs | 1/18/1867 | 03/23/1896 | 6217.00000 |
| | | | 5.13 cfs | 5/13/1867 | 03/23/1896 | 6360.00000 |
| | | | 1.47 cfs | 11/30/1870 | 03/23/1896 | 7639.00000 |
| | | | 3.4 cfs | 12/32/1870 | 03/23/1896 | 7670.00000 |
| | | | 2.0 cfs | 9/18/1873 | 03/23/1896 | 8662.00000 |
| | | | 3.0 cfs | 12/31/1876 | 03/23/1896 | 9862.00000 |
| | | | 0.41 cfs | 12/31/1876 | 03/23/1896 | 10592.00000 |
| | | | 14.0 cfs | 5/4/1881 | 03/23/1896 | 11447.00000 |
| | | | 2.0 cfs | 6/20/1881 | 03/23/1896 | 11494.00000 |
| | | | 8.0 cfs | 3/31/1882 | 03/23/1896 | 11778.00000 |
| | | | 322.0 cfs | 5/1/1887 | 03/23/1896 | 13635.00000 |

| | | |
|---|---|---|
| Adjustment | | |
| Price in 2010 dollars | $ 6,767 | |
| Decree Use Irr | - | Similar |
| Location | - | Similar |
| Seniority | (3,383) | Superior (-50%) |
| Other | | |
| Total Adjusted | $ 3,383 | |
| Rounded | $ 3,400 | |

The comparable sales indicated values per acre foot of consumptive use are summarized below in Table 8:

**Table 8**
**Summary of Comparable Sales Indicated Value**

| No. | Transaction | Indicated Value |
|---|---|---|
| 1 | UAWCD - Hermit Basin | $ 2,900 |
| 2 | Woodmoor - Rocky Mountain Highline | 2,800 |
| 3 | Woodmoor - Holbrook | 3,000 |
| 4 | PBWW - Bessemer | 3,400 |
| Mean | | $ 3,025 |
| Median | | $ 2,950 |
| Minimum | | $ 2,800 |
| Maximum | | $ 3,400 |

### 9.1.2 Sales Comparison Approach Reconciliation

The indicated unit value as of March 2, 2010 is based on comparable Sale No. 1, $2,900. The final agreement on the Upper Arkansas Water Conservancy District and Hermit Basin was not signed until March 19, 2010; however, negotiations on the agreement began in December 2009.

The indicated value as of September 30, 2010 includes equal consideration of all four comparable sales with an indicated unit price of $3,000 per acre-foot.

The historic consumptive use (HCU) for the HCIC system is approximately 3,100 acre-feet. The indicated values of the HCIC system are as follows:

Effective Date March 2, 2010:

3,100 acre-feet @ $2,900 per AF HCU = $8,990,000

Effective Date September 30, 2010

3,100 acre-feet @ $3,000 per AF HCU = $9,300,000

The Two Rivers ownership interest was a majority interest for both of the effective dates above: 53.9 percent as of March 2, 2010 and 90.9 percent as of September 30, 2010. The value of a

majority interest is of greater value than a minority interest, as management and operation decisions are controlled by the majority interest.

The value of the majority interest versus a minority interest is indicated in Table 9. The Penrose Water District purchased a majority interest in a water right in 2005 and then two years later purchased a minority interest at a lower price. During the 2005 to 2007 period, water prices for Twin Lakes water escalated at a rate of 2.3 percent, and for Fountain Mutual Irrigation Company shares at 5 percent. Applying an escalation rate of 3.5 percent to the 2005 transaction below gives a 2007 time adjusted price of $3,999 for the majority interest, as compared to the minority interest price of $3,158. The minority price interest is 79 percent of the majority price ($3,158/$3,999 = 0.79). The majority to minority ratio is rounded to 80 percent.

**Table 9**
**Majority Interest vs. Minority Interest**

| Transaction No. | A | B |
|---|---|---|
| Water Right | Pleasant Valley Ditch | |
| Seller | Denzel Goodwin | |
| Purchaser | Penrose Water District | |
| Stream | Arkansas River | |
| Water District | 12 | |
| County | Fremont | |
| Date | 2005 | Sep-07 |
| Estimated Quantity (af) | 375 | 19 |
| Purchase Price | $1,400,000 | $ 60,000 |
| Price per Acre Foot | $ 3,733 | $ 3,158 |
| Change Case Files | 06CW12 | |
| | 10/12ths interest | ~0.5/12ths interest |

As of the March 2, 2010 date, the Majority and Minority interests in HCIC water rights are:

| | |
|---|---|
| Majority Interest | $4,994,400 |
| Minority Interest | 3,995,600 |
| Total | $8,990,000 |

As of the September 30, 2010 date, the Majority and Minority interests in HCIC water rights are:

| | |
|---|---|
| Majority Interest | $8,610,400 |
| Minority Interest | 689,600 |
| Total | $9,300,000 |

## 9.2 Cost Approach

The Applegate Group, Inc prepared a September 7, 2010 Memorandum regarding the replacement cost new of the HCIC infrastructure. WWE is well acquainted with the Applegate Group, Inc., knows the firm's work to be competent and reliable, and has relied upon the work of Applegate for the replacement cost new estimate. The Applegate infrastructure cost estimate is included in Appendix A and totals $67,075,327. The valuation did not take into account depreciation of the infrastructure facilities.

Tables 10 and 11 provide the indicated value of the HCIC infrastructure for the dates of March 2, 2010 and September 30, 2010, respectively. The replacement cost new for the Cucharas Reservoir has been updated with the cost opinion provided by GEI, Inc. in their March 2010 report. A percentage depreciation has been estimated based on our review of documents, observation of the facilities in the field, and engineering judgment.

The indicated value of the HCIC Infrastructure as of March 2, 2010 is:

| | |
|---|---|
| Majority Interest | $ 8,439,000 |
| Minority Interest | 6,767,000 |
| Total HCIC Infrastructure | $15,206,000 |

The indicated value of the HCIC Infrastructure as of September 30, 2010 is:

| | |
|---|---|
| Majority Interest | $15,648,000 |
| Minority Interest | 1,269,000 |
| Total HCIC Infrastructure | $16,917,000 |

**Table 10**
**Cost Approach – Indicated Value HCIC Infrastructure as of March 2, 2010**

| Item No. | Item | Quantity | Unit | Unit Cost New | Total Cost New | Depreciation | Cost New Less Depreciation |
|---|---|---|---|---|---|---|---|
| 1 | Cucharas Reservoir (~41,000 AF) | Lump Sum | | | $26,646,000 | 90% | $ 2,664,600 |
| 2 | HCIC Ditch | 120,214.0 | LF | 150 | 18,032,100 | 75% | 4,508,025 |
| 3 | HCIC Ditch ROW | 110.4 | Acres | 200 | 22,080 | 0% | 22,080 |
| 4 | HCIC Laterals | 18,480 | LF | 50 | 924,000 | 75% | 231,000 |
| 5 | HCIC Lateral ROW | 8.48 | Acres | 200 | 1,696 | 0% | 1,696 |
| 6 | HCIC Ditch Turnouts | 21 | each | 25000 | 525,000 | 90% | 52,500 |
| 7 | HCIC Diversion Structure | Lump Sum | | | 1,500,000 | 25% | 1,125,000 |
| 8 | Broadacre Ditch Upper Section | 37,670 | LF | 175 | 6,592,250 | 75% | 1,648,063 |
| 9 | Broadacre Ditch Lower Section | 66,035 | LF | 175 | 11,556,125 | 75% | 2,889,031 |
| 10 | Broadacre Easement | 95.23 | Acres | 200 | 19,046 | 0% | 19,046 |
| 11 | Braodacre Ditch Turnouts | 15 | each | 25000 | 375,000 | 90% | 37,500 |
| 12 | Broadacre Diverson Structure | Lump sum | | | 1,500,000 | 25% | 1,125,000 |
| 13 | Six Mile Creek River Return | 5,280 | LF | 100 | 528,000 | 75% | 132,000 |
| 14 | Huerfano Valley Lake | 2,000 | AF | 750 | 1,500,000 | 50% | 750,000 |
| Total | | | | | | | $ 15,205,541 |
| Total Indicated Value Infrastructure as of March 2, 2010 (Rounded) | | | | | | | $ 15,206,000 |
| Two Rivers Majority Ownership Interest (Rounded) | | | | | | | $ 8,439,000 |
| Minority Ownership Interest (Rounded) | | | | | | | $ 6,767,000 |

**Table 11**
**Cost Approach – Indicated Value HCIC Infrastructure as of September 30, 2010**

| Item No. | Item | Quantity | Unit | Unit Cost New | Total Cost New | Depreciation | Cost New Less Depreciation |
|---|---|---|---|---|---|---|---|
| 1 | Cucharas Reservoir (~41,000 AF) | Lump Sum | | | $26,646,000 | 85% | $ 3,996,900 |
| 2 | HCIC Ditch | 120,214.0 | LF | 150 | 18,032,100 | 75% | 4,508,025 |
| 3 | HCIC Ditch ROW | 110.4 | Acres | 200 | 22,080 | 0% | 22,080 |
| 4 | HCIC Laterals | 18,480 | LF | 50 | 924,000 | 75% | 231,000 |
| 5 | HCIC Lateral ROW | 8.48 | Acres | 200 | 1,696 | 0% | 1,696 |
| 6 | HCIC Ditch Turnouts | 21 | each | 25000 | 525,000 | 75% | 131,250 |
| 7 | HCIC Diversion Structure | Lump Sum | | | 1,500,000 | 20% | 1,200,000 |
| 8 | Broadacre Ditch Upper Section | 37,670 | LF | 175 | 6,592,250 | 75% | 1,648,063 |
| 9 | Broadacre Ditch Lower Section | 66,035 | LF | 175 | 11,556,125 | 75% | 2,889,031 |
| 10 | Broadacre Easement | 95.23 | Acres | 200 | 19,046 | 0% | 19,046 |
| 11 | Braodacre Ditch Turnouts | 15 | each | 25000 | 375,000 | 90% | 37,500 |
| 12 | Broadacre Diverson Structure | Lump sum | | | 1,500,000 | 20% | 1,200,000 |
| 13 | Six Mile Creek River Return | 5,280 | LF | 100 | 528,000 | 75% | 132,000 |
| 14 | Huerfano Valley Lake | 2,000 | AF | 750 | 1,500,000 | 40% | 900,000 |
| Total | | | | | | | $ 16,916,591 |
| Total Indicated Value Infrastructure as of September 30, 2010 (Rounded) | | | | | | | $ 16,917,000 |
| Two Rivers Majority Ownership Interest (Rounded) | | | | | | | $ 15,648,000 |
| Minority Ownership Interest (Rounded) | | | | | | | $ 1,269,000 |

## 9.3 Income Approach

In the income approach, the potential net annual income from irrigated land is estimated. An appropriate capitalization rate is developed and used to convert the series of annual net income into a present value.

Table 12 summarizes available water supply from the HCIC for an average year. The average year consumptive use requirement for pasture grass is approximately 2.25 feet (27 inches). The estimated HCU for the system is 3,100 acre-feet per year, which would be the CU for 1380 acres pasture grass a year with a full water supply. Crops can also be short watered for a time and rely on the available soil moisture. The soils on the HCIC lands are typically clay loam, which has good water-holding capacity. For this reason, the estimated irrigated area used is 1818 acres, at 2 feet per acre.

**Table 12**
**Estimate of Average Irrigated Acres**

| | | |
|---|---|---|
| Average Annual Water Yield | 6,804 | AF/yr |
| Lateral Headgate Headgate | 6,214 | AF/yr |
| Farm Headgate | 5,593 | AF/yr |
| Max efficiency | 65% | |
| Irrigation Water Available | 3,635 | AF/yr |
| Average Annual HCU | 3,100 | AF/yr |
| Unit Net Irrigation Req't | 2.25 | ft/yr Pasture Grass |
| Unit Irrigation @ 2 ft | 1,818 | Acres |
| Unit Irrigated @ 1.2 ft | 3,000 | Acres |

The next step is to select a capitalization rate. Table 13 provides a history of various interest rates and the change in the Consumer Price Index. For the period years 2000-2010, the interest rate has been in the neighborhood of 6 percent while the inflation rate has averaged about 2.5 percent. A net discount rate of 3.5 percent is used.

## Table 13
## Interest Rates[1] and CPI Change[2]

| Year | Bank Loans to Business Prime Interest Rate | Moody's aaa | Bond 20-bond index | 30-year Conventional Mortgage | Gov't Securities 10-yr constant maturity | Change in Consumer Price Index |
|---|---|---|---|---|---|---|
| 1990 | 10.01% | 9.32% | 7.27% | 10.13% | 8.55% | 5.39% |
| 1991 | 8.46% | 8.77% | 6.92% | 9.25% | 7.86% | 4.25% |
| 1992 | 6.25% | 8.14% | 6.44% | 8.40% | 7.01% | 3.03% |
| 1993 | 6.00% | 7.22% | 5.60% | 7.33% | 5.87% | 2.96% |
| 1994 | 7.15% | 7.97% | 6.18% | 8.35% | 7.09% | 2.61% |
| 1995 | 8.83% | 7.59% | 5.95% | 7.95% | 6.57% | 2.81% |
| 1996 | 8.27% | 7.37% | 5.76% | 7.80% | 6.44% | 2.93% |
| 1997 | 8.44% | 7.27% | 5.52% | 7.60% | 6.35% | 2.34% |
| 1998 | 8.35% | 6.53% | 5.09% | 6.94% | 5.26% | 1.55% |
| 1999 | 8.00% | 7.05% | 5.43% | 7.43% | 5.65% | 2.19% |
| 2000 | 9.23% | 7.62% | 5.71% | 8.06% | 6.03% | 3.38% |
| 2001 | 6.91% | 7.08% | 5.15% | 6.97% | 5.02% | 2.83% |
| 2002 | 4.67% | 6.49% | 5.04% | 6.54% | 4.61% | 1.59% |
| 2003 | 4.12% | 5.66% | 4.75% | 5.82% | 4.01% | 2.27% |
| 2004 | 4.34% | 5.63% | 4.70% | 5.84% | 4.27% | 2.68% |
| 2005 | 6.19% | 5.23% | 4.40% | 5.86% | 4.29% | 3.39% |
| 2006 | 7.96% | 5.59% | 4.40% | 6.41% | 4.80% | 3.24% |
| 2007 | 8.05% | 5.56% | 4.40% | 6.34% | 4.63% | 2.80% |
| 2008 | 5.09% | 5.63% | 4.86% | 6.04% | 3.66% | 3.85% |
| 2009 | 3.25% | 5.31% | 4.62% | 5.04% | 3.26% | -0.34% |
| thru June 2010 | 3.25% | 4.88% | 4.36% | 4.74% | 3.20% | 2.07% |
| Avg '90-2010 | 6.8% | 6.8% | 5.4% | 7.1% | 5.4% | 2.8% |
| Avg '00-2010 | 5.7% | 5.9% | 4.8% | 6.2% | 4.3% | 2.5% |

| | |
|---|---|
| Use Interest Rate of | 6.0% |
| Use Inflation Rate of | 2.5% |
| Net Discount Rate | 3.5% |

[1] http://www.federalreserve.gov/Release/h15/data.htm

[2] http://inflationdata.com?Inflation/Inflation_Rate/HistoricalInflation.aspx

[3] Consumer Price Index - All Urban Consumers

The Lytle report gave a crop mix of 20 percent alfalfa and 80 percent pasture hay. Table 14 summarizes the estimated annual net income based on the crop mix, acres irrigated, yield per acre, and net income per unit. The net income is based on 2010 unit prices less a 70 percent

expense ratio. The unit yields and expense ratio for the crops are based on review of the 2007 *Agricultural Census for Colorado*. The annual net income is estimated to be $170,127. The series of annual net income is then converted to a present value based on the capitalization rate and a term of 100 years. For sensitivity purposes, in addition to the 3.5 percent rate, the calculations are also provided for 2.5 and 4.5 percent rates. The indicated value is for land and water. The value of land is subtracted ($300 per acre), and the remainder is the value of the water rights.

The indicated value of alfalfa pasture grass crop mix is $4,160,000.

An additional set of calculations are performed for a different crop mix with a lower irrigated acreage amount, which is an approximate estimate of current irrigated acreage. The net annual income is estimated at $163,376, and the capitalized indicated value is $4,188,000. See Table 14 below.

The indicated value derived from the income approach does not vary significantly between the March 2, 2010 and September 30, 2010 effective dates. The indicated value from the income approach as of March 2, 2010 and September 30, 2010 is $4,160,000.

## Table 14
## Water Rights Value Indicated by Income Approach

Crop Mix given by Lytle

| Crop | Percent | Acres | Yield per acre | Unit | Total Yield | Net Income per Unit | Total Annual Income |
|---|---|---|---|---|---|---|---|
| Alfalfa | 20% | 364 | 3.0 | tons | 1,091 | $ 36 | $ 39,260 |
| Pasture | 80% | 1,454 | 3.0 | tons | 4,362 | 30 | 130,867 |
| Total | | 1,818 | | | | | $ 170,127 |

| Net discount rate | 2.5% | 3.5% | 4.5% |
|---|---|---|---|
| Use n years | 100 | 100 | 100 |
| Equal series present worth | 36.6141 | 27.6554 | 21.9499 |
| Indicated Value Land & Water | $6,229,044 | $ 4,704,932 | $ 3,734,260 |
| Unit value land (per acre) | $ 300 | $ 300 | $ 300 |
| Land Value (1818 ac X $300) | $ 545,279 | $ 545,279 | $ 545,279 |
| Water Rights Indicated Value | $5,683,765 | $ 4,159,653 | $ 3,188,982 |
| Round to | | **$ 4,160,000** | |

Crop Mix Sensitivity

| Crop | Percent | Acres | Yield per acre | Unit | Total Yield | Net Income per Unit | Total Annual Income |
|---|---|---|---|---|---|---|---|
| Alfalfa | 55% | 605 | 3.0 | tons | 1,815 | $ 36 | $ 65,340 |
| Corn | 30% | 330 | 184 | bu | 60,720 | 1.50 | 91,080 |
| Sorghum | 10% | 110 | 24.5 | bu | 2,699 | 1.50 | 4,048 |
| Oats | 5% | 55 | 47 | bu | 2,585 | 1.13 | 2,908 |
| Total | | 1100 | | | | | $ 163,376 |

| Net discount rate | 2.5% | 3.5% | 4.5% |
|---|---|---|---|
| Use n years | 100 | 100 | 100 |
| Equal series present worth | 36.6141 | 27.6554 | 21.9499 |
| Indicated Value Land & Water | $5,981,866 | $ 4,518,233 | $ 3,586,079 |
| Unit value land (per acre) | $ 300 | $ 300 | $ 300 |
| Land Value (1100 ac X $300) | $ 330,000 | $ 330,000 | $ 330,000 |
| Water Rights Indicated Value | $5,651,866 | $ 4,188,233 | $ 3,256,079 |
| Round to | | **$ 4,188,000** | |

# 10.0 RECONCILIATION

## 10.1 HCIC Water Rights

The sales comparison approach is the method relied upon for the valuation of the HCIC water rights. An income approach analysis to value the water rights was performed but is not relied upon. The cost approach was considered but was judged to not be applicable for use in valuing water rights.

As of the March 2, 2010 date, the Majority and Minority interests in HCIC water rights are:

| | |
|---|---|
| Majority Interest | $4,994,400 |
| Minority Interest | 3,995,600 |
| Total | $8,990,000 |

As of the September 30, 2010 date, the Majority and Minority interests in HCIC water rights are:

| | |
|---|---|
| Majority Interest | $8,610,400 |
| Minority Interest | 689,600 |
| Total | $9,300,000 |

## 10.2 HCIC Infrastructure

The cost approach is used to estimate the value of the HCIC Infrastructure. The sales comparison approach was considered, but sales of irrigation canal infrastructure are not common. There are sales of reservoir facilities, but with the impending SEO breach order, the sales comparison approach would require cost adjustments to account for the condition of the reservoir and would essentially become a cost approach. The income approach was performed to value the water rights, and portions of the canal infrastructure are necessary to deliver the irrigation water; however, the HCIC Infrastructure has value beyond agricultural use.

Tables 10 and 11 present the cost approach calculations as of the effective dates of March 2, 2010 and September 30, 2010 and the results are summarized as follows:

The indicated value of the HCIC Infrastructure as of March 2, 2010 is:

| | |
|---|---|
| Majority Interest | $ 8,439,000 |
| Minority Interest | 6,767,000 |
| Total HCIC Infrastructure | $15,206,000 |

The indicated value of the HCIC Infrastructure as of September 30, 2010 is:

| | |
|---|---|
| Majority Interest | $15,648,000 |
| Minority Interest | 1,269,000 |
| Total HCIC Infrastructure | $16,917,000 |

## 10.3 Reconciliation HCIC System

The combined HCIC water rights and infrastructure indicated values are as follows.

The indicated value of the HCIC Infrastructure as of the valuation date of March 2, 2010 is:

| | |
|---|---|
| Majority Interest | $13,433,400 |
| Minority Interest | 10,762,000 |
| Total HCIC Infrastructure | $24,196,000 |

The indicated value of the HCIC Infrastructure as of the valuation date of September 30, 2010 is:

| | |
|---|---|
| Majority Interest | $24,258,400 |
| Minority Interest | 1,958,600 |
| Total HCIC Infrastructure | $26,217,000 |

# 11.0 CONTINGENT AND LIMITING CONDITIONS

This valuation report has been made with the following general assumptions:

1. The subject water rights and infrastructure are described in general terms. The appraiser has not reviewed all documents relating to the subject water interests. No responsibility is assumed for matters including legal or title considerations. Title to the properties is assumed to be good and marketable unless otherwise stated.

2. The subject water rights and infrastructure are appraised free and clear of any and all liens or encumbrances unless otherwise stated.

3. The general information regarding the subject water rights and infrastructure furnished by others is believed to be reliable. However, no warranty is given for its accuracy.

4. It is assumed that there are no hidden or unapparent conditions of the water rights and infrastructure that render them more or less valuable. No responsibility is assumed for such conditions or for engineering studies that may be required to discover them.

5. It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations and laws unless noncompliance is stated, defined, and considered in the appraisal report.

6. It is assumed that all required approvals for construction, permits, and administrative requirements from state government have been or can be obtained or renewed for the stated property use.

7. WWE is experienced in water engineering, water supply systems, and in performing appraisals. Patricia K. Flood, P.E. is a qualified appraiser and has appraised numerous water rights and water facilities in Colorado and several other western states.

8. The forecasts, projections, or operating estimates contained herein are based upon current market conditions, anticipated supply and demand factors, and a stable economy. These forecasts are, therefore, subject to changes in future conditions.

This market report has been made with the following general limiting conditions:

1. The subject water rights and infrastructure have been identified and described in terms of use and a general location.

2. No legal opinion was obtained relative to property ownership or legal status.

3. Possession of this report, or a copy thereof, does not carry with it the right of publication.

4. The appraiser, by reason of this appraisal, is not required to give further consultation or testimony or to be in attendance in court with reference to the property in question unless arrangements have been previously made.

5. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraiser, or the firm with which the appraiser is connected) shall be disseminated without the prior written consent and approval of the appraiser.

## CERTIFICATE OF VALUE

I, the undersigned, do hereby certify that Patricia K. Flood has prepared this appraisal and to the best of my knowledge and belief:

1. The statements of fact contained in this report are true and correct.

2. The reported analyses, opinions, and conclusions are limited by the reported assumptions and limiting conditions and are my personal unbiased professional analyses, opinions, and conclusions.

3. I have no present or prospective interest in the property that is the subject of this report, and I have no personal interest or bias with respect to the parties involved.

4. Compensation is not contingent upon reporting a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.

5. The confidentiality of the appraiser-client relationship has been protected.

6. This appraisal has been prepared in general accordance to the *Uniform Standards of Professional Appraisal Practice.*

**Valuation as of March 2, 2010**

| | Majority Interest | Minority Interest | Total |
|---|---|---|---|
| Water Rights | $ 4,994,400 | $ 3,995,600 | $ 8,990,000 |
| Infrastructure | 8,439,000 | 6,767,000 | 15,206,000 |
| Total | $ 13,433,400 | $10,762,600 | $ 24,196,000 |

**Valuation as of September 30, 2010**

| | Majority Interest | Minority Interest | Total |
|---|---|---|---|
| Water Rights | $ 8,610,400 | $ 689,600 | $ 9,300,000 |
| Infrastructure | 15,648,000 | 1,269,000 | 16,917,000 |
| Total | $ 24,258,400 | $ 1,958,600 | $ 26,217,000 |

**WRIGHT WATER ENGINEERS, INC.**

By:_____

Patricia K. Flood, P.E., Senior Consultant
Certified General Appraiser
#CG01318801

## QUALIFICATIONS OF APPRAISER

Patricia K. Flood, P.E. has a B.S. Degree in civil engineering from the University of Kansas, is a registered professional engineer, and is a certified general appraiser in Colorado and Arizona. She has prepared numerous appraisals of water rights and water and wastewater facilities. Patricia has provided expert testimony in water court and in civil court. She was a co-author of the book, *Water Rights Handbook for Colorado Conservation Easements, Colorado Water Trust for Conservation Organizations*. She has been a speaker at several Continuing Legal Education seminars on water rights valuation. Patricia is author of the chapters "Water Rights of the 50 States and Territories" and "Water Rights of the Eastern United States" in the American Water Works Association manuals on water rights.

The curriculum vitae of Patricia K. Flood, P.E. are attached in Appendix B.

## BIBLIOGRAPHY

Applegate Group. 2008. Arkansas Basin Consumptive Use Water Needs Assessment: 2030, 2008 Update. Prepared for Arkansas Basin Roundtable, July.

Applegate Group. 2009. Cucharas Reservoir No. 5 Dam Rehabilitation Feasibility Study. Prepared for Huerfano-Cucharas Irrigation Company, March.

Applegate Group. 2010. Memorandum to Two Rivers Water Company Regarding Estimate of Value of HCIC Water Project. September 7,

Arkansas Basin Roundtable. 2009. A Resource Document: Projects and Methods to Meet the Needs of the Arkansas Basin. November.

GEI Consultants, Inc. 2010. Final Cucharas Dam Rehabilitation Project Preliminary Design Huerfano County, Colorado. Submitted to Two Rivers Water Company, March.

GEI Consultants, Inc. 2010. Preliminary Design Drawings for the Cucharas Dam Rehabilitation Project. Prepared for Two Rivers Water Company, January.

Lytle Water Solutions. 2006. Yield/Exchange Evaluation of Cucharas Reservoir and Huerfano Valley Ditch. Prepared for Huerfano-Cucharas Irrigation Company, November.

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# APPENDICES

# Photo Log

# October 7, 2010 Site Visit

Photo 1. Cucharas Dam looking west along crest with ogee spillway in center background

Photo 2. Looking east along Cucharas Dam toward gate house.

Photo 3. Looking downstream from Cucharas Dam.

Photo 4. Looking over Bradford Reservoir with outlet gate in middle foreground.

Photo 5. Ditch leading from Bradford Reservoir.

Photo 6. Bradford Ditch sandout.

Photo 7. Bradford Ditch.

Photo 8. Orlando Reservoir.

Photo 9. Huerfano Valley Diversion Dam.

Photo 10. Looking upstream from the Huerfano Valley diversion dam and headgate

Photo 11. Huerfano Ditch Headgate and Diversion Dam

Photo 12. Broadacre Ditch Sandout.

Photo 13. Lower Broadacre Ditch flume.

Photo 14. Lower Broadacre Ditch.

Photo 15.  Lateral Gate.

Photo 16.  Typical Turnout.

Photo 17. Two Rivers Farming Corn Crop.

Photo 18. Huerfano Reservoir with channel to outlet gate.

Photo 19. Huerfano Valley Reservoir outlet gate.

Photo 20. Outlet channel from Huerfano Valley Reservoir.

Photo 21. Six Mile Creek Return Pipeline

Photo 22. Six Mile Creek Return.

Photo 23. Six Mie Creek Return

# Appendix A

## Applegate Infrastructure Cost Estimate

**Applegate Group, Inc.**
*Water Resource Advisors for the West*

# *Memorandum*

Date: September 7, 2010 **AG Job No.: 10-131**

To: **Two Rivers Water Company, Files**

From: Mike Applegate, PE

Subject: **Estimate of value of HCIC Water Project**

I have completed a preliminary opinion of the value of the infrastructure for the Huerfano Cucharas Irrigation Company (HCIC) as requested. Based on information supplied by several sources which include Wayne Harding, Kevin Lowther, John Stroh and Jeff Clark, I can supply you the following information and conclusions.

**Understanding of Assignment**

My task was to place a value on the project infrastructure for purposes of doing an internal company valuation. The approach taken was on a cost basis. In other words, given the inventory of features such as reservoirs, canals, turnouts, laterals, and rights-of-way, what would it cost to build a water project to replace the one that currently exists as if it had never existed. This approach did not include applying any depreciation to the existing structures. This approach did not consider using the existing project features and rehabilitating them back to like new condition.

**Methodology**

A quantity spreadsheet that used inventory information on the various features of the project was compiled based on information supplied by the sources outlined above. Questions were answered about such issues as size, function and use. Some information is preliminary and my opinion could be subject to change if better information becomes available. Due to the limitations of schedule, I did not perform a field inspection of the project features other than one previous visit to Cucharas reservoir.

The values for individual features were derived from a variety of sources. The replacement cost for Cucharas reservoir was based on the recently completed studies done by GEI. We used the recommended alternate of building a brand new RCC dam rather than rehabilitating the old one. This approach was justified because we are assuming starting a project from scratch. The value of replacing the irrigation canals was based on construction cost of the channel, cost of the rights-of-way, cost of the turnouts, and cost of the river diversion structures.

The HCIC system apparently has fee simple ownership of the ditch rights-of-way based on my discussions. This is unusual for a ditch system this old and a plus in value. The purchase of this row was based on a land value of $200 per acre which is the approximate market value for dry pasture land in the area. This approach was used because it would be assumed that there was no irrigated farm land pre-project. We did not consider severability issues attached to bisecting property ownership which would have added some additional cost to the project, but probably not significant compared to the infrastructure.

The system has the 6 Mile Creek Return which was mentioned by several sources. This return allows the project to route flows back to the Arkansas River below the Avondale gauge on the Arkansas River. There is an easement approximately one mile in length that runs from the HCIC ditch above Huerfano Lake into 6 Mile Creek. A value was placed on the replacement cost for the easement, but not on the value of the ability to wheel water to the Arkansas River at this location.

The Orlando Canal has not been included in the project since it has not operated for a very long time period and shows no historic use for a considerable time period.

**Disclaimer**

1499 West 120th Avenue, Suite 200
Denver, Colorado 80234
(303) 452-6611 • Fax: (303) 452-2759
www.applegategroup.com

This opinion of replacement cost of the HCIC project is not represented to be a formal appraisal of the project. Applegate Group does not have certified appraisers or real estate professionals. This opinion is strictly for internal use. It is recommended to retain a qualified appraiser if the information is needed for public use such as loan applications, or solicitation of investors.

**Conclusions**

Based on the information that I have currently available, the value of replacement cost for the HCIC system is $67,075,326.97. This does not include that value of the water rights that go along with the project. The attached tabulation summarizes separate values of the components of the system that were used to arrive at this replacement cost.

1499 West 120th Avenue, Suite 200
Denver, Colorado 80234

(303) 452-6611 • Fax: (303) 452-2759
www.applegategroup.com

**Applegate Group, Inc.**
WATER RESOURCE ADVISORS FOR THE WEST

Job No: 10-131
Date: September 7, 2010

# Two Rivers Water Company
# Cucharas Project Valuation Estimate

| Item No. | Description | Quantity | Units | $/Unit Value | Total Cost |
|---|---|---|---|---|---|
| 1 | Cucharas Reservoir, Existing Storage | 40,000.00 | AF | 600 | $ 24,000,000.00 |
| 2 | HCIC Ditch | 120,214.00 | feet | $ 150 | $ 18,032,100.00 |
| 3 | HCIC Ditch ROW | 110.55 | Acres | $ 200 | $ 22,109.09 |
| 4 | HCIC Laterals | 18,480.00 | feet | $ 50 | $ 924,000.00 |
| 5 | HCIC Laterals ROW | 8.48 | Acres | $ 200 | $ 1,696.97 |
| 6 | HCIC Ditch Turnouts | 21 | Each | $ 25,000 | $ 525,000.00 |
| 7 | HCIC Diversion Structure | | L.S. | | $ 1,500,000.00 |
| 8 | Broadacre Ditch Upper Section | 37670 | feet | $ 175 | $ 6,592,250.00 |
| 9 | Broadacre Ditch Lower Section | 66035 | feet | $ 175 | $ 11,556,125.00 |
| 10 | Broadacre Easement | 95.23 | Acres | $ 200 | $ 19,045.91 |
| 11 | Broadacre Ditch Turnouts | 15 | each | $ 25,000 | $ 375,000.00 |
| 12 | Broadacre Diversion Structure | | L.S. | | $ 1,500,000.00 |
| 13 | 6 Mile Creek River Return | 5280 | feet | $ 100 | $ 528,000.00 |
| 14 | Huerfano Valley Lake | 2000 | AF | $ 750 | $ 1,500,000.00 |
| 15 | **Total Estimated Replacement Value** | | | | **$ 67,075,326.97** |

Note: This estimate is for the replacement cost of the original project features at today's market value for construction. There is no adjustment for depreciation.

# Appendix B

## Curriculum Vitae of Patricia K. Flood, P.E.

Wright Water Engineers, Inc.

# PATRICIA K. FLOOD, P.E.

SENIOR PRINCIPAL CONSULTANT

**CURRENT** Appraisal of water rights and water facilities, evaluation of water rights, feasibility studies, and design of water supply and storm drainage facilities.

**EDUCATION**

B.S., Civil Engineering, 1974
University of Kansas

Graduate Work, Water Resources, 1976-78
University of Colorado

**REGISTRATION**

Registered Professional Engineer—Colorado #20307
Certified General Appraiser—Colorado #CGO1318801
Certified General Appraiser—Arizona Certificate No. 31496
LEED Accredited Professional

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## REPRESENTATIVE PROJECTS

### *Appraisals and Valuations*

**South Platte River Lease Rates.** Compiled summary of water lease rates located on the South Platte River downstream of Denver for clients use in establishing a renewal lease rate.

**Conservation Easement Appraisal Manual.** Prepared a chapter on the appraisal of water rights associated with conservation easements for a Conservation Easement Handbook.

**Appraisal of Denver Basin Groundwater and Tributary Water Rights.** Prepared an appraisal for a bank of a portfolio of deep groundwater and tributary groundwater rights.

**Appraisal of Irrigation Company Water Rights, Lower Arkansas River, Colorado.** Performed an appraisal of direct flow and storage water rights of an irrigation company's shares for decision-making purposes related to conservation easements

**Appraisal of Water Rights Portfolio for Denver Metro Area Homebuilder.** Prepared an appraisal of a package of water rights, including storage capacity, on the South Platte River and South Boulder Creek and contract water for consumable effluent.

**Appraisal of Colorado-Big Thompson Water and Seepage Water Right.** Prepared a valuation for an industrial client of their water right assets to be included in their financial statement.

**Appraisal of a Reservoir Right-of-Way.** Performed a valuation of a reservoir right-of-way located in a Wilderness Area. Analysis included feasibility analyses of reservoir construction.

**Appraisal of Water Rights, Summit County, Colorado.** Performed appraisal of water rights to be donated as part of a conservation easement.

**Valuation of Reservoir, Weld County, Colorado.** Preparation of appraisal for a 1,750 acre-foot reservoir rehabilitation project for use by the Colorado Water Conservation Board as collateral.

**Valuation Consultation for San Juan County Water Conservancy District.** Performed audit and replacement cost new-less-depreciation analysis of the water system facilities and a reservoir of a private water company for potential acquisition.

**Appraisal of Water Rights Associated with Oil Shale Project.** Analysis of yield and market for absolute and conditional water rights in the Colorado River basin. Appraisal also included the valuation of an existing roller-compacted concrete dam.

**Appraisal of Irrigation Water Rights in South Park, Colorado for Park County and Colorado Open Lands.** Prepared appraisal of water rights, including reservoir yield, "with" and "without" a conservation easement.

**Appraisal of Groundwater Rights in Southern Nevada**. Review of yield of a portfolio of groundwater certificates in the Pahrump, Nevada area with an annual duty of 11,000 acre-feet. Provided follow-up testimony.

**Yield of Analyses and Appraisal of Denver Basin Groundwater Rights**. Analyze and prepare appraisal of 7,300 acre-feet of water rights south of the Denver metropolitan area.

**Appraisal of Surface Water Rights, Lead, South Dakota.** Analyze and appraise a Whitewood Creek surface right that was used for power generation, gold mining, and other uses.

**Appraisal of Irrigation Water Right.** Analyze yield and prepare an appraisal of a South Platte water right to be transferred to the Denver Botanical Gardens.

**Appraisal of Transmountain Ditch in Rocky Mountain National Park.** Analysis and appraisal of a transmountain ditch which was to be exchanged for Colorado Big Thompson Article 24 water. Appraisal prepared for National Park Service.

**Appraisal of Reservoir Storage Right and Reservoir Right-of-Way.** Appraisal for National Park Service of reservoir interests located within Rocky Mountain National Park. The subject failed due to hydraulic piping with extensive property damage and loss of life.

**Valuation of Denver Basin Groundwater.** Provide opinion of value of 30,000 acre-feet of adjudicated but undeveloped groundwater underlying lands of State Land Board. Work included analysis of distribution and transmission pipeline costs.

**Appraisal of Surface and Groundwater Water Rights for FDIC.** Analyze and prepare appraisal of South Platte surface water rights and Denver basin groundwater for Federal Deposit and Insurance Corporation.

**Firm Yield Analysis and Appraisal of Municipal Water Supply**. Water supply and reservoir operations study to determine firm yield of City of Broomfield, Colorado system. Preparation of market value appraisal of water systems associated with reservoir.

**Appraisal of Water Rights**. Evaluation and appraisal of direct flow and reservoir storage rights in North Platte River basin.

**Yield Analysis and Appraisal of Yampa River Water Rights**. River operation study of Yampa River in northwest Colorado to determine average and dry year yield. Preparation of appraisal of water rights.

**Appraisal of Groundwater Rights in Eastern Colorado**. Review of rights in a designated groundwater basin and preparation of an appraisal.

**Appraisal of Water Farm Project.** Preparation of appraisal of water farm project in western Arizona adjacent to the Central Arizona Project Canal.

**Water Rights Acquisition Study.** An analysis of current water rights and recommendations for purchase of additional water rights to meet future industrial demands on Clear Creek.

**Appraisal of Water Rights.** Evaluation and economic analysis of water rights transaction for industrial client in Denver, Colorado metropolitan area.

### *Water Rights*

**Town of Buena Vista, Colorado.** Water Rights engineer for town since 1985 with work including water transfer plan, substitute water supply plans, well permits, and proposed augmentation plan and exchange.

**Irrigation Pond, Boulder County.** Water rights change and augmentation plan for small pond.

**Manhattan Creek, Tributary to Cache la Poudre River.** Water rights change and augmentation plans for a retreat center. Well permit for center.

**Substitute Water Supply Plans, South Platte River, Colorado.** Preparation of substitute supply plans for a gravel mine operator with numerous plants along the South Platte River.

**Coors Brewing Company, Colorado.** Ditch-wide analyses for water rights change and augmentation plan.

**Quantification and Water Rights Application.** Quantify groundwater for a 320-acre parcel near Parker, Colorado for water rights application.

**Analysis of Groundwater Rights and Augmentation Plan.** Quantification of groundwater rights for proposed subdivision near Elizabeth, Colorado.

**Cache la Poudre Transfer.** Analysis and evaluation of proposed City of Thornton application to transfer and exchange irrigation rights on Cache la Poudre to Thornton.

**Evaluation of South Park, Colorado Ranch.** Field inspection and analysis of a South Park ranch transferable consumptive use.

**Kansas v. Colorado.** Analysis and preparation of exhibits regarding the Arkansas River Winter Storage Program for Southeastern Colorado Water Conservancy District.

**Water Transfer Plan.** Assist in negotiations with protesters in water transfer and provide testimony (Buena Vista, Colorado).

**Augmentation Plan and Water Source Planning.** Water augmentation plan and water source evaluation for the city of Woodland Park, Colorado.

**Diversion Dam and Irrigation Gates.** Feasibility study, design, and construction supervision of irrigation diversion dam and dual headgate installation (two-75 cfs capacity) Encampment, Wyoming.

### *Drainage*

**Feasibility of Low-Water Stream Crossing, Lakewood, Colorado.** Represented property owner in alternative feasibility for property access in light rail corridor.

**Frank Residence, Colorado Springs, Colorado.** Represented home builder in evaluation of drainage and development of a drainage cure for a single family residence located in Hillside Overlay District of Colorado Springs.

**Bennett Apartments, Topeka, Kansas.** Evaluation of grading and drainage on behalf of excavating contractor on an apartment building project.

**Hillsboro Condominiums, Colorado Springs, Colorado.** Evaluate grading and drainage for 15 buildings in a condominium complex.

**Park Avenue Condominiums, Aurora, Colorado.** Evaluate surface and subsurface drainage for an existing townhome development in Aurora, Colorado.

**Arapahoe County Detention Facility, Centennial, Colorado.** Represented contractor with regard to grading and drainage issues at the Arapahoe County Justice Center complex.

**Comp USA, Denver, Colorado.** Analyzed roof drainage, surface drainage and perimeter drain system for insurance company with regard to a flooded commercial space basement.

**Standley Lake HOA, Arvada, Colorado.** Represented Homeowners Association in the evaluation of flooding damages to an adjacent residence and recommended cures.

**Lifestyle Homes, Inc., Evans, Colorado.** Evaluation of drainage system and review of development plat with regard to drainage issues for a single family home.

**Dickey Residence, Littleton, Colorado.** Represented homeowner and prepared analyzed hydraulic capacity in a drainage dispute with neighboring residence (Arapahoe County District Court, 99CF1278).

**Meadow Creek Homeowners Association, Lakewood, Colorado.** Hired by homeowners' association to determine source of groundwater periodically flooding a residential unit.

**High Pointe of Westminster Association, Westminster, Colorado.** Design of drainage cures for localized drainage problems for a multifamily complex.

**Sableglen Residences, Colorado Springs, Colorado.** Prepared a design for drainage facilities for four residences where drainage problems occurred on a routine basis.

**Denver Art Museum, Denver, Colorado.** Designed building drainage improvements to alleviate occasional subsurface basement seepage in an area of new construction.

**Wyndham Park, Arvada, Colorado.** Represented the builder in a lawsuit with regard to surface and subsurface drainage deficiency issues at a multifamily development.

**Multifamily Housing, Highway 36 in Adams County, Colorado.** The Colorado Department of Highways improved Highway 36 in the north Denver area, which caused the blockage of historic drainage. Flooding of multifamily housing occurred. The problem was defined and solutions were proposed.

**Kipling Sun Townhomes**, **Jefferson County, Colorado.** Provided consulting services to homeowners association regarding floodplain insurance. Provided design and construction administration of drainage facilities for units adjacent to floodway.

**Integrated Subsurface Building Drainage System for University of Southern Colorado, Pueblo, Colorado.** Planning and design of subsurface drainage system, surface drainage, and landscape modifications to provide protection to campus housing and university buildings to avoid damaging of foundations, to avoid wet basements, and to minimize wetting of highly expansive soils. Materials analysis for subsurface drains at depths of 20 to 25 feet and surface drainage materials selection with consideration of alkaline soils.

**Master Planning for Highline Canal.** Performed stormwater master planning for future conversion of the Highline Canal in the Denver metropolitan area from irrigation use to recreation corridor.

**Calahan Construction Drainage.** Performed site investigation and drainage analysis related to building damage claims.

**City of Black Hawk, Colorado.** Reviewed plans, specifications, and site investigation of drainage facilities related to roadway construction.

**Continental Homes, Douglas, County.** Prepared design of a storm sewer outlet modification to minimize erosion of stream bank.

**Town of Del Norte, Colorado.** Prepared drainage master plan for town.

**E-470 Drainage Special Benefits Analyses.** Provided analyses of benefits to adjacent landowners due to construction of drainage facilities associated with construction of E-470 toll road.

**Design Standards Denver International Airport.** Prepared design standards for sanitary sewer, storm sewer and manholes for Denver International Airport. Standards included materials and structural analysis procedures for “airside and “landside” facilities.

**Water, Sewer, and Drainage Master Planning.** Water supply augmentation engineering report and conceptual design and engineering report on water, sewer, and drainage facilities for 6000-unit Regis-Maryvale, Inc. development project.

**Pipe Materials Manual.** Research, evaluation, economic analysis, and development of Technical Criteria for the use of various storm sewer pipe materials for the Urban Drainage and Flood Control District (Denver, Colorado metropolitan area).

**Big Thompson River Channel Improvements**. Analysis of flood water surface elevations and design of channel improvements to contain the 100-year flood within the channel.

**Drainage Utility and Rate Study.** Preparation of a rate study to equitably assess monthly fees to generate funds for construction, operation, and maintenance of a municipal drainage utility program (Longmont, Colorado).

**Groundwater Subsurface Underdrain Criteria.** Preparation of criteria for sizing, typical installation details, and outfall requirements for groundwater underdrains for the City of Longmont, Colorado.

**Floodplain Study**. Computer analysis of floodplain for Roaring Fork/Castle Creek confluence, Aspen, Colorado. Master plan for facilities to mitigate flood hazards.

**Drainage Facilities and Access Road.** Design of access road utilizing reinforced fill with subsurface drainage and design of roadway drainage and detention facilities for condominium project in Snowmass Village, Colorado.

**Floodplain Analysis.** Structural and hydraulic analysis of effect of fence placed in floodplain (Adams County, Colorado).

### *Water and Wastewater Systems*

**Town of Buena Vista, Colorado.** Planning, design, and construction services for wells, water treatment plant, pump station, water storage, water transmission lines, and distribution system. Review submittals for proposed subdivision.

**Water Transmission and Distribution Pipelines for Industrial Plant, Commerce City, Colorado**. Planning, design, and construction services for a water line to provide fire flow for a large industrial facility.

**450-Unit Subdivision, Chaffee County, Colorado**. Services included rehabilitation of an existing water system and master planning and design of improvements including wells, pump station, storage and distribution system.

**Water Resource Planning for Boy Scouts**. Prepared water resource master plan for the two Denver Area Council Boy Scout camps. Planning and design of water system to serve new Family Camp and design of individual wastewater disposal systems.

**Water Supply and Facilities Planning.** Analysis of existing and future water supply demands and planning of water supply facilities for a regional parks complex (Adams County, Colorado).

**Water and Wastewater Alternatives Analysis.** Engineering and economic feasibility study regarding water supply costs and the costs of wastewater effluent use for irrigation (Phoenix, Arizona).

**Water Supply Alternatives.** Evaluation, engineering feasibility, and economic analysis of various water supply alternatives available to the City of El Paso, Texas for the State of New Mexico in El Paso vs. New Mexico.

**Municipal Diversion Dam and Pump Station.** Design of diversion structure with fish ladder, high head (900 feet) pumping station, and pipeline. Preparation of 404 permit application, Pitkin County, Colorado.

**Metropolitan District Service Plan.** Preparation of a service plan report for the formation of a Special District to provide functions relative to water, sewer, parks and recreation, streets, and other metropolitan district statutory powers (Exxon, USA, Battlement Mesa, Colorado).

**Pipe Failure Analysis**. Determine cause of water line pipe failure by compiling fact situation and performing structural analysis of pipe.

**Water System and Road Improvements.** Feasibility study, service plan for special district formation, design, and construction administration for water system and roadway improvements (Aspen, Colorado).

**Water Supply for Municipal and Mining Use.** Design review of polyethylene pipeline material for a high head water supply pipeline and diversion and pump station facilities.

**Buena Vista Airport.** Design of spring collection system piping and piping of irrigation laterals with up to 30 feet of cover and location under airport runway.

**Design and Construction of Sanitary Sewers.** Initial planning, design, and construction observation for Sanitation District in Aspen, Colorado. Services included coordinating inflow/infiltration studies on sewer system and the design of repairs.

**Design of Water and Wastewater Systems.** Planning, design, and construction administration of wastewater collection systems, water distribution system, water storage tanks, and pump stations for Water and Sanitation District, Snowmass Village, Colorado.

### *Reservoirs*

**Expert Testimony on Reservoir Facility**. Researched records and historic use and performed hydraulic analysis of reservoir in Denver metropolitan area. Provided expert testimony in District Court.

**Capacity Analysis of Reservoir**. Research and feasibility study of enlarging reservoir storage capacity and spillway improvements necessary to provide safe operating conditions (Arvada, Colorado).

**Dam Outlet Modifications at Rocky Flats Environmental Technology Site.** Design of dam outlet modifications for three reservoirs. Work included analysis of piping materials and control gates.

### *Miscellaneous Engineering Services*

**Cliff Stability Analysis.** Consultation with State Geologist and preliminary design of drainage improvements and erosion protection/retaining wall on 40-foot cliff.

**Water Quality Mitigation Plan.** Preparation of plan to mitigate water quality impacts and supporting documentation for 404 permit application for proposed ski area development (Eagle County, Colorado).

**Geothermal Well Utilization**. Design of arthritis research clinic facilities utilizing geothermally heated natural mineral water. Water rights analysis and augmentation plan (Carbondale, Colorado).

## OTHER EXPERIENCE

**Partner, Flood & Flood Consulting Engineers, Aspen, Colorado.** Project management and design of water resource and civil engineering projects.

**Design Engineer, Wright-McLaughlin Engineers.** Aspen and Denver, Colorado, feasibility, and design of water, wastewater, and drainage facilities.

**Design Engineer, Bucher & Willis Consulting Engineers, Salina, Kansas.** Design of concrete structures and bridges.

## PROFESSIONAL & HONORARY SOCIETIES

American Society of Civil Engineers
American Water Works Association
Tau Beta Pi
Chi Epsilon

## HONORS

Outstanding Woman Engineer in Colorado, Colorado Consulting Engineers Council, 2006.

## PUBLICATIONS/PRESENTATIONS

Flood, P.K. 2009. "Valuation of Water Rights." Presentation Colorado Bar Association CLE, Denver, Colorado. April 3.

Flood, P.K. 2006. "Appraisal Issues with Conservation Easements." Presentation CLE on Conservation Easements, Pueblo, Colorado. June 23.

Flood, P.K., K.R. Wright. 2006. "Appraisal of Water Rights in Conservation Easements," Presentation Colorado Water Trust, Glenwood Springs, Colorado. February 27.

Nichols, P.D., M.F. Browning, K.R. Wright, P.K. Flood, and M.S. Weston. 2005. "Water Rights Handbook for Colorado Conservation Easements." Colorado Water Trust for Conservation Organizations, Funded by Great Outdoors Colorado.

Flood, P.K. 2003. Valuation of Water Interests in a Takings Context–CLE International Regulatory Takings, Denver, Colorado. June 9.

Flood, P.K. and K.R. Wright. 2003. Valuation of Water Rights CLE International Colorado Water Law, Denver, Colorado. March 29.

Flood, P.K. and K.R. Wright. 1998. *Water Rights of the Eastern United States.* American Water Works Association.

Flood, P.K., K.R. Wright, and D. Freeman. 1998. The Eastern Water Manager's Guide to Water Rights. *Proc., American Water Works Association, Annual Conference, Dallas, TX*. June 21-25.

Flood, P.K. and K.R. Wright. 1998. Eastern Water Rights Engineering: The Role of the Hydrologist. Proc. *American Water Works Association, Annual Conference, Dallas, TX.* June 21-25.

Flood, P.K. 1996. Water Allocation Using the Efficient Marketplace. *Proc. from the USCID Water Management Conference*, Las Vegas, Nevada. December 5-7.

Flood, P.K. 1990. Water Rights of the 50 United States and Possessions. *Water Rights Handbook.* American Water Works Association.

Flood, P.K. 1987. Water Management Decision Support Using CADD. Paper presented at 3rd Water Resources Operation and Management Workshop, Colorado State University, sponsored by ASCE.

## EXPERT WITNESS TESTIMONY

Deposition and trial testimony regarding Case No. 2008CV56, Gilpin County, for plaintiff in Dory Lake Property Owners Association v. Board of County Commissioners. August and September 2009.

Deposition regarding Case No. 2007CV8, Weld County District Court, for defendant in James Busby v. Lifestyle Homes, Inc., et al. September 2008.

Trial testimony, Case 00CV35, Conejos County, Colorado. Archuletta and Martinez vs. Los Sauces Ditch Company. January 2007.

Trial testimony on behalf of Lincoln County in Case 98CV6, Lincoln County, Colorado. Rodney J. Preisser v. Board of County Commissioners of Lincoln County, et al. October 2005.

Deposition regarding Case No. A455945, Dept. No. 20, District Court, Clark County, Nevada. Commercial Federal Bank, FSB, v. Lee Kapaloski; Parsons Behle & Latimer et al. 2005.

Deposition regarding Case No. 96CW313, Water Division 4, for Objectors Telluride Ski Company and Mountain Village Metropolitan District to the Application of the Town of Telluride and Idarado Mining Company. October 2002.

Eagle River Water & Sanitation District, Upper Eagle Regional Water Authority, and Vail Associates v. Town of Minturn: Deposition taken regarding Town of Minturn water rights. 1998.

**DENVER**
2490 W, 26th Avenue Suite 100A
Denver, Colorado 80211
Phone: 303.480.1700
Fax: 303.480.1020

**GLENWOOD SPRINGS**
818 Colorado Avenue
P.O. Box 219
Glenwood Springs, Colorado 81602
Phone: 970.945.7755
Fax: 970.945.9210

**DURANGO**
1666 N. Main Avenue Suite C
Durango, Colorado 81301
Phone: 970.259.7411
Fax: 970.259.8758

**www.wrightwater.com**

**Wright Water Engineers, Inc.**