



# Update on Statewide Water Supply Initiative – Arkansas Basin

## Statewide Water Supply Initiative Background

The Statewide Water Supply Initiative (SWSI) has identified how much water Colorado will need to help meet the needs of its growing population. By 2030, Colorado will have an additional 2.8 million residents and a total population of 7.1 million people. Most of the state's population (87 percent) will be along the Front Range from Pueblo to Weld County. However, the fastest growing areas will actually be on the West Slope in the Colorado and San Juan/Dolores/San Miguel Basins. Table 1 summarizes the population changes by river basin.

**Table 1 Population Projections by Basin**

Basin	2000	2030	Increase in Population	Percent Change 2000 to 2030	Percent Annual Growth Rate
Arkansas	835,100	1,293,000	457,900	55	1.5
Colorado	248,000	492,600	244,600	99	2.3
San Juan/Dolores/San Miguel	90,900	171,600	80,700	89	2.1
Gunnison	88,600	161,500	72,900	82	2.0
North Platte	1,600	2,000	400	25	0.7
Rio Grande	46,400	62,700	16,300	35	1.0
South Platte	2,985,600	4,911,600	1,926,000	65	1.7
Yampa/White/Green	39,300	61,400	22,100	56	1.5
<b>TOTAL</b>	<b>4,335,500</b>	<b>7,156,400</b>	<b>2,820,900</b>	<b>65</b>	<b>1.7</b>

Source: Colorado Department of Local Affairs Demography Section

SWSI is an 18-month study by the Colorado Water Conservation Board (CWCB) to take a comprehensive look at how Colorado will meet its future water needs. During the 1990s, Colorado was the third fastest growing state in the nation, surpassed only by Nevada and Arizona. The recent drought also highlights the importance of understanding how Colorado will manage water during times of increased scarcity. SWSI's approach to this problem is to both develop technical data and work with local interests and water experts to obtain consensus on the issues, identify where data are missing, and to understand the obstacles to meeting our water supply needs.

Working with Basin Technical Roundtables consisting of multiple interests (water providers, local governments, agricultural users, recreational interests, the environmental community, and the business sector interests) from Colorado's eight major river basins (Figure 1), SWSI is a "bottoms-up" process to make sure local expertise and knowledge is incorporated into the study findings. These roundtables have identified water supply needs ranging from ensuring that municipal and agricultural users have a safe and reliable water supply, to providing water for recreation and the environment—important drivers for our economy.

## Statewide Municipal and Industrial and Self-supplied Industrial Demands

SWSI has examined current water use and supply and has also estimated future water needs based on a per capita water use methodology. Per capita water use was

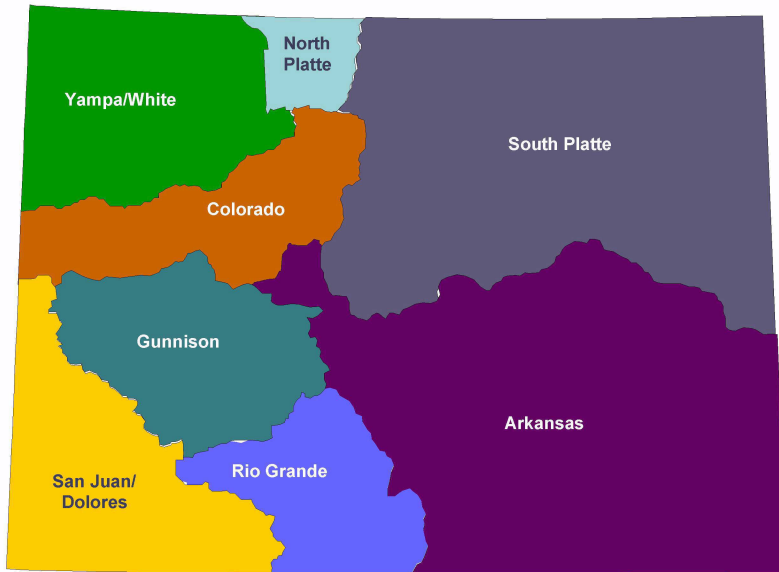


Figure 1 Colorado's Eight Major River Basins

obtained from over 75 percent of Colorado's water providers, and the data they provided were then combined with population estimates from the State Demographer's Office to develop future water demand projections. The results are shown in Table 2 for the year 2000 and year 2030. The state's eight major water basins will need an additional 630,000 acre-feet (AF) of new water by the year 2030 to meet projected demands, 53 percent more water than is being used today. An acre-foot of water is approximately 326,000 gallons. These projected water demands are reduced by

anticipated water conservation savings as a result of the National Energy Efficiency Act, which established mandatory standards for water use efficiency for certain plumbing fixtures.

Table 2 Preliminary Statewide Gross Municipal and Industrial and Self-supplied Industrial Water Demands–2000 to 2030

Basin	Total 2000 Gross Demand (AF)	Total Projected 2030 Gross Demand (AF)	Projected Conservation Savings (AF)	Increase in Gross Demand (AF)	Identified Gross Demand Shortfall (AF)
Arkansas	256,900	354,900	18,600	98,000	16,400
Colorado	74,100	136,000	7,800	61,900	4,000
San Juan/Dolores/San Miguel	23,600	42,400	2,400	18,800	5,000
Gunnison	20,600	35,500	2,100	14,900	1,800
North Platte	500	600	—	100	—
Rio Grande	17,400	21,700	1,400	4,300	—
South Platte	772,400	1,182,100	68,700	409,700	41,800
Yampa/White/Green	29,400	51,700	900	22,300	—
<b>TOTAL</b>	<b>1,194,900</b>	<b>1,824,900</b>	<b>101,900</b>	<b>630,000</b>	<b>69,000</b>

Columns and rows may not add up exactly due to rounding

Understanding **how** future water needs will be met is the real challenge that SWSI will be examining in more detail over the next 4 months. To date, the study team has identified how the major water suppliers plan on meeting their 2030 demands. This inventory of solutions includes conservation, water reuse, water transfers, enlargement and re-operation of facilities, and new facilities. Examples of some of the

projects include: Colorado Spring's Southern Delivery System, Denver's north system improvements, Northern Colorado Water Conservancy District's Windy Gap Firing Project and Northern Integrated Supply Plan (NISP), greater utilization of Ruedi and Wolford mountain reservoirs in the Colorado River drainage, and enlargement of Elkhead Reservoir in the Yampa/White/Green Basin. A more complete list of how our future needs will be met is still under development. Once it is developed, we will have a full understanding of how much remaining unmet need there will be and begin to focus on how to close the remaining gap between supply and demand in the year 2030.

SWSI has identified that most water providing entities are actively planning for future demand and have identified key projects to meet this demand. It is essential that these plans and projects move forward. If they do not move forward, alternative solutions will need to be implemented. SWSI has also found that the greatest needs for state assistance in meeting future water needs are with rural and small water providers and agricultural users.

## Statewide Agricultural Demands

The Colorado Decision Support System (CDSS) modeling tool was used to estimate existing agricultural water demands in the Colorado, Gunnison, Rio Grande, San Juan/Dolores/San Miguel, and the Yampa/White/Green Basins. Agricultural use in the Arkansas, North Platte, and South Platte Basins were estimated using a variety of available sources. Table 3 presents an estimate of current irrigated acres and average total diversions (in AF) over a period of record for each basin. It is important to note that the number of irrigated acres may vary on an annual basis for each basin over the period of record.

**Table 3 Preliminary Statewide Agricultural Demands**

Basin	Current Estimated Irrigated Acres	Average Total Diversions* (AF)	Period of Record for Average Diversions
Arkansas	538,100	1,769,900	1999 – 2001
Colorado	237,700	1,986,900	1975 – 1990
San Juan/Dolores/San Miguel	254,900	810,100	1975 – 1990
Gunnison	263,500	1,726,000	1950 – 2000
North Platte	95,700	396,900	1993 – 2002
Rio Grande	632,700	1,514,500	1950 – 1997
South Platte	1,003,500	2,545,500	1993 – 2002
Yampa/White/Green	118,500	629,900	1975 – 1990
<b>TOTAL</b>	<b>3,144,600</b>	<b>11,379,700</b>	-

\* Arkansas, South Platte and Rio Grande Basins include estimates of alluvial groundwater pumping

Agriculture represents approximately 91 percent of water used in Colorado for agricultural, municipal and industrial (M&I), and self-supplied industrial (SSI) purposes (Figure 2). SWSI projections indicate that it will make up 86 percent of the water use in 2030 (Figure 2). The greatest changes in agricultural water use are expected to occur in the Front Range as M&I growth moves into agricultural lands and/or as water is transferred from agriculture to support growth. Understanding the



impact of these changes on rural Colorado economies, and the effect on the open space provided by farms and ranches, is a key challenge for all Coloradans. In other areas of the state, localized decreases and increases in agricultural water use are also expected. A net increase in agricultural water use may occur in the Yampa/White/Green and the San Juan/Dolores/San Miguel Basins.

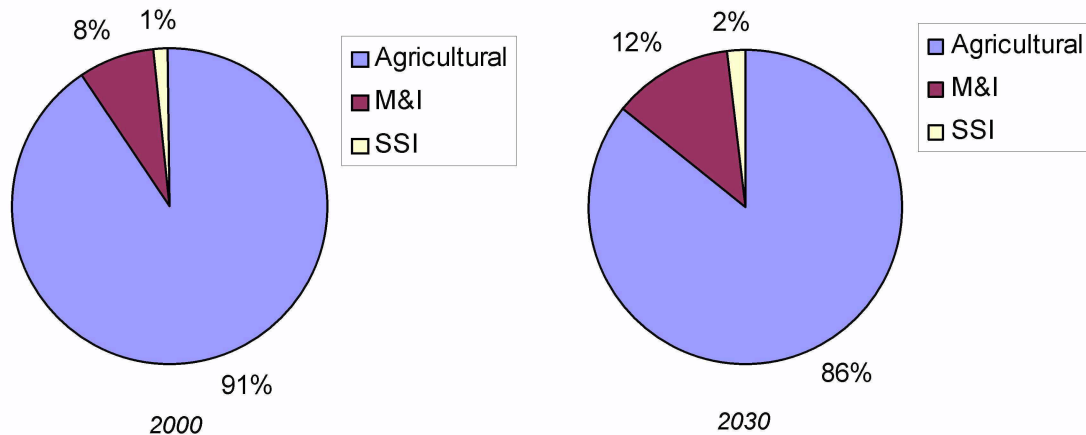


Figure 2  
2000 and 2030 Statewide Agricultural, M&I, and SSI Demands

## Arkansas Background

Following the South Platte Basin, the Arkansas Basin is projected to experience the largest increase in M&I and SSI water demand by 2030, or 98,000 AF. In SWSI, M&I is defined as all of the water use of a typical municipal system, including residential, commercial, industrial, irrigation, and firefighting. Large industrial water uses that have their own water supplies or lease raw water from others are described as SSI water users. For the purposes of SWSI in evaluating these regional water needs, counties in the Arkansas Basin have been aggregated into subbasins. These subbasins are shown in Figure 3, along with changes in population from 2000 to 2030 on a county level. Table 4 shows the total population and percent increases for the subbasins of the Arkansas Basin. For the purposes of SWSI, Park County population has been allocated to the South Platte basin.



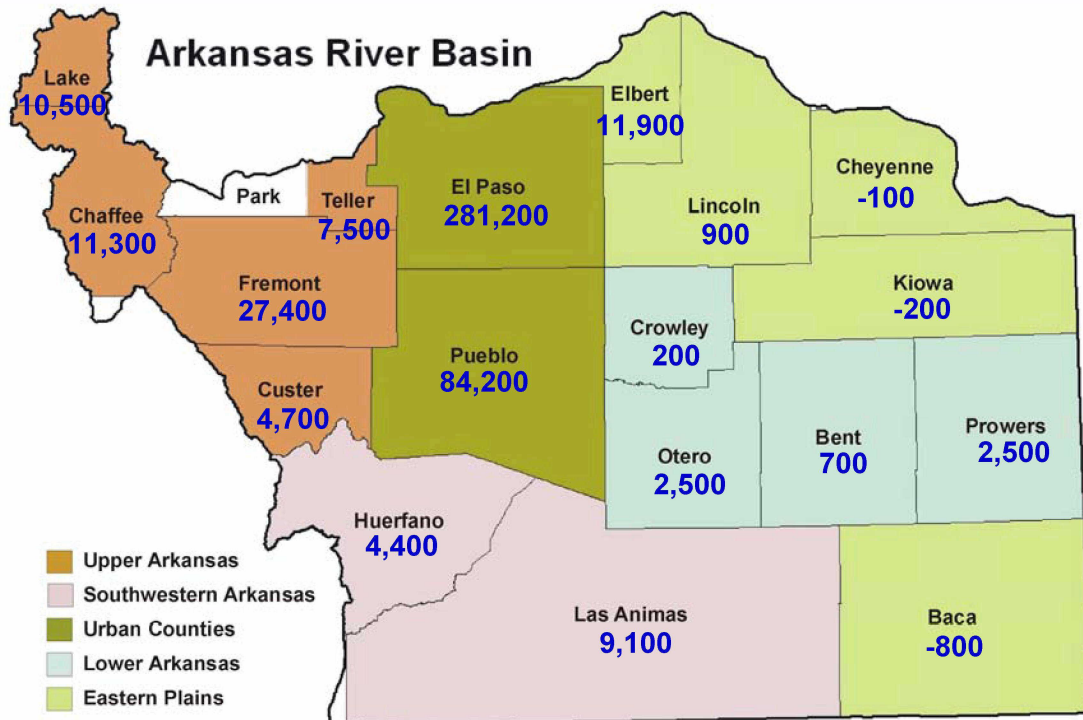


Figure 3 Arkansas Subbasins and  
Changes in County Populations 2000 to 2030

Table 4 Arkansas Population Projections by Subbasin

Subbasin Designation	2000 Population	2030 Population	Increase in Population 2000 to 2030	Percent Change 2000 to 2030	Percent Annual Growth Rate
Upper Arkansas	85,000	146,400	61,400	72	1.8
Urban Counties	662,600	1,028,000	365,400	55	1.5
Lower Arkansas	46,200	52,100	5,900	13	0.4
Eastern Plains	18,200	29,900	11,700	64	1.7
Southwestern Arkansas	23,100	36,600	13,500	58	1.5
<b>TOTAL</b>	<b>835,100</b>	<b>1,293,000</b>	<b>457,900</b>	<b>55</b>	<b>1.5</b>

M&I and SSI water demand forecasts for the Arkansas Basin are shown in Table 5. Water use can be considered both in terms of gross water needs or demands – the total amount of water treated at the water treatment plants or pumped from wells – and in consumptive use (CU), or the water that will actually be consumed. The 2000 and 2030 gross demands are presented in the table, along with the projected conservation savings. Of the 98,000 AF of increased water demands in the Arkansas Basin, the majority of the demand is proposed to be met through existing supplies and water rights and through the implementation of identified projects and processes. However, there are still some anticipated shortfalls expected in certain portions of the basin. This is also shown in Table 5. The identified shortfalls will be the focus for supply alternatives developed for the basin.

**Table 5 Arkansas Subbasins Preliminary M&I and SSI Demand Analysis**

Subbasin Designation	2000 Gross Demand (AF)	2030 Gross Demand (AF)	Projected Conservation Savings (AF)	Increase in Gross Demand (AF)	Identified Gross Demand Shortfall (AF)	Estimated CU Demand Shortfall (AF)
Upper Arkansas	22,700	36,400	2,400	13,700	5,200	1,500
Urban Counties	212,900	292,800	14,500	79,900	8,000	2,800
Lower Arkansas	12,200	13,000	900	800	1,000	400
Eastern Plains	4,300	5,500	300	1,200	1,400	500
Southwestern Arkansas	4,800	7,200	500	2,400	800	300
<b>TOTAL</b>	<b>256,900</b>	<b>354,900</b>	<b>18,600</b>	<b>98,000</b>	<b>16,400</b>	<b>5,500</b>

Columns and rows may not add up exactly due to rounding

Table 6 provides a list of the major identified projects and planning efforts that are underway or are planned in the Arkansas Basin. It will be very important that these projects and plans move forward or significant additional water supplies will be required.

**Table 6 Major Identified Projects and Processes to Provide Additional Supply**

Subbasin	Identified Projects and Processes
Upper Arkansas	<ul style="list-style-type: none"> <li>■ Preferred Storage Options Plan (PSOP) <ul style="list-style-type: none"> <li>– Re-operation of the Fryingpan-Arkansas (Fry-Ark) Project</li> <li>– Turquoise and Pueblo Reservoir Enlargements</li> <li>– 10-12% reduction in demand for storage via conservation</li> </ul> </li> <li>■ Augmentation Plans</li> <li>■ Increased use of Fry Ark M&amp;I allocation</li> <li>■ Agricultural transfers</li> </ul>
Urban Counties	<ul style="list-style-type: none"> <li>■ Active conservation</li> <li>■ PSOP</li> <li>■ Maximizing existing water rights</li> <li>■ Reuse</li> <li>■ Exchanges</li> <li>■ Agricultural transfers</li> <li>■ Southern Delivery System</li> <li>■ Increased use of Fry-Ark allocation</li> </ul>
Lower Arkansas	<ul style="list-style-type: none"> <li>■ Active Conservation</li> <li>■ PSOP</li> <li>■ Arkansas Valley Pipeline</li> <li>■ Exchanges</li> <li>■ Increased use of Fry-Ark allocation</li> <li>■ Agricultural transfers</li> <li>■ Groundwater</li> </ul>
Eastern Plains	<ul style="list-style-type: none"> <li>■ Groundwater (non-tributary)</li> </ul>
Southwestern Arkansas	<ul style="list-style-type: none"> <li>■ Existing water rights</li> <li>■ Augmentation Plans</li> <li>■ Agricultural transfers</li> </ul>

Conservation efforts will be a significant strategy for most providers in the Arkansas Basin in meeting future demands. In addition, the plans for many Arkansas water providers include some component of agricultural transfers and the optimization of existing supplies through new storage and/or reuse, exchanges, and augmentation plans. As urban growth continues, there will be some natural retirement of agricultural lands as these properties are converted to urban use. In addition to the urbanization of agricultural lands, most water providers continue to acquire agricultural water rights to some extent. If the new water projects and reservoir enlargements listed in Table 6 do not produce the planned amounts of water, there will be significant pressure on water providers to acquire additional agricultural water rights beyond what will normally occur.

A final round of Basin Roundtable meetings will be held in August and September. The fourth meeting for the Arkansas Basin will take place on Tuesday, September 7, 2004. You are welcome to attend the final round, but in either case, information regarding results, decisions, and outcomes of the meetings will be available on the project website. For more information on meeting times, locations, and additional details, visit the CWCB website at [www.cwcb.state.co.us](http://www.cwcb.state.co.us) and click on Statewide Water Supply Initiative.