

Colorado River Allocation Activity

More than any other factor, the resource that has defined the history of the Intermontane West region has been water. Without water, the rapidly growing cities of Phoenix, Los Angeles, and Las Vegas could not exist in their present form. Without irrigation, California and Arizona would not be able to support the rich agricultural economies they have today.

From your readings and the *Cadillac Desert* video, you know that the dominant river of the Intermontane West region is the Colorado. You also know that water supplies from the Colorado have been divided up among different interests (irrigation, hydroelectric power, industry, recreation, municipal supplies) virtually to the last drop. Under the Colorado River Compact of 1922, water rights were split between the upper basin (CO, UT, WY, NM) and lower basin (AZ, CA, NV) states. Currently, a complex series of laws, compacts, regulations, court decisions, and contracts, known as the “Law of the River,” guide proper use of the Colorado.

Division of the Colorado’s water is compounded by several issues. First, the river’s flow varies widely from year to year. If the mountains at the river’s headwaters in Colorado do not receive as much snow as usual in a winter, the entire basin suffers. When the seven states agreed upon the division of the Colorado’s resources in 1922, it was running at historically high levels, about 18 million acre-feet per year. As a result, the states allocated 15 million acre-feet just for their own use, then over time carved out shares for Indian tribes and for Mexico (which by itself has rights to 1.5 million acre-feet per year). A major problem is that the average annual flow over the past 30 years has been only about 12.2 million acre-feet. In recent years, the river has been running at only 1/5th of its long-term average – in 2004, just a little more than 3 million acre-feet!

Secondly, demand for the river’s water is skyrocketing. Initially, the water was used almost exclusively for irrigation. During the 1900s through the 1920s, the Imperial Valley of California developed into one of the country’s leading fruit- and vegetable-growing areas (e.g. dates, grapefruit, lettuce), thanks to Colorado River water moved through 900 miles of aqueducts and canals. More recently, agriculture has faced competition for land and water from the thriving cities of the Southwest. Today, population growth accounts for most of the new demand for water in this region: Arizona’s population grew by 40 percent over the 1990s, while Nevada’s grew by 66 percent! Protection of the environment is another increasingly important factor in water allocation.

Finally, individual states are competing for their own shares of Colorado River water. Colorado, Utah, and Wyoming together contribute 3/4ths of the water in the Colorado River, but are only minor users of the river. They are almost always opposed to the ever-growing demand for water in California, Arizona, and more recently, Nevada.

Most western states employ a state engineer, whose job is to decide who gets water and how much. This is a very powerful position in most states, a job that affects many people's lives.

Your Task!

The year is 2008, and there is another drought. Competition for the Colorado River's water has gotten so out of hand that the President has decided to set up a commission to mediate the dispute. As a state engineer, you have been asked to submit a proposal for water distribution in the entire basin, which will be compared with other proposals.

The politics of your decisions are complex:

The president is interested in maintaining good relations with Mexico. In 1976, the Mexican elections were affected by the availability of water for farms in the Colorado Delta, one of Mexico's most important agricultural areas. Most often, however, Mexico receives no water and the river never reaches the sea.

You will also need to keep the farmers happy. However, the real political power is in the cities of your region, so you must also try to keep them content.

Of increasing importance in the region are both Indian Reservation water rights and environmental concerns of the Colorado River Basin. These are issues you must take into consideration.

The Users and the Cuts

Agricultural Uses

Despite explosive urban growth in the region, agriculture still uses more water than any other use in the West (approximately 90%).

Colorado Farmers

In the Colorado River Basin of Colorado, there are more than a million acres of agricultural lands. The Colorado River helps to irrigate approximately two-thirds of the entire state's irrigated lands. Major crops grown in the region include corn,

hay, wheat, vegetables and fruit. These crops and others contribute over \$1.1 billion to the state's economy.

Gila Valley Farmers (Arizona)

Today nearly 900,000 acres of land are harvested each year in the state of Arizona. The total income from all crops and livestock in one year is approximately \$1.8 billion. In general a less water intensive crop – lettuce -- makes up 32% of the region's acreage. The second largest crop is wheat. Among the other crops grown in the area are cotton, hay, barley, corn, sorghum, potatoes, onions, broccoli, carrots, honeydews, cantaloupes, watermelons, grapefruit, oranges, lemons, and grapes.

Imperial Valley Farmers (California)

California farmers (including those in the Imperial Valley) rank first in U.S. production of 48 crops – they grow more than 70 percent of our lemons, lettuce, tomatoes, and celery; more than 80 percent of our melons, broccoli, garlic, and grapes; more than 90 percent of our avocados, apricots, and plums/prunes; and more than 98 percent of our artichokes, walnuts, almonds, and olives.

Effects of cuts on Agriculture:

- Without water, these farmers will go out of business.
- Irrigation systems are somewhat inefficient and could be modified, but this is a very expensive endeavor. Nonetheless, cuts in water appropriations will drastically affect irrigation systems.
- Cuts could affect types of crops grown or put farmers or farm workers out of business or severely affect their incomes.

Urban Uses

In all urban areas, uses of water include domestic uses, commercial and industrial applications, as well as thermoelectric power generation.

Arizona (Phoenix)

Phoenix, the state's capital, has become the nation's ninth largest city. It is a city of many amenities and water is essential to the survival of these amenities (such as universities, office complexes, industrial centers, etc.)

California (Los Angeles)

In LA, resorts and recreation are the industry of the valley just as surely as steel mills, oil refineries, and automobile factories.

Colorado (Denver)

Water is essential to manufacturing, including computers, electronic instruments, food products and many others, as well as defense-related companies, military

bases, financial, medical, and retail activities, and transportation. Denver also relies heavily on tourism and recreation.

Nevada (Las Vegas)

There is no doubt that Las Vegas' leading business is tourism. One out of every three jobs in the state is tourism-related. Las Vegas is Nevada's largest user of Colorado River supplies. The distinction of "urban user" is unnecessary as none of the river's water is allotted for agricultural purposes in southern Nevada.

Effects of cuts on Urban Areas:

- You can impose conservation measures to save water, but you must remember that water is what has changed Phoenix and Las Vegas from empty desert to the lush, green oases that attract visitors and dollars from outside the region, and that sustains the population and economy of Los Angeles.
- If cuts are too drastic, it is possible that cities will rely more heavily on ground water supplies and run the danger of exhausting those supplies. Additionally, cutting water supplies could dangerously affect the municipal services in this area.

Other Considerations

Ten Tribes Partnership

Indian rights were side-stepped in the 1922 Compact but are now recognized as very important. In 1992, the Ten Tribes Partnership was established to strengthen tribal influence over the management and use of the Colorado River. Ten tribes occupy Indian reservations with claimed or vested water rights to the Colorado River. Typically, those tribes have the senior water rights on the river.

Environmental rights were not considered important at the time the Compact was signed, but have also become increasingly important. The U.S. Fish and Wildlife Service designated four different species of fish native to the Colorado River as endangered. This protection typically represents additional regulatory requirements for development of new or operation of existing facilities.

A few other guidelines:

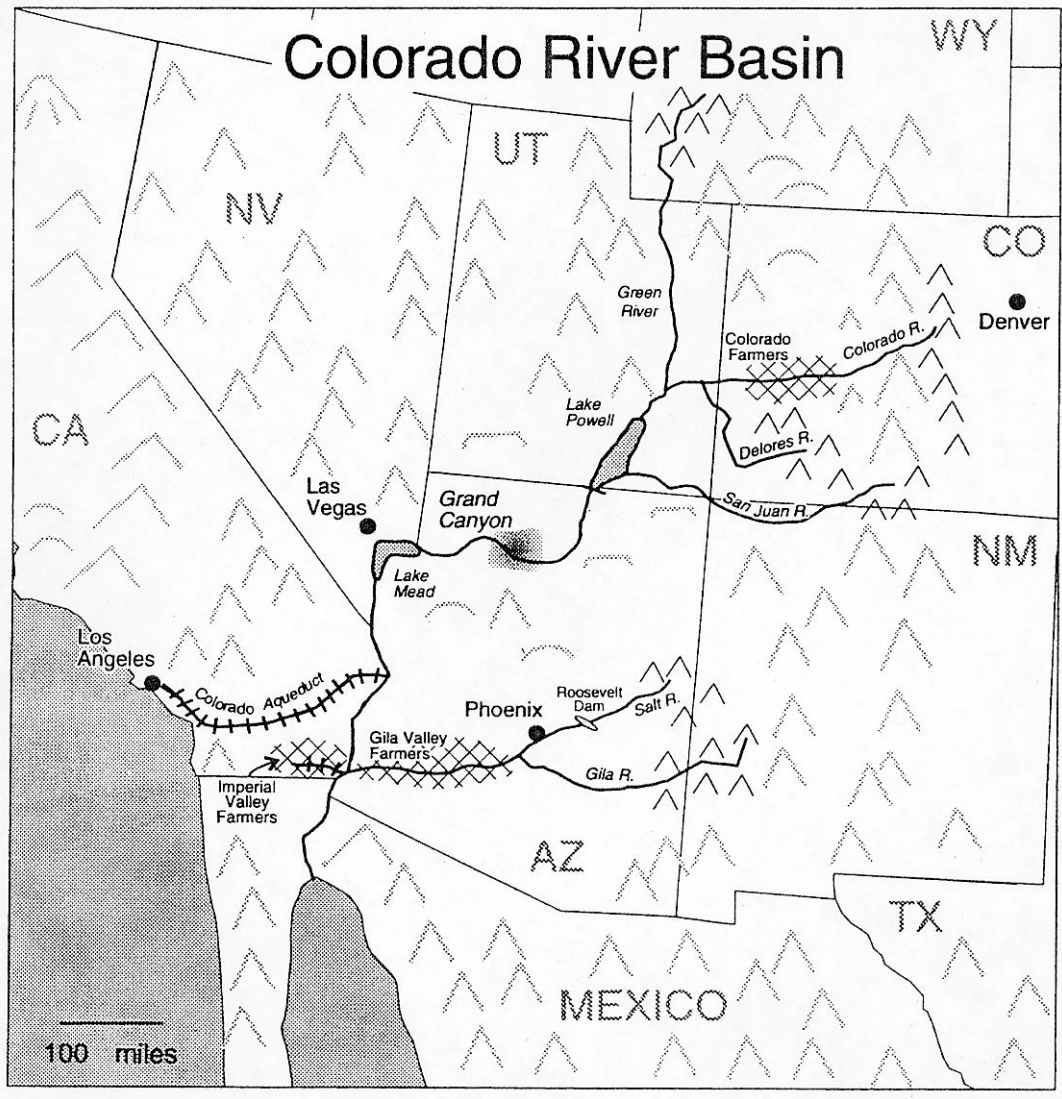
- Evaporation from Lakes Powell and Mead is constant and cannot be changed
- You have no control over how much water is coming into the system
- You can cut the amount of water that farmers receive, but any cut larger than 20% will collapse local agricultural markets

- You can force conservation measures on cities of up to 20%, but anything beyond that will force cuts in municipal services

Come up with creative solutions to these problems. If you are going to decrease the amount of water a certain area gets, how can you justify doing so? And what measures can be taken to ensure water security in that area?

No, there is not enough water to go around!!

Your proposal to the President's commission should include the allocation worksheet, plus a 1-2 page report explaining your decisions and why you made them.



Year 2008

		<u>Acre-feet</u>
Colorado Rockies		3,059,076
Denver (demand: 46,033)	-	_____
Colorado Farmers (demand: 632,806)	-	_____
Dolores River	+	198,128
Green River	+	2,541,967
Lake Powell evaporation	-	1,300,145
San Juan River	+	485,254
Las Vegas (demand: 40,816)	-	_____
Lake Mead evaporation	-	1,367,233
Los Angeles (demand: 695,412)	-	_____
Salt/Gila River System	+	264,846
Native American Tribes (demand: 900,000)	-	_____
Phoenix (demand: 182,599)	-	_____
Gila Valley Farmers (demand: 524,168)	-	_____
Imperial Valley Farmers (demand: 3,004,757)	-	_____
Flow to Mexico	=	_____

Year 2008

<u>Inputs</u>	<u>Acre-feet</u>		
Colorado Rockies	3,059,076		
Dolores River	198,128		
Green River	2,541,967		
San Juan River	485,254		
Salt/Gila River System	264,846		
<u>Users</u>	<u>Demand (acre-feet)</u>	<u>Minimum requirement for sustainability (Demand w/ 20% cut)</u>	
Denver	46,033	36,827	
Colorado Farmers	632,806	506,245	
Lake Powell evaporation	1,300,145	1,300,145	
Las Vegas	40,816	32,653	
Lake Mead evaporation	1,367,233	1,367,233	
Los Angeles	695,412	556,330	
Native American Tribes	900,000	720,000	
Phoenix	182,599	146,080	
Gila Valley Farmers	524,168	419,334	
Imperial Valley Farmers	3,004,757	2,403,805	