

THE AMERICAN SOUTHWEST: ARE WE RUNNING DRY? COLORADO RIVER BASIN

Activity 4 Law of the River Game

"Look out on the western side of the Great Divide from the heart of Rocky Mountain National Park. You're at the top of the watershed destined for the Sea of Cortez. All that lies before you, all you can hope for, is a chance to serve, to be of use, to share tumbling through the sublime. This is what it means to be the Colorado River."

-Gregory Hobbs, Colorado Supreme Court Justice

Overview:

The following activity is designed to help the students synthesize all the information they have gained from the previous three activities. The students will play this simulation game as one of the water users in the Colorado River Basin. They will need to follow the Law of the River in distributing the available water, finding ways to make deals and compromise in order to meet their needs. The game has no winner or loser; the focus is on the process.

Objectives:

- Students will understand and use the Law of the River.
- Students will suffer the consequences of drawing more water than the river has.
- Students will predict the results of decisions.
- Students will work collaboratively to make decisions.

Materials:

- Reprint of attached articles – 1 per student
- Small wooden cubes (substitute place value blocks or other similar objects)
- Action Cards
- Identity Cards
- Overhead of attached allotment map
- 8 manila envelopes
- The Law of the River (see attached)
- Container for Reservoir Water blocks

Prior to the Activity:

- Make copies of the Identity Card sheets. Cut them apart and place them in a container from which the students may draw.
- Make copies of the Action Cards. Cut them apart and have them ready to draw.
- Post a copy of the attached "Law of the River"
- Set up a container for Reservoir Water. Place 50 blocks in the container.
- Label each envelope with a state name and Mexico.
- Using the following chart, count out and place each state's cubes into the appropriate envelope.

<u>States</u>	<u>Allotment</u> <u>MAFY</u>	<u># of Blocks</u>	<u># on Team</u>	<u>Roles</u>
Wyoming	1.00	10	1	1 Farmer
Utah	1.70	17	3	2 Farmers, 1 Urbanite
Colorado	3.90	39	6	4 Farmers, 2 Urbanites
Nevada	0.30	30	4	1 Farmers, 3 Urbanites
New Mexico	0.85	9	2	1 Urbanite, 1 Native American
Arizona	2.85	29	4	2 Farmers, 1 Urbanite, 1 Native American
California	4.40	44	7	3 Farmers, 4 Urbanites
Mexico	1.52	15	3	2 Farmers, 1 Urbanite

Procedures:

1. Allow the students time to read the two articles. They provide relevant background information. Discuss.
2. In order to divide the class into teams, have the students draw an Identity Card from the hat. Have the students gather into 7 state groups and Mexico. Move the desks or tables so the students may sit in their groups, separate from the other teams.
3. Show the students the map of the Colorado River Basin with the allotments. Discuss the allotments shown on the map. MAFY stands for million acre-feet per year. (*There are about 326,000 gallons in an acre-foot, enough to cover an acre of land in one foot of water. According to the Southern Nevada Water Authority, an average household in Las Vegas, Nevada uses about 230,000 gallons of water a year.*) These numbers represent the agreed upon amounts of water each state may draw or use from the Colorado River.
4. Call the students' attention to the posted *Law of the River*. Explain that the *Law of the River* is simplified for this game as follows:
 - a. Mexico must always receive their full allotment. They can decide what to do with that allotment.
 - b. Upper Basin states must reduce the amount of their allotments so that the Lower Basin states get their full allotment. (*Explain this might be disputed but I would*

suggest that the group would need to have a very good reason for doing so. To date, the drought has not been severe enough to force this issue.)

- c. According to the Winters Doctrine of 1908 Native American tribes and reservations, who were “first in time, first in right” based on the date that their reservations were established, should always get their full allotment. As we learned in the movie *Is the Southwest Running Dry*, they receive what they call “paper water.” Therefore, for this game Native Americans have no more rights than the 7 Basin States.
5. Each state allocates the water in their state. In other words, they decide how much water goes to agriculture and how much goes to the municipalities.
6. Tell the students that each state team will receive their allotment in blocks. For the purposes of this game the allotments have been rounded up and each block represents 100,000 acre-feet.
7. Give each state team the envelope containing their allotment of river water.
8. Direct each team to divide their water allotment among their members ***in a manner they believe to be fair.***
9. The teacher will maintain the Reservoirs, starting with 50 blocks.
 - Together Lake Mead and Lake Powell hold about 50 million acre-feet. Explain that reservoirs are like water bank accounts. They hold water so that users will have a constant supply even in times of drought. If Glen Canyon Dam were removed the water from Lake Powell would then be stored in Lake Mead. However, during drought years Lake Mead would be mostly drained.
 - If a group loses water, it goes to the Reservoir Container.
 - If a group or groups are to receive water from the reservoir, you take it from the Reservoir Container.
10. Let the game begin! Remind the students that the game has no winner or loser; the focus is on the process.
11. The teacher will read the first card. Proceed through the cards, each time allowing the students time to make the necessary adjustments in their allotments. Sometimes they will lose some to the river. Sometimes they will gain. Sometimes there will be conflict between groups or within groups, so give the students time to work it out. They may always revert to the Law of the River to claim (or keep) their allotment.



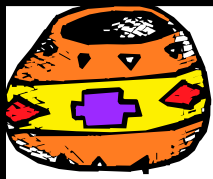
New Mexico Native American



Arizona Native American



_____ Native American



_____ Native American



Wyoming Farmer



Utah Farmer



Utah Farmer



Colorado Farmer



Colorado Farmer



Colorado Farmer



Colorado Farmer



Nevada Farmer



Arizona Farmer



Arizona Farmer



California Farmer



California Farmer



California Farmer



Mexico Farmer



Mexico Farmer



Mexico Farmer



_____ Farmer



_____ Farmer



_____ Farmer



_____ Farmer



Utah Urbanite



Colorado Urbanite



Colorado Urbanite



Nevada Urbanite



Nevada Urbanite



Nevada Urbanite



New Mexico Urbanite



Arizona Urbanite



California Urbanite



California Urbanite



California Urbanite



California Urbanite



Mexico Urbanite



_____ Urbanite



_____ Urbanite



_____ Urbanite



_____ Urbanite



_____ Urbanite

According to the Law of the River 16.5 MAFY has been allotted to the 7 Basin States BUT the river has been over-allotted by 4 MAFY. Because they have made little effort to conserve,
California has to give 5 blocks to the Reservoirs.

Because of a persistent drought the snow pack in the Rockies is very light. . .

New Mexico has to give 1 block to California.

High salinity levels are killing the crops in Arizona. Nevada has been drawing more water than their allotment allows.

Nevada must give 2 blocks of fresh water to the Farmers of Arizona.

There has been rain, but not enough. Farmers and Urbanites everywhere are hurting.

ALL Farmers & ALL Urbanites LOSE 2 blocks each.

The Colorado River loses thousands of gallons of water every month due to evaporation. **Every state must give up 2 blocks. YOU decide who will give up their water - the Farmers or the Urbanites or both?**

Mexico is starved for water. Federal Law says they **MUST** get their allotment. Upper Basin states cannot afford to give up more water.
Arizona & California will give 1 block each to Mexico.

Urban growth in the Lower Basin continues. Nevada, Arizona, and California ask for more water to sustain their growth.

Which states will give block to them? How many blocks? YOU decide.

It has been a very wet winter and everyone is hoping the drought is over.

Everyone gets 1 block from the Reservoir.

According to the Law of the River 16.5 MAFY has been allotted to the 7 Basin States BUT the river has been over-allotted by 4 MAFY. Because they have not lined their canals to curb evaporation,
Arizona has to give up 1 block.

Because of a persistent drought the snow pack in the Rockies is very light.

Arizona has to give 1 block to California.

The Farmers have had enough! They cannot afford to leave fields fallow because of lack of water and high salinity levels.

Urbanites in every state must give 2 blocks to their Farmers.

The Cienega de Santa Clara is starved for water. Federal Law says they **MUST** get their allotment.

Arizona Farmers will give 1 block to Mexico.

Urban growth in the Upper Basin continues. Remember the Law of the River. **The states in the Lower Basin must give 5 blocks to Colorado, Utah, and New Mexico. Who and how much? The Lower Basin states must decide.**

Urban growth continues as more people move to the Southwest.

ALL Farmers must give 1 block to the Urbanites in their state.

According to the Law of the River 16.5 MAFY has been allotted to the 7 Basin States **BUT** the river has been over-allotted by 4 MAFY. Because they don't use their full allotment, **Nevada has to give 1 block to the Reservoirs.**

Because of a persistent drought the snow pack in the Rockies is very light. Because they haven't been using their full allotment, **Wyoming has to give 1 block to California.**

The Native Americans in New Mexico and Arizona continue to suffer as their wells dry up. **The Upper Basin states will give both Native American groups 1 block each. Who and how much? The Upper Basin states must decide.**

There has been rain, but not enough. Arizona Farmers are hurting, and Mexico wants the water they have been promised. **Arizona Urbanites must give 2 blocks to their farmers and 1 block to Mexico.**

The wells that the Native Americans of New Mexico have used are dry. Their groundwater is depleted. The Reservoirs do not have water to give them. **The Native Americans of New Mexico LOSE 3 blocks.**

The Cienega de Santa Clara isn't getting enough water and endangered species continue to be threatened. Federal Law says they **MUST** get their allotment.

Each state will give 1 block to Mexico.

The water allotted to California, Arizona, and Mexico has very high salinity levels. Remember the Law of the River. **The states in the Upper Basin must give 2 blocks to California, and 1 block each to Arizona and Mexico. Who and how much? The Upper Basin states decide.**

Urban growth is booming as more people move to the Southwest.

ALL Farmers must give 1 block to the Urbanites in their state.

According to the Law of the River 16.5 MAFY has been allotted to the 7 Basin States BUT the river has been over-allotted by 4 MAFY. Because they don't use their full allotment, **Utah has to give 1 block to the Reservoirs.**

Because of a persistent drought the snow pack in the Rockies is very light. Because they haven't been using their full allotment, **Nevada has to give 1 block to the Reservoirs.**

The Native Americans in New Mexico and Arizona continue to suffer as their wells dry up. **Both groups will get water. The Reservoirs will give both Native American groups 1 block each.**

There has been rain, but not enough. Arizona farmers are hurting, and Mexico wants the water they have been promised. **Arizona Urbanites must give 2 blocks to their Farmers and 1 to Mexico.**

The wells that the Native Americans of New Mexico have traditionally used to support themselves are dry. The groundwater is depleted.

The Reservoirs must give them 1 block.

The "Big Straw" to move water from western to eastern Colorado will be built to provide water to the Urbanites. **Remember the Law of the River. ALL states & Mexico will give 1 block each to the Urbanites in Colorado.**

The cities and town in Nevada continue to grow. There seems to be no end in sight.

Nevada Farmers must give up 2 blocks.

The drought is continuing. Reservoirs continue to drop. In order to increase water levels for the future, **2 states must give 1 block each to the Reservoirs. Remember the Law of the River. Who will give up water? How much?**

According to the Law of the River 16.5 MAFY has been allotted to the 7 Basin States BUT the river has been over-allotted by 4 MAFY. Because they have shown no effort to conserve,
Colorado must give 1 block to the Reservoirs.

There has been rain, but not enough. Farmers and Urbanites everywhere are hurting.

ALL Farmers & ALL Urbanites LOSE 1 block each to the Reservoirs.

Development on the Eastern slope of Colorado has been booming. The people of Colorado are asking for more water from the river. **Remember the Law of the River. They will get 1 block. Who downriver will give it up?**

The population from San Diego to Los Angeles continues to grow. The municipalities are asking for more water.

Arizona must give California 1 block.

It has been a wet year for the Native Americans in northern Arizona. Their cisterns are full and their crops are doing well. They are very thankful. **The Native Americans in Arizona give the Farmers in their state 1 block.**

There has been increased rainfall and the snow pack in the Rockies has increased substantially.

Remember the Law of the River. The Farmers in Colorado get 1 block from the Reservoirs.

The cities of New Mexico are showing substantial growth and continued development. There is no end in sight.

New Mexico Farmers must give the Urbanites of their state 2 blocks.

The drought is continuing. Reservoirs continue to drop. In order to increase water levels for recreational purposes, **3 states must give up 1 block each. Remember the Law of the River. Who must give up water?**

According to the Law of the River 16.5 MAFY has been allotted to the 7 Basin States BUT the river has been over-allotted by 4 MAFY. Because they have made little effort to conserve,
New Mexico must give 1 block to the Reservoirs.

Because of a persistent drought the snow pack in the Rockies is very light.

Colorado must give 1 block to the Reservoirs.

Development on the Eastern slope of Colorado has been booming. The people of Colorado are asking for more water from the river.

Remember the Law of the River. They will get 1 block. Who downriver will give it up?

The population from San Diego to Los Angeles continues to grow. The municipalities are asking for more water.

Mexico must give California 1 block.

A new community the size of Albuquerque has been developed in New Mexico.

The Native Americans in New Mexico must give the Urbanites in their state 1 block.

There has been increased rainfall and the snow pack in the Rockies has increased substantially. The water levels in the reservoirs are going up. **There are 8 blocks to distribute. Remember the Law of the River. Who gets water?**

Las Vegas continues to grow but they are giving water back to the river because of conservation efforts.

Nevada gets 1 block from the Reservoirs.

The drought is entering its 8th year. Reservoirs are dropping quickly. In order to increase water levels, **5 states must give up 1 block each. Remember the Law of the River. Who must give up water?**

According to the Law of the River 16.5 MAFY has been allotted to the 7 Basin States BUT the river has been over-allotted by 4 MAFY. Because they don't use their full allotment, **Wyoming must give 1 block to the Reservoirs.**

Because of the persistent drought the snow pack in the Rockies is very light. Because they haven't been using their full allotment, **Utah must give 1 block to the Reservoirs.**

Development on the Eastern slope of Colorado has been booming. The farmers in western Colorado have been asked to give up some of their water.

Colorado Farmers, may the Urbanites have some of your water? YOU decide.

The population from San Diego to Los Angeles continues to grow. The municipalities are asking for more water.

California Farmers, will you give more water to your Urbanites? YOU decide.

The Upper Basin states traditionally use less than their allotment. The Farmers in California need more water.

Wyoming, Utah, Colorado, and New Mexico, will any of you give water to the California farmers? YOU decide.

There has been increased rainfall and the snow pack in the Rockies has increased substantially. The Reservoirs are full.

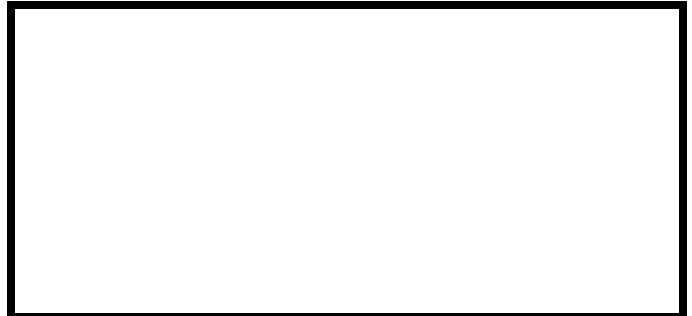
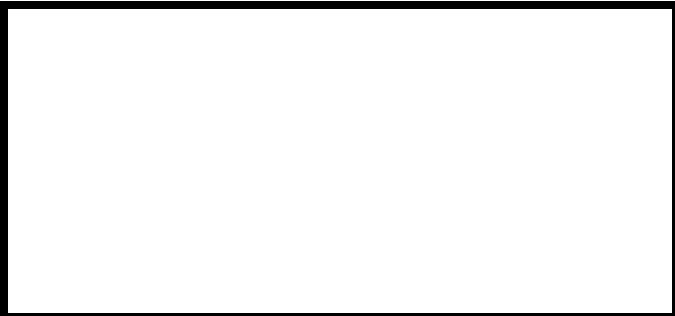
The Reservoirs have 5 blocks to distribute. Remember the Law of the River. Who gets them?

To "clean out" Lake Mead for environmental reasons, **1 block** of water will be released through Hoover Dam.

Who will be allowed to draw this water, Arizona, California, or Mexico? Remember the Law of the River.

The drought is entering its 10th year. Reservoirs are at their lowest point ever.

In order to increase water levels, ALL 7 states & Mexico must give up 1 block each to the Reservoirs.



THE AMERICAN SOUTHWEST: ARE WE RUNNING DRY? COLORADO RIVER BASIN

Activity 4

Law of the River Game – Articles

Excerpt from *Utah's Perspective: The Colorado Perspective*, May 2002:

The steep and at times turbulent Colorado River falls more than 12,000 feet as it flows from the Rocky Mountains in Colorado and Wyoming to its natural outlet in the Gulf of California. The river has a huge drainage basin that covers over 244,000 square miles; it is 1,440 miles long and passes through parts of seven states and Mexico.

The seven states, Arizona, California, Colorado, Nevada, New Mexico, Utah and Wyoming, are referred to as the Colorado River Basin states. The drainage basin comprises about one-twelfth of the area of the continental United States. Despite the size of its drainage area, the Colorado River ranks only sixth among the nation's rivers in volume of flow with an average annual flow in excess of 17.5 million acre-feet. (15 million acre-feet at Lee Ferry, the Colorado River Compact division point.) In comparison, the Columbia River's drainage area is about the same size, but its flow is about 12 times greater.

Demands on the Colorado River are not limited to needs within the basin. In fact, more water is exported from the basin than from any other river in the U.S. The Colorado River provides municipal and industrial water for more than 24 million people living in the major metropolitan areas of Los Angeles, Phoenix, Albuquerque, Las Vegas, Salt Lake City, Denver, San Diego and hundreds of other communities in the seven states. It also provides irrigation water to about 2.0 million acres of land. The river has more than 60 million acre-feet of storage capacity, 4,000 megawatts of hydroelectric generating capacity, and provides more than 20 million annual visitor days of outdoor recreation.

Excerpt from “Law of the River: Don’t ‘dis the Colorado River Compact” published in the Salt Lake Tribune, August 23, 2008:

The compact is the linchpin in a series of agreements, treaties, laws and court rulings that have evolved since the 1920s to allocate the water in the Colorado River among seven Western states and Mexico. The river is divided into the Upper Basin (Wyoming, Colorado, Utah, New Mexico) and Lower Basin (Arizona, Nevada, California). Each basin is allotted 7.5 million acre-feet of water a year. Mexico gets 1.5 million acre-feet.

Unfortunately, when the compact was negotiated in 1922, the West was wetter than it is now. In this decade, the Colorado often has fallen short of the 16.5 million acre-feet of flow that the compact anticipates.

Utah's Perspective: The Colorado River, May 2002, by D. Larry Anderson, Director, Utah Division of Water Resources
www.water.utah.gov/Interstate/TheColoradoRiverart.pdf

“Law of the River: Don’t ‘dis the Colorado River Compact”, *The Salt Lake Tribune*, August 23, 2008.
www.sltrib.com/opinion/ci_10284843

THE LAW OF THE RIVER

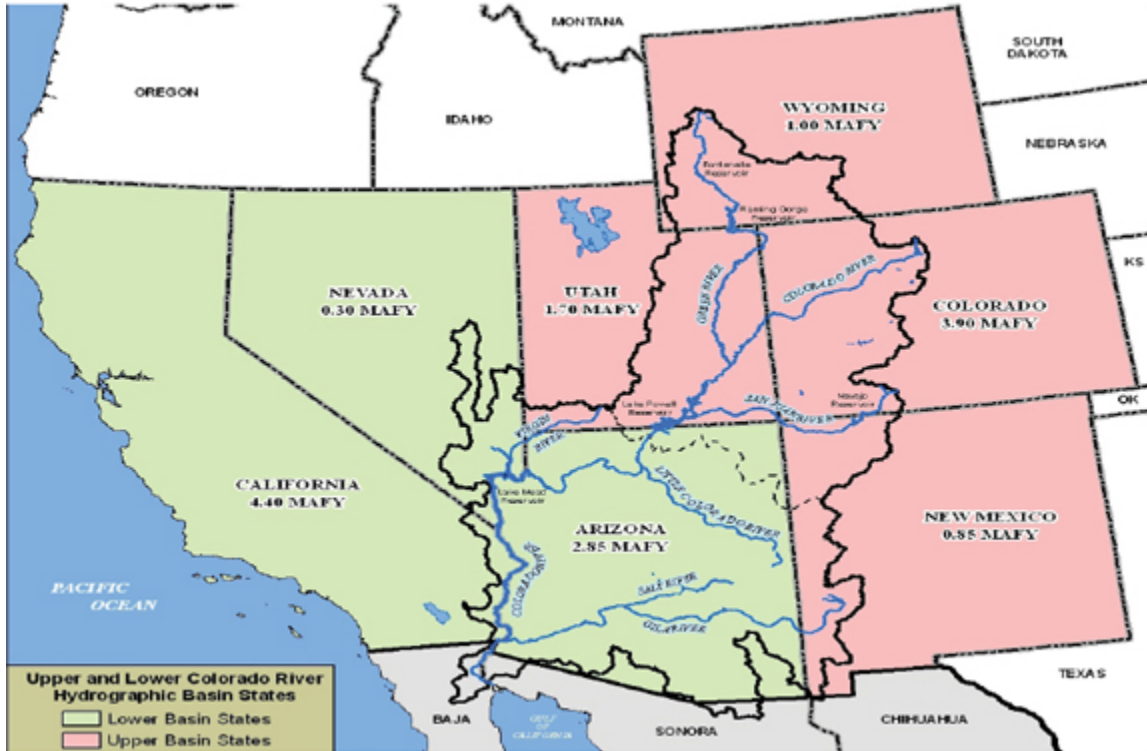
Mexico must ALWAYS receive their full allotment.

Upper Basin states must reduce their allotments so that the Lower Basin states get their full allotment in times of drought.

Native Americans have no more rights than the 7 Basin States.

Each state allocates the water in their state.

Colorado River Basin Allotment Map



Courtesy of the Southern Nevada Water Authority "Water Resource Plan"
<http://www.snwa.com/html/index.html>