



# Colorado Reader

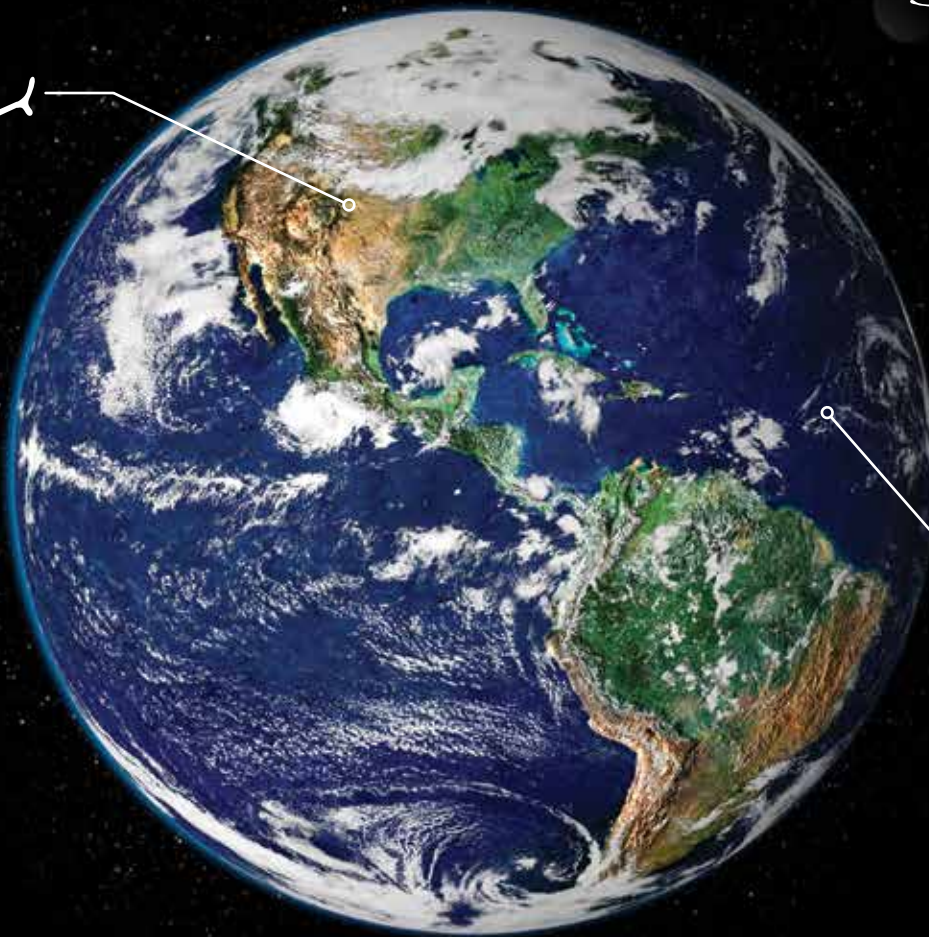
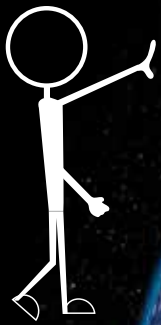
AG in the Classroom—Helping the Next Generation Understand Their Connection to Agriculture

Colorado Foundation for Agriculture ~ [www.growingyourfuture.com](http://www.growingyourfuture.com)

"If there is magic on this planet,  
it is contained in water."

— *Karen Eiseley*

*You are here...*



## Water is Life

When scientists look for life on other planets, they look for signs of water (not little green people). Why? In part because scientists have yet to find an organism that can live without water. Some bacteria require very little water, but they still require water.

## Water on Earth

- 97% Salt Water
- 2% Polar Ice Caps, Glaciers and Permanent Snow fields
- 1% Available Freshwater

# 2014 Winter Olympics

The 2014 Winter Olympics feature 98 medal-awarding events for men and women—all made possible by water in the form of ice and snow. As a matter of fact, the Olympic venues in Sochi, Russia, boast the largest snow making operation in the world.

One of the largest concerns for Olympic planners was whether there would be enough snow. Snow comes from water vapor in the atmosphere. When water vapor cools and starts to condense, it forms tiny droplets. These droplets are so tiny they float in air. We see these collections of droplets as clouds in the sky. Under the right conditions, the droplets begin to combine into small ice crystals. The crystals grow by moving around in the cloud, attracting more droplets which freeze onto the original crystal. The result is a snowflake. Because of their growing weight, the snowflakes fall toward earth.

Interestingly, this is also how rain is formed in the summer. The ice crystals form in the clouds and begin to fall, but in warmer air they melt and become rain drops.

To make “artificial snow”, water and pressurized air are forced through a device known as a “snow canon” or “snow gun”. The resulting spray forms ice crystals which fall as snow. Some devices use a fan instead of pressurized air to spray the water droplets into the air. Colorado ski resorts also use snow making machines to make sure there is enough snow on their slopes in the winter.



*Snow-making machines spray water droplets into the air which freeze and become snow.*

The people in Colorado who manage water supplies for homes, farms and other businesses worry about winter snowfall. Nearly all of the water we use in Colorado begins as snow in the mountains. As it melts, it forms creeks, rivers and lakes. We store some of this runoff water in reservoirs for use throughout the year and some flows out of Colorado to other states. Eighteen states and Mexico receive some of their water from rivers that originate in Colorado.

As water is making its journey through rivers toward the sea, it is put to work. It is used in households. It is used to grow food, create energy, manufacture products and in many other ways. With heat from the sun, some water also evaporates, once again becoming vapor in the atmosphere.

This process of water vapor becoming clouds, forming ice crystals, falling to earth, moving across and through the ground, and returning to vapor is known as the water cycle. It happens all over the world, making life—and the Olympics—possible.

*People from all over the world will be travelling to Sochia, Russia for the 2014 Winter Olympic games.*

*1—Mark Sochia on the map (hint: one of the airplane paths starts there).*

*2—Mark Colorado on the map*

*Extra credit: Sochia is located next to what large body of water?*

*Extra credit: If you flew in a straight line from Denver to Sochia, what is the largest body of water you would cross?*



*At the 2010 Winter Olympics in Vancouver, Canada, (above) Americans Lindsey Vonn (center) and Julia Mancuso (left) won the gold and silver medals respectively in the women's downhill event., Elisabeth Görgl of Austria (right) won the bronze medal. The Olympic torch (below) will arrive in Sochi, Russia for the beginning of the 2014 games on February 7, 2014.*



## Snow = Water

If you like winter sports, you are probably concerned about the depth of snow and maybe the type of snow on any given day. Does the ski slope have a cover of new, powdery snow? Are the rocks on the sledding hill covered?

Scientists who measure snowpack are also concerned about the type and depth of snowpack, but they often want to know how much water is contained in the snow.

Why? One of the reasons is to predict how much water will be available for use after the snow melts. If you like to go to the lake in the summertime, you might also be interested in predicting water supplies.

By measuring the depth and density of the snow, we can calculate how much water is in snow.

For example, after a storm there is 24 inches of snow on the ground. It is light, powdery snow and you estimate the density of the snow at 10% water (the range is about 5 to 20 percent for new snow). If you could instantly melt all of it, how much water would you have? Calculate your water by multiplying the 24 inches by the density (24 x .10). The result is 2.4 inches of water.

$$24 \text{ inches snow} \times .10 \text{ density} = 2.4 \text{ inches water}$$

Try another example. Heavy, spring snow has a density of about 20%. If you had 12 inches of spring snow, how many inches of water do you have?



# Water—An Essential Part of Your Body

While your mother may think you are made of sugar and spice and everything nice, your body is mostly made of water.

Water is essential to your body. The hotter it gets and the more active you are, the more water your body needs. The recommended amount of water per day is about eight cups, but some of this water comes from the food you eat (oatmeal is 84 percent water) and drink (milk is 87 percent water).

If you were to get stranded in the wilderness, you would start to feel thirsty when you lose about one percent of your body weight. You lose water through perspiration and when you breathe. On a cold day, have you seen your breath make clouds? That is water vapor.

As time goes by without taking in water, your body loses more water. When you

don't drink water, you feel fatigued and your body, including your brain, stops working properly. In about three days without water, you would perish. Of course, if your wilderness is a hot desert and you don't have shelter, you won't last even three days without water.

You don't have to be stranded in the desert to worry about water and health. Ice hockey players and other athletes are known to sweat a large amount during practice and games. We could measure how much perspiration and water vapor is lost during a game by weighing a player before and after. If he or she were two pounds lighter after the game, we would know they had lost one quart of water through their skin and breath. It also means athletes need to drink plenty of fluids to maintain peak performance.

## 1 – What percentage of your bones are water?

- A – 2 %
- B – 22%
- C – 52%
- D – 72%

## 2 – What percentage of your brain is water?

- A – 10%
- B – 25%
- C – 50%
- D – 75%

Water helps regulate your body temperature.

Water helps carry nutrients and oxygen to your cells.

## 5 – What percentage of your blood is water?

- A – 3%
- B – 23%
- C – 53%
- D – 83%

Water helps convert food to energy.

## 3 – What percentage of your muscles are water?

- A – 10%
- B – 25%
- C – 75%
- D – 95%

Water helps cushion your joints.

## 4—An adult male's body is about 60 percent water. What percent of a newborn baby's body is water?

- A – 38 %
- B – 58%
- C – 78%
- D – 98%

Water helps remove waste from your body.

**6 – Bonus question: If a quart of water weighs two pounds, approximately how much does a gallon of water weigh?**

# Bringing It All Together

Every living thing on Earth needs water to survive. It's one way we're all connected. Another way to look at how water connects us is to consider the watersheds in which we live. A watershed is the area of land where all of the water on or in the ground drains into the same place. The famous explorer and scientist John Wesley Powell (he was the first person to thoroughly investigate the Colorado River and made the first known passage of the Grand Canyon) said it this way:



John Wesley Powell  
1834–1902

“that area of land, a bounded hydrologic system, within which all living things are inextricably linked by their common water course and where, as humans settled, simple logic demanded that they become part of a community.”

Consider the map of the Colorado and Green rivers at right. The map shows how smaller rivers come together to form larger rivers. From this satellite view, you can also see how water flows down the mountains—the darker green shaded areas—toward the river. What you can't see is that some water is moving through the ground.

In the ground, water can fill the spaces in layers of rock, gravel and sand. These underground layers of water-bearing materials are known as aquifers. In rural areas, homes and farms often get their water by pumping water from these aquifers. Groundwater is an important resource.

Combining surface and groundwater, it is estimated that nearly 40 million people depend on water that gets its start in the drainage area of the Colorado and Green river basin.

If Colorado has a drier than normal winter and snowpack is low, people, plants and animals downstream will be impacted by reduced flows in the spring when the snow melts. If something were to happen in Wyoming that greatly reduced water quality, those impacts could be felt in the downstream states, as well as in Wyoming and Colorado.



The land area that drains into the Colorado and Green rivers includes seven states and Mexico.

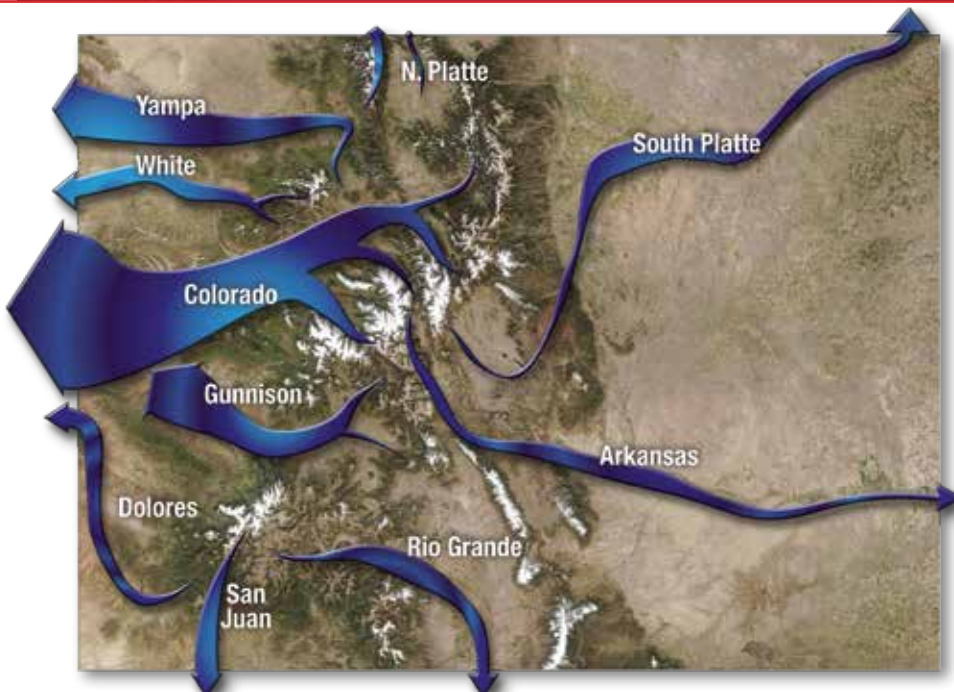
## Colorado-Mother of Rivers

The Colorado River is the mightiest of the rivers that get their start in Colorado's high country. The map at right shows the relative size of the annual water flow in each of Colorado's major rivers. But what the map doesn't show is about 80 percent of Colorado's population lives on the eastern side of the mountains.

To have more water on the east slope of Rocky Mountains, water is pumped through tunnels from one river basin to another. The largest of these systems is known as the Colorado-Big Thompson or C-BT project.

The C-BT brings water from the headwaters of the Colorado River to more than 33 Front Range communities. The tunnel that carries the water underneath the Continental Divide is more than 13-miles long, bringing water from Lake Granby to Estes Park. Horsetooth Reservoir, near Fort Collins, is the largest reservoir in the system.

The construction of this system by the federal government was, in part, a response to the drought of the Dust Bowl era. The project was authorized in 1937 by President Franklin Delano Roosevelt. Construction, which included reservoirs and other components, started the next year and took nearly 20 years to complete.



Geo-Bee: Mark the map to show Denver, Colorado Springs and your school. Bonus: Which river is closest to your school? \_\_\_\_\_



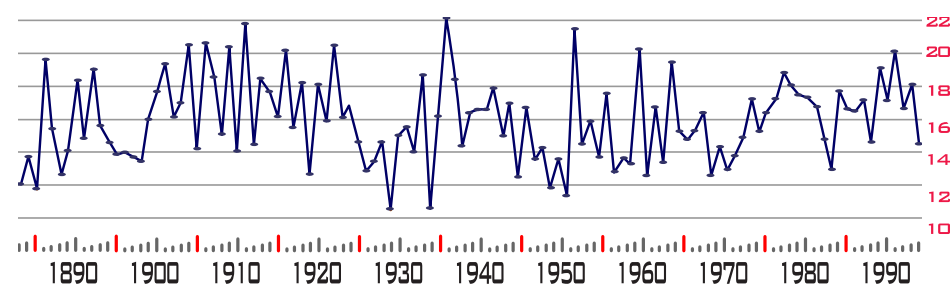


Lake Mead is the largest human-made reservoir in the nation and part of the Colorado River system. It's located in Nevada and Arizona.

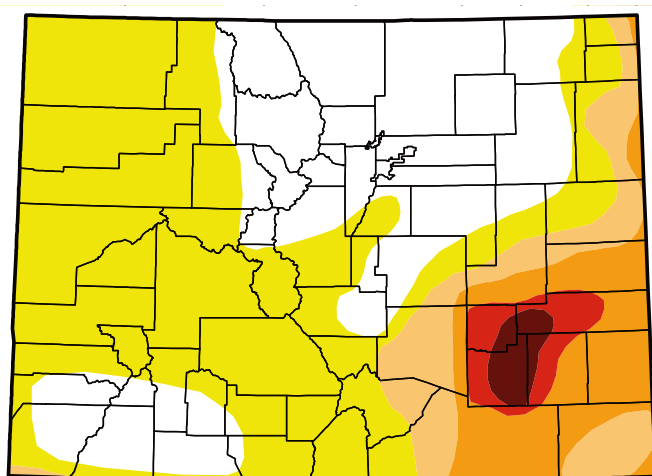
# Drought

On average, Colorado is a pretty dry place. While parts of the Rocky Mountains measure winter snowpack in feet, the eastern plains average about 13 inches of precipitation a year. By comparison, Baton Rouge, Louisiana averages more than 64 inches of precipitation a year. Population in Colorado and the West continues to grow, as do the demands for water.

## Average Annual Precipitation for Colorado



The amounts of rain and snow in any year are variable. The chart above illustrates average annual precipitation across Colorado. When an area receives less than the average amount of rain and snow over time, we call this a drought. In any year, it's normal for a portion of the state to be in a drought while other parts are average or above.



**Intensity:**  
 D0 Abnormally Dry  
 D1 Moderate Drought  
 D2 Severe Drought  
*The Drought Monitor focuses on Local conditions may vary. See for forecast statements.*  
**Author:**  
 Matthew Rosencrans  
 CPC/NCEP/NWS/NOAA

The map illustrates drought conditions in Colorado at the end of 2013. Large portions of the state are abnormally dry. The dark red areas of the map are in extreme drought conditions.

During a drought, the first people to feel the problem are farmers and ranchers.



Lake Powell is also part of the Colorado River system and is the second-largest reservoir in the United States.

Crops suffer, including the grass that grows for livestock to eat. Wildlife are also impacted as stream flows lessen, plants grow less and lakes, particularly seasonal ponds, begin to dry up.

As a drought continues or becomes more severe, watering restrictions and other conservation measures are taken in cities. Water stored in reservoirs from previous years is used to help make up the shortfall.

This is one reason we have reservoirs—to store water in times of plenty for use in times of shortage. This is true from year to year, but it's also true seasonally. Since most of our water comes from snowmelt, the largest river flows are in the spring and early summer. Farms need water for crops during the drier, hotter summer months. All of us need water year around, so some of the river flows need to be stored.

Reservoirs also provide habitat for wildlife and recreational opportunities. Water stored in reservoirs is used to provide ample streamflow for downstream fish during times of need.

Lake Mead (top ) stores water from Colorado, Utah and Wyoming for use on millions of acres of farm land and by cities including Los Angeles and Las Vegas. The white 'bathtub ring' on the shoreline shows how water levels have declined due to drought. If the water level declines another 30-feet from current levels, water rationing will begin. In nearby Lake Powell, if the water levels drop 100 feet from current levels, the generators in the dam that provide electricity for up to 350,000 homes will be shut down.

Particularly during periods of drought, decisions about how we use water are important. Even in our homes, using water wisely—and only what we need—makes a difference.



# Drought, Fires, Floods and the Watershed

## Fire

Periods of drought can increase the likelihood of wildfires and their severity. Colorado has seen a number of devastating fires in the last few years. These fires have both short-term and long-lasting impacts on the watershed.

Fire leaves soot and ash on the ground that washes into waterways following a rain or snow. The soot and ash can harm fish and other aquatic life. The loss of vegetation and scarring of the ground increases runoff and erosion.

Sediment from erosion in the water may impact downstream water treatment facilities, as well as the river ecosystem. Fires can increase nitrogen levels in the runoff water which can cause an increase in algae blooms in lakes and reservoirs. Algae can have a negative impact on fish and plants. Excess algae can also require additional treatment measures before the water can be used by cities. Land managers can re-seed forests and take other steps to help speed the recovery of watersheds, but it takes time.

When rains return to a burned forest, the increased runoff can contribute to flooding problems. Following a fire, less water soaks into the ground, causing the runoff to move more quickly to waterways.



*Wildlife, including this eagle, are dependent on healthy waterways.*

## Floods

Much of Colorado was experiencing some level of drought this past fall when unusually heavy rains along the northern Front Range brought catastrophic flooding. Parts of Boulder County saw up to 20 inches of rain in a one week period of time and as much as 9 inches one day—twice the previous single-day record. In an average year, the City of Boulder receives about 21 inches of total precipitation.

When it rains, the ground absorbs some water and some moves across the surface towards wetlands. During periods of heavy rain, the ground becomes saturated and can't absorb more water, increasing runoff. The presence of hard surfaces such as

pavement and concrete also increase the amount of runoff in an area. When the amount of runoff exceeds the volume that can be carried by waterways, the water runs over the banks and floods adjacent areas.

Flooding happened all along the South Platte River as far as Nebraska. Not only was there loss of life and property, but floodwater carries with it chemicals, trash and other pollutants that were on the ground. Drought, fires and floods are examples of how water-related events can have a large impact on a watershed and every plant, animal and person in the watershed.

*"We forget that the water cycle and the life cycle are one."  
- Jacques Cousteau*



*More than 1,000 personnel from the Colorado Air National Guard and other agencies helped with search and rescue efforts for the thousands of people who were trapped or cut off from surrounding towns by washed out roads and bridges.*



*The view as seen from an Air National Guard helicopter carrying water to be dropped on a forest fire in Larimer County in 2012.*

# Water Grows Food

One of the many ways we use water is to grow crops. About 87% of water used in Colorado is for agriculture. Farmers grow everything from apples to watermelons. The dairy industry supplies us with milk, cheese, and other dairy products. Cattle and calves for beef are the single largest agricultural sector in Colorado by dollar value.

Because most of Colorado is relatively dry, farmers need water to supplement what falls from the sky. The practice of providing additional water for crops is known as irrigation. The water commonly comes to the farm from a reservoir through rivers and a complex series of human-made ditches. The water is applied to the fields by flooding or row crop irrigation, large sprinklers or drip systems.

The system of reservoirs and ditches is carefully managed to make fair and efficient use of water supplies. Managers need to anticipate the needs of farmers on a daily basis and have enough water in the system. The water has to be allocated correctly to the proper users.

How is it decided who gets to use the water? Water is a public resource. The right to use the water is similar to a private property right—a water right can be bought, sold or rented. The right to use water is not connected to a specific piece of property. It is connected to a specific water system—a reservoir, river, ditch or well for example.

Colorado has a legal platform called the “prior appropriation doctrine” and a system of laws and water courts to govern the system. An appropriation is the act of diverting water from its source and putting it to beneficial use. The concept goes back to the Gold Rush days and was designed to prevent newcomers from encroaching on existing miners’ use of water and to stop hoarding and misuse.



*Peaches are one of the many crops grown on Colorado's Western Slope. Some seasonal farmer's markets provide an opportunity to interact with the people who grow your food.*

In simplified terms, the doctrine says that those with the oldest water rights have first priority to use water from a system and that the water has to be put to beneficial use. The needs of water users with the oldest or senior water rights are addressed before newer or junior users.

The water that flows out of Colorado is governed by a system of agreements called ‘compacts’. These agreements govern Colorado’s water commitments to other states.

## Putting Water to Work

This map shows Colorado’s 64 counties. Fill in the name of your county on the map. Then draw a line from each of Colorado’s top ten agricultural counties (below) to locate the county on the map.

*Cattle, dairy products, poultry, wheat, corn, nursery products, sheep, hay, vegetables*

### 1. Weld

### 2. Yuma

*Cattle, corn, wheat, hay, dry beans, hogs*

### 3. Morgan

*Cattle, wheat, corn, proso millet, hay*

### 4. Logan

*Cattle, wheat, corn, hay, proso millet*

### 5. Kit Carson

*Cattle, wheat, corn, proso millet, sunflowers*

### 6. Prowers

*Cattle, wheat, hay, corn, sorghum*

### 7. Adams

*Nursery products, proso millet, sunflowers*

### 8. Phillips

*Wheat, corn, proso millet*

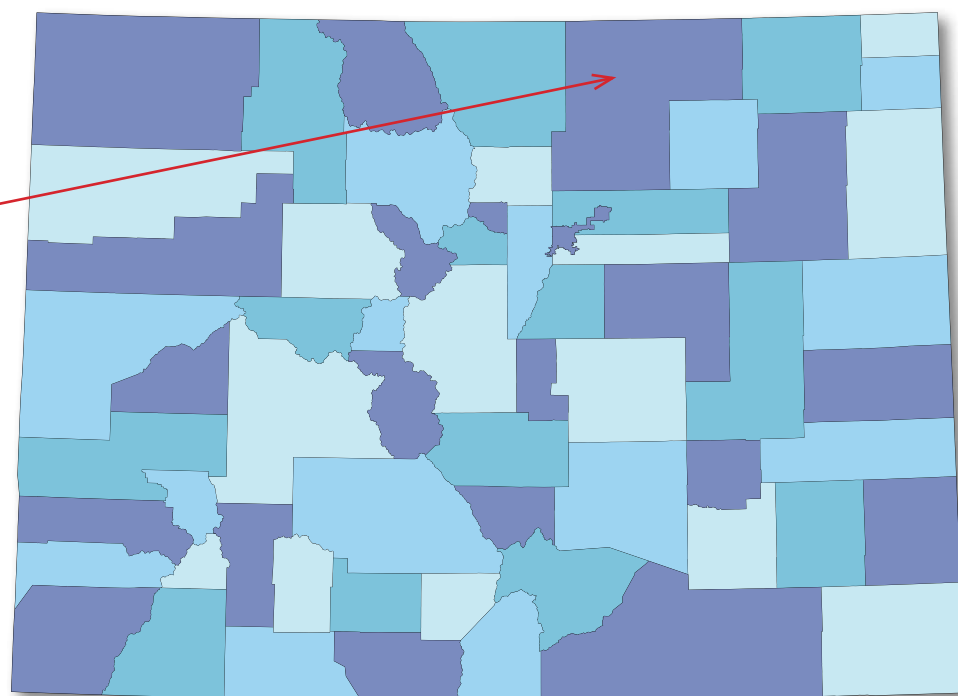
### 9. Washington

*Wheat, proso millet, corn, cattle, hay*

### 10. Larimer

*Dairy products, cattle, nursery products, wheat, corn, hay, vegetables*

*Agriculture contributes more than \$7 billion dollars to the Colorado state economy annually.*



## Top 10 Agricultural Commodities in Colorado

1. Cattle & Calves
2. Corn for Grain
3. Wheat
4. Dairy Products
5. Hay

6. Greenhouse & Nursery
7. Hogs
8. Potatoes
9. Sheep & Lambs
10. Poultry/Eggs



# The Number One Threat to Clean Water in the United States...

With millions of people—not to mention countless animals and plants—dependent on water that flows from Colorado’s mountains, we have a special responsibility to protect water. The number one threat here and across the United States is known as runoff or nonpoint source water pollution.

Going back to the floods mentioned on page 5, water moving across and through the ground can be contaminated by chemicals and trash. This type of pollution—runoff pollution—happens every time it rains or snow melts.

Consider a parking lot. First, the parking lot is usually paved, which means it doesn’t absorb water when it rains or snows. Instead, water flows to storm drains which lead to nearby creeks, streams and lakes—not treatment plants. The problem is what the water washes away as it moves.



Oil, as seen above, may leak from vehicles in the parking lot a few drips at a time. One car dripping a small amount of oil may not seem like a big deal, but when you figure thousands of cars a day, it adds up to be a big problem—and it’s not just one parking lot we’re worried about, but all of the parking lots in the watershed. A single quart of motor oil can pollute up to 250,000 gallons of water. One gallon of spilled gasoline can pollute up to 750,000 gallons of water. Still not thinking this is a big problem? The EPA estimates Americans spill 180 million gallons of used oil into lakes, streams and rivers every year.



*Litter is one example of pollution that is washed into waterways and collects in rivers and lakes. Many other pollutants are dissolved by the water and can't be seen.*

The parking lot most likely has other pollutants as well. Litter, pet waste, rubber from tires and metal from brake wear all contribute to the problem. Of course parking lots aren’t the only problem area either. Any non-absorbing surface—sidewalks, roofs, roads—increases runoff. Even your household can be a problem. The improper use or disposal of household chemicals can contribute to nonpoint source pollution. The pollution is a threat to aquatic life and impacts downstream users.



## Keep it Clean with H<sub>2</sub>O Jo & Flo

Runoff pollution is definitely a bummer, but the cool thing is that it’s something you can help prevent everyday. After all, this type of pollution is created by many sources. Part of the solution is for all of us to make small contributions to protecting water that add up to make a big impact.

### Help prevent winter runoff pollution...

1. Don’t litter.
2. Clean up pet wastes.
3. Shovel, snow-blow, plow and/or sweep the snow. These are all effective in removing snow and minimizing ice buildup.
4. Apply deicer before snow storms to prevent snow and ice buildup. This also makes shoveling more effective.
5. If leftover salt crystals are still visible after salt has been applied, then you’ve used too much. Sweep up the leftover salt and re-use it, or dispose of it in the trash

To find out how you can help H<sub>2</sub>O Jo and Flo protect our water everyday, visit <http://npscolorado.com>.

## Watershed Defenders

Everybody likes a good comic book every now and then. The Colorado Foundation for Agriculture has created the Watershed Defenders comic. You can download past issues and see our heroes battle their arch-nemesis, the Contaminator, at [GrowingYourFuture.com](http://GrowingYourFuture.com). If you enjoy the Watershed Defenders, be sure to check out Major Ag, a superhero protecting food and fiber in Colorado.

The Colorado Reader publication and Ag in the Classroom are projects of the Colorado Foundation for Agriculture. Educational projects are produced in cooperation with the Colorado Department of Agriculture, other state and federal agencies, Colorado commodity groups, Colorado agricultural associations, state universities and colleges and interested individuals. Colorado Readers are provided free to educators requesting them. For more information contact: Bette Blinde, Colorado Foundation for Agriculture, P.O. Box 10, Livermore, CO 80536 or phone 970 881.2902. Financial support for this reader has been provided by: Colorado Department of Public Health and Environment ~ Water Quality Control ~ NPS Program.



# Teacher's Guide

Ag in the Classroom - Helping the Next Generation Understand Their Connection to Agriculture

## WATER IS LIFE

### Additional Resources

#### **United States Geological Survey - USGS**

USGS collects and provides information needed to understand the nation's water resources and provides access to water data, publications, and maps. Send your students to the education page and click on the hydrology primer for some good information!

[www.education.usgs.gov](http://www.education.usgs.gov)

#### **Colorado Foundation for Water Education - CFWE**

CFWE focuses on water education with a goal of promoting a better understanding of Colorado's water resources by providing balanced and accurate information and education.

[www.cfwe.org](http://www.cfwe.org)

#### **Colorado Foundation for Agriculture - CFA**

Where have we heard that name before? The web site contains pdf files of activity books, past readers, e-lessons and more. It's a useful site to visit any time for agriculture and natural resource topics. Water resources abound.

[www.growingyourfuture.com](http://www.growingyourfuture.com)

#### **Additional sites containing pertinent information:**

[www.npscolorado.com](http://www.npscolorado.com)

[www.groundwater.org](http://www.groundwater.org)

[www.watereducation.org](http://www.watereducation.org)

#### **agclassroom.org**

This is the national web site for Ag in the Classroom programs from across the nation. A site search will bring up a variety of lessons, books, videos and links.

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*Comments, questions, suggestions and feedback about the Colorado Reader are welcome.*

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**INTRODUCTION:** Colorado is a headwater state and as such we have the privilege of first dibs on some of this resource. Water flowing from melting mountain snowpack is fresh and clean. As it tumbles down mountain slopes it picks up and carries things from the environment. That's one of the reasons water goes to water treatment plants before it flows into pipes that bring it to our faucets. This year, as in recent years, the mountains are providing more things for water to carry downstream. Trees that have died from the bark beetle infestation are falling. This frees up more than just tree debris. Roots that held soils, minerals and rocks in place are displaced and become free to flow down the streams, creeks and rivers. Wildfires have created a challenge for water managers as ash and related debris wash into waterways. Runoff on denuded slopes compounds the problems.

We witnessed massive flooding this past year, both in burned areas and in watersheds that received too much precipitation at one time. It is easy to see that water management is a difficult task. There sometimes is too much, too little, or occasionally just the right amount of water.

This issue looks at the challenges Colorado faces as a headwater state. Water issues go beyond Colorado's borders as we see with the 2014 Winter Olympics.

**PAGE 1** - Water is life. Ask students to think of an analogy to communicate how much water is available for use on Earth.

#### **PAGE 2** - ANSWERS

An airplane flying directly from Denver to Sochi will fly over the Atlantic Ocean.

12 inches of snow x .20 density = 2.4 inches of water

Do your students know that the water cycle and the hydrologic cycle are the same?

#### **PAGE 3** - ANSWERS

1. 22% of our bones are water
2. 75% of our brains are water
3. 75% of our muscles are water
4. 78% of a newborn baby's body is water
5. 83% of our blood is water
6. A gallon of water weighs approximately 8 pounds (1 quart = 2 pounds; 4 quarts make a gallon, therefore 2 pounds times 4 (quarts in a gallon) = 8 pounds)

Invite your students to visit the drinking fountain!

#### **PAGE 4** -

What geologic feature in Colorado causes water to flow out of the state? (mountains)

What is the dividing line in the mountains that determines whether rivers will flow in an easterly or westerly direction? (Continental Divide)

#### **PAGE 5** -

Do you and your students live in an area that is drought free, experiencing abnormally dry conditions, in a moderate drought or a severe drought?

Discuss the impacts of drought.

Discuss the difference between weather and climate.

#### **PAGE 6** -

Lead a discussion of current events that involve precipitation.

#### **PAGE 7**

What steps have we, as a society taken to ensure that water is available when we need it?

Colorado's water management system is different from systems used in other states. Ask students to research different ways states determine who gets the water.



## STUDENT ACTIVITIES & REVIEW

1. Evaporation, condensation, precipitation are \_\_\_\_\_ that occur in the water cycle.

- foods
- processes
- sounds
- colors

2. Agriculture in Colorado uses \_\_\_\_\_ water than other segments of the state's economy.

- less
- the same amount of
- more
- wetter

3. Climate is

- forecast temperatures
- long-term summary of weather patterns
- exactly the same as weather
- what causes the equinox and solstice

4. Runoff

- is water that flows over surface areas
- can carry litter and debris into waterways
- is channeled by gutters into storm drains
- all of the above

5. Water can be used to

- drink
- water crops
- make electricity
- all of the above

6. Write a definition of non-point source pollution and provide an example.

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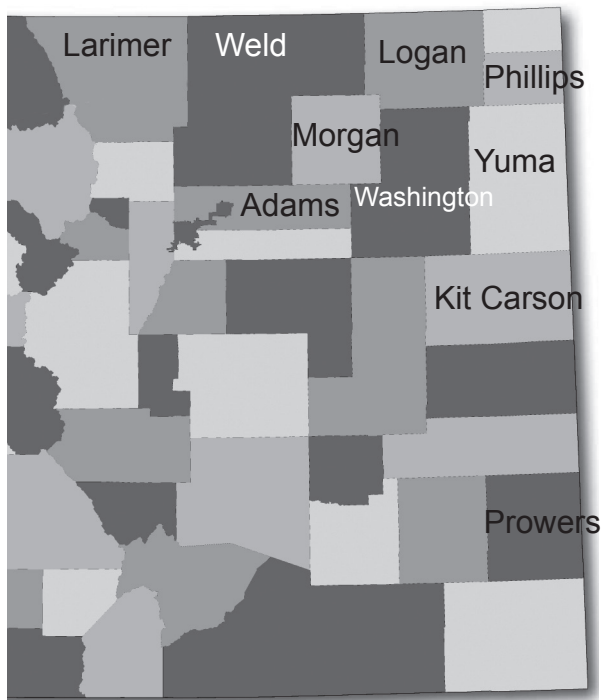
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7. Select all of the following that are things that can be done to help keep water clean.

- do not litter
- clean up pet waste and put in trash
- remove snow from walkways right away
- pick up litter that you find

### PAGE 7 - ANSWERS

The counties named are all on the front range.



### PAGE 8

Discussion: Have students brainstorm ideas of things they can do to help keep water clean.

#### VOCABULARY

Ask students to circle words that are new or for which they cannot determine a meaning based on context.

Make a list of words. Open a discussion to let students who know the meaning explain the meaning. Look up definitions to determine correct pronunciation and to find the root words.

#### Colorado Academic Standards,

##### Physical Science

1. Matter exists in different states such as solids, liquids, and gases and can change from one state to another by heating and cooling.

##### Relevance and Application

1. Water is distributed on Earth in different forms such as vapor, ice or glaciers, rivers, and freshwater or saltwater oceans.
2. There is only a certain amount of water available for human use.

##### Physical Science

1. All matter is made of atoms, which are far too small to see directly through a light microscope. Elements have unique atoms and thus, unique properties. Atoms themselves are made of even smaller particles.
2. Atoms may stick together in well-defined molecules or be packed together in large arrangements. Different arrangements of atoms into groups compose all substances.
3. The physical characteristics and changes of solid, liquid, and gas states can be explained using the particulate model.
4. Distinguish among, explain, and apply the relationships among mass, weight, volume, and density.

##### Life Science

1. Changes in environmental conditions can affect the survival of individual organisms, populations, and entire species
2. Organisms interact with each other and their environment in various ways that create a flow of energy and cycling of matter in an ecosystem

##### Earth Systems Science

1. Complex interrelationships exist between Earth's structure and natural processes that over time are both constructive and destructive.
2. Water on Earth is distributed and circulated through oceans, glaciers, rivers, ground water, and the atmosphere.

##### Relevance and Application:

1. Home water quality and consumption affects health and conservation policies.
2. Water systems affect local, regional, and world population development.
3. Water-use irrigation patterns in Colorado affect economic development in the state.
3. Earth's natural resources provide the foundation for human society's physical needs. Many natural resources are nonrenewable on human timescales, while others can be renewed or recycled.

##### Relevance and Application

1. Humans use an understanding of the cycling of matter and energy to help mitigate environmental problems. For example, they treat waste water and clean up oil spills.

#### Reading, Writing and Communicating

##### Reading for all purposes

1. Comprehension and fluency matter when reading informational texts in a fluent way.
2. Comprehension and fluency matter when reading informational and persuasive texts in a fluent way.
3. Knowledge of complex orthography (spelling patterns), morphology (word meanings), and word relationships to decode (read) multisyllabic words contributes to better reading skill.



# WATER

## Evaluation ~ 2014

### Colorado Reader ~ Agriculture in the Classroom

Please take a few minutes to evaluate your students' knowledge of this topic.

There is an area for additional comments.

Your comments help us improve future Colorado Reader issues. Thank you!

How many students used this reader? \_\_\_\_\_

How many or what percentage of your students can explain how fires and floods are connected? \_\_\_\_\_

How many or what percentage of your students can name the percentage of fresh water found on Earth?  
\_\_\_\_\_

How many or what percentage of your students can describe two ways water is used in Colorado?  
\_\_\_\_\_

How many or what percentage of your students can describe how "artificial snow" is made? \_\_\_\_\_

Additional Comments \_\_\_\_\_

How many or what percentage of your students can explain why water is an essential part of your body? \_\_\_\_\_

How many or what percentage of your students recognize that the Colorado River is Colorado's largest river?  
\_\_\_\_\_

How many of your students understand what a drought is?  
\_\_\_\_\_

How many or what percentage of your students can describe two ways to prevent water pollution? \_\_\_\_\_

**SUBMIT THIS EVALUATION FOR A CHANCE  
TO WIN A \$100 VISA CARD!**

Please rate:	Good	4	Average	2	Poor
Student Activities Throughout Reader	5	4	3	2	1
Teacher's Guide	5	4	3	2	1
Reading Level	5	4	3	2	1

I would like to see more activities like: \_\_\_\_\_

School \_\_\_\_\_ Grade Level \_\_\_\_\_

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### Food, Fiber & More Summer Institute

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Colorado Foundation for Agriculture will be adding electronic activities on line this year. We'll be asking a limited number of teachers to pilot test projects. Your name

will be included in the credits of the final product after comments and suggestions for improvement are incorporated and the e-files are made available.