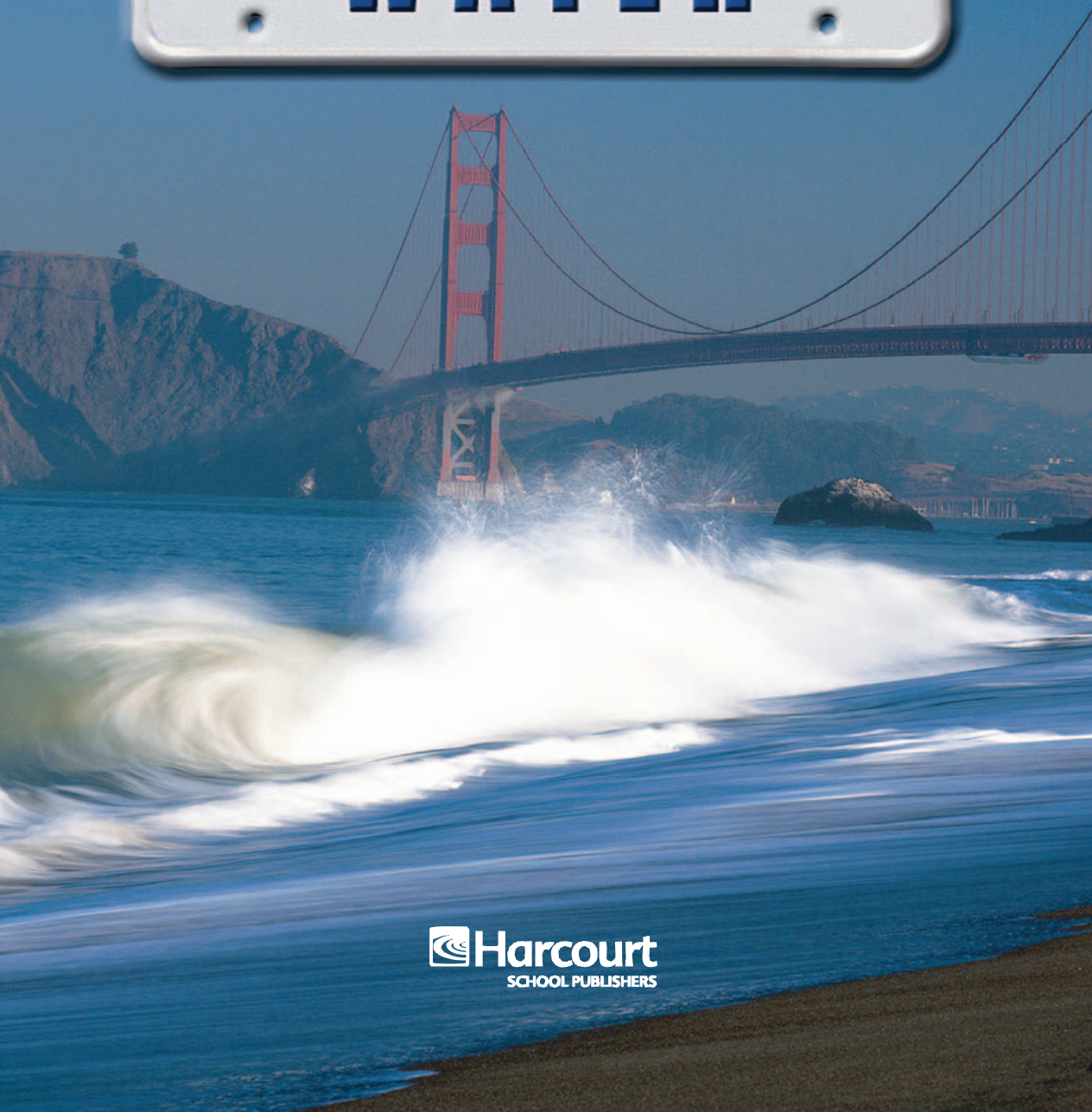


California's
WATER



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California's People and Water

Do you know where most of the people in California live? To find out, you could look at a **population density map**. Use the key to find the areas where only a few people live. Look again to find out where many people live very close together.

For example, find Sacramento on the map. Now look at the key. You can figure out that Sacramento is a place with very high population density. Many people live very close together.

Now look at the northern part of California. The population density is low. That's because not many people live there.

You can form opinions from the population density map. You can conclude that most Californians live in the central or southern part of the state or near the coast.

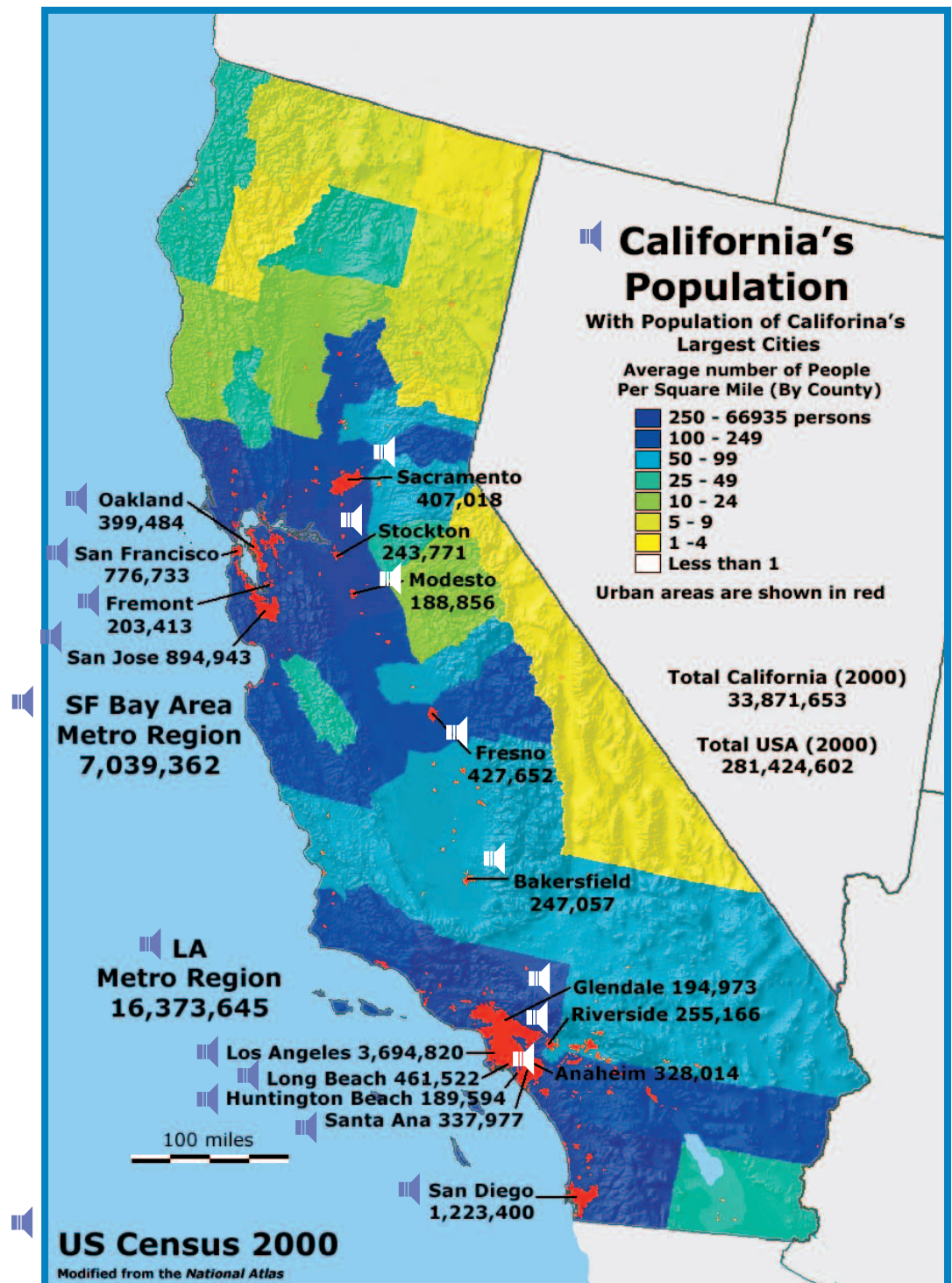
The map on this page shows the average rainfall for California. Look at the key to find out what part of the state gets the least amount of rain.

When you compare the population density map to the **average rainfall map**, you can tell that the most rain falls in areas where there are the fewest people. This is a problem! The millions of people living in the dry parts of the state are thirsty! They need water to drink, wash, and bathe in. But they live in the very place with the least amount of rain!

Californians face a big challenge in moving the water from the rainy parts of the state to the dry parts. In this book, you'll learn about some of the ways this happens.



CAUSE AND EFFECT Why is it a problem that rain falls in areas where there are few people?



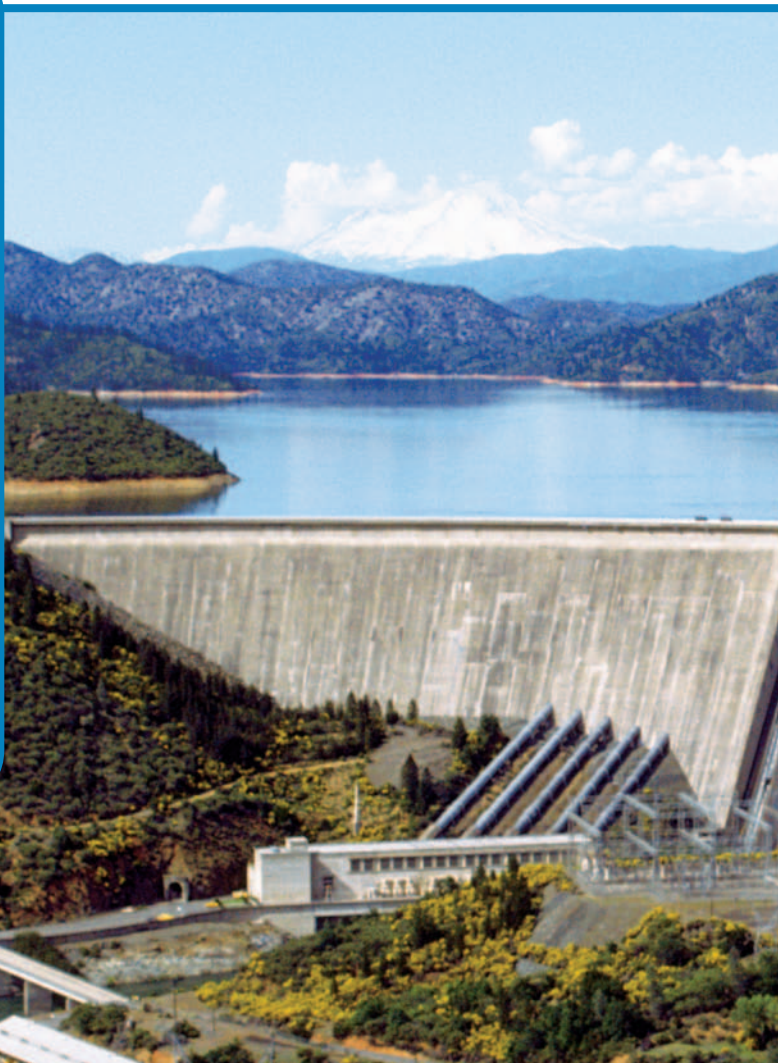
Rivers and Dams

When the rain falls and when snow melts, it flows downhill. Much of it makes its way to rivers and streams. In the spring, the rivers are surging with water. There is lots of water for everyone to drink. However, in California there are often periods of **drought** when no water falls for months at a time. During a drought, some streams run dry and rivers are low. It's hard to find enough water for everybody who needs it during a drought.

 One way to solve the problem of droughts is to collect water in reservoirs. A **reservoir** is a lake formed by building a dam across a river. The dam allows a steady stream of water to flow

Fast Fact

The beautiful Hetch Hetchy Valley is in Yosemite National Park. It was flooded in 1923 when a dam was built. Many Californians want to take the dam apart. That would make the valley beautiful again. But people in San Francisco get their water from the Hetch Hetchy reservoir. They worry about where their water will come from without the dam. Californians will debate this issue and come to a good solution.

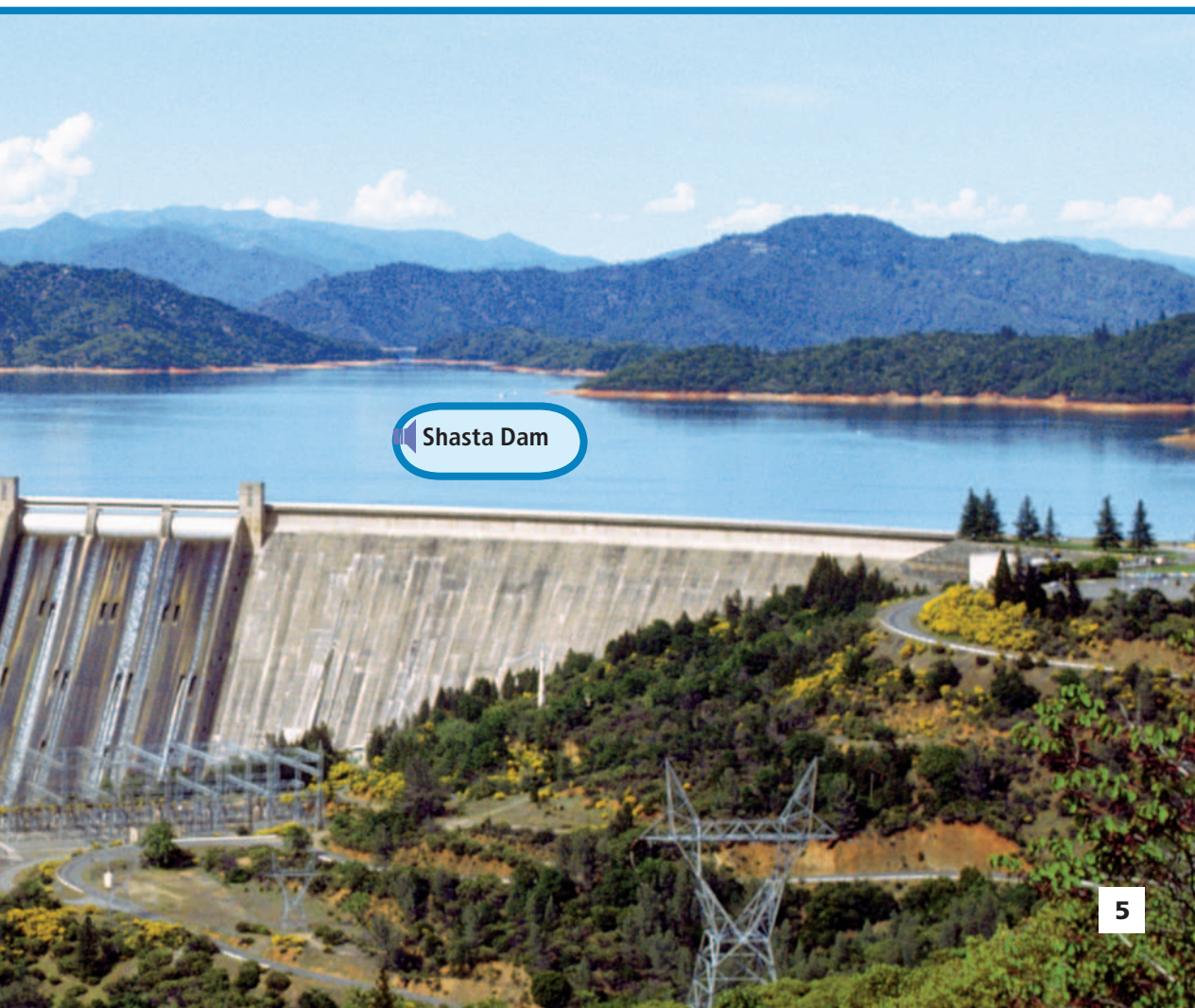


from the reservoir every day all year round. That way, when there is lots of water, the reservoir gets very full. When rains stop, the dam continues to allow the same amount of water out. The reservoir gets lower and lower during dry months. But as soon as the rains come again—SHAZAM!—the water fills the reservoir up.

Californians get water from reservoirs all year long. Aqueducts and canals carry water from the reservoir to farms and cities where it is needed. This is very important to farmers. They need water to keep their crops alive all year long. If the water were not available, they could not grow food for people all over the world.



CAUSE AND EFFECT How do dams help farmers get through periods of drought?



Shasta Dam

Aqueducts in California

Californians use aqueducts to **transport**, or move, water. An **aqueduct** is a series of pipes. The pipes carry water from a river or reservoir to a city or farm. There it can be used for drinking or watering crops.

 One of the most important aqueducts in California carries water from the Colorado River to Los Angeles. Can you guess how long this aqueduct is? It's an amazing 242 miles long!

 To travel such a long distance, the aqueduct uses more than just a couple of pipes. Some parts of the aqueduct are concrete canals. Other areas are underground tunnels. In two places are reservoirs. These hold the water until it is needed. There are even

A photograph of the Colorado River Aqueduct, showing a long line of large white pipes supported by concrete pillars, stretching across a dry, hilly landscape under a clear blue sky.

 Colorado River Aqueduct

five pumping stations. The stations pump the water up and over the hills on its journey.

When the water arrives in Los Angeles, it is cleaned. Then it is sent all around the city for people to drink. Some of it is sent to other towns. Even San Diego gets drinking water from the Colorado River Aqueduct.

Building an aqueduct is expensive. It also takes constant work to keep it clean and in good working order. However, it has become essential for the survival of the cities in Southern California.

 **MAIN IDEA AND DETAILS** What is an aqueduct and what does it do?

Fast Fact

The Colorado River Aqueduct was completed in 1941. It took 8 years and 30,000 people to build.

Desalinization

The coastal cities in California have water all around them. But seawater is not drinking water. It is full of sea creatures and salt. It has minerals that humans cannot drink.

 Have you ever separated water from salt? If you have, then you know about **desalinization**. Many places in California use this same process in desalinization plants. These big factories take water from the ocean. They heat it up. Then they collect the vapor. When the vapor cools, it becomes pure drinking water.

 A desalinization plant works best when it filters **brackish** water. Brackish water is seawater mixed with fresh water. Brackish water is found in a **delta**, where freshwater from a river empties and mixes with salty ocean water.



■ The advantage to desalinization plants is that they can be built near where the water is needed, such as in a city near the ocean. Another advantage is that the water the factory produces is extremely pure. In fact, it is so pure, that a town must mix it with less pure water before people drink it!

■ However, there are disadvantages too. The process of desalinization uses a lot of electricity. In some cases, it costs more money to heat and filter seawater than it does to transport fresh water from hundreds of miles away!

■  **COMPARE AND CONTRAST** What are the advantages and disadvantages of desalinization plants?

Fast Fact

■ When it filters brackish water, a desalinization plant can get as much as 50 gallons of fresh water for every 100 gallons of impure water.

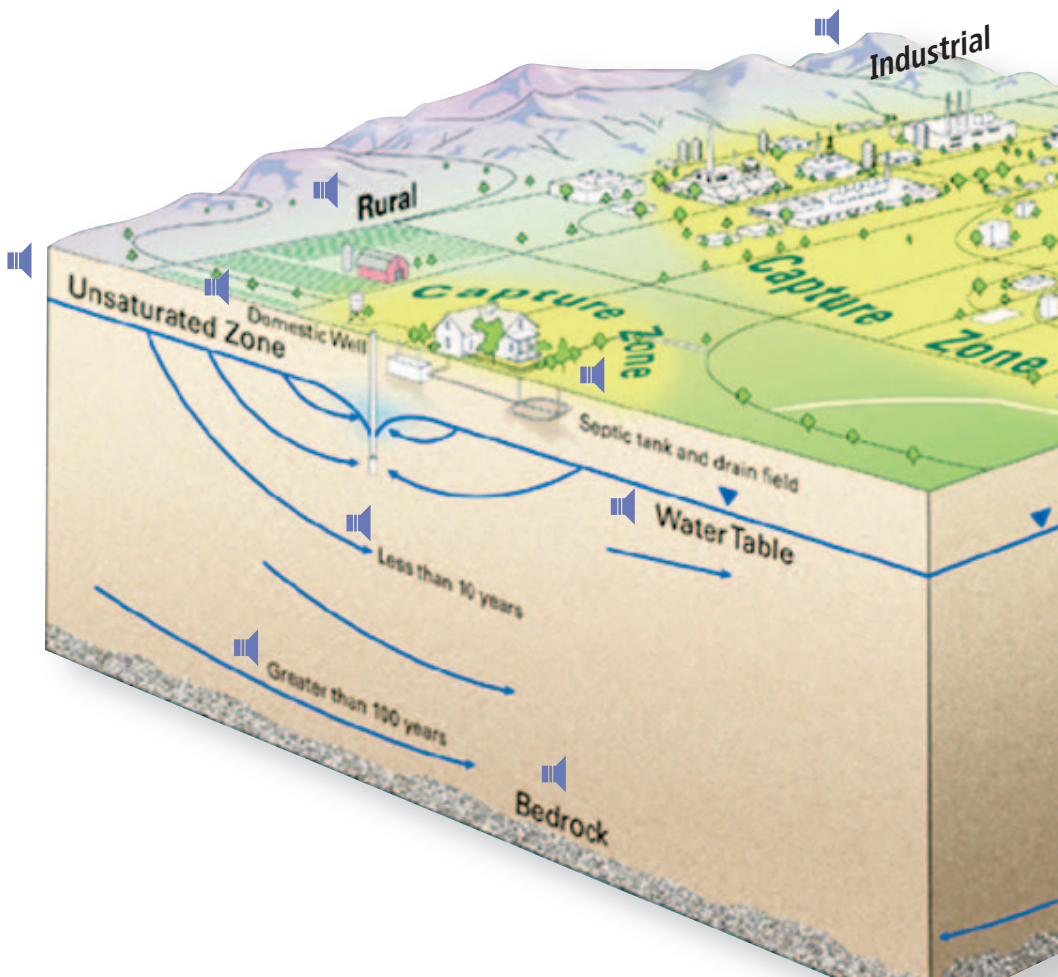
Groundwater and Aquifers

A **watershed** is a large region of land in which the water drains into a series of rivers and creeks. Some of the water in each watershed seeps into the soil. It becomes groundwater.

Groundwater is water found in the rocks and sandy sediments underground.

The minerals and salts in the soil clean the groundwater as it seeps through. The soil takes out the impurities from the water. That means that the water deep in the ground is clean enough to drink.

Much of the groundwater in California collects in a giant **aquifer**. An aquifer is an area underground that holds water. There is an aquifer that lies in a long strip down the center of California. People who live above the aquifer can use that water.



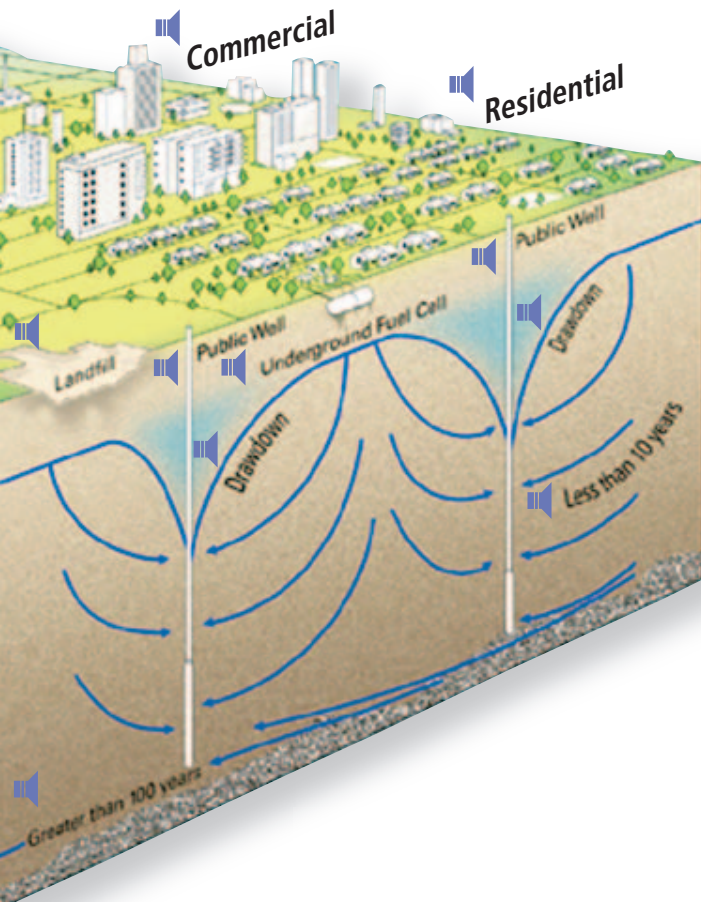
They just drill a well and pump up the water. They use the water for irrigating crops, drinking, or bathing.

However, sometimes the groundwater can get polluted.

Runoff is water that drips from roofs and roads. It can carry salts and poisons into the aquifer. Pesticides can runoff fields and get into the groundwater. Sometimes chemicals are stored in tanks underground. If they leak they can make the groundwater unsafe. The chemicals can make people sick.

Polluted groundwater must be cleaned before it is used. But Californians are now protecting their groundwater. They keep close watch on how land is used. They have strict laws about storing chemicals.

 **MAIN IDEA AND DETAILS** What is an aquifer and why must it be protected?



Fast Fact

More than 50% of the people in the United States depend on groundwater for their drinking water.

Where Do California's Farmers Get their Water?

Farmers are very important in California. They produce food that is shipped all over the world. Farms employ many thousands of people. Their work brings in billions of dollars to the state. However, to grow crops, farmers need lots of water. They need to transport water to their farms just as the cities do.

To get the water they need, farmers rely on huge water projects. In each area of the state, aqueducts, canals, and reservoirs deliver water to farms. That water is used to **irrigate**, or water, the crops.



 Most California farmers are very careful with the water they use. They know that water is precious. So they find ways to conserve it. For example, one irrigation system is buried underground. It is a series of pipes and hoses that sit right near the roots of plants. The hoses allow water to drip out where it can be absorbed by the roots.

 Many farmers also collect the water that runs off their land. They pump it out again onto their crops.

As technology improves, farmers can filter their water better. They find ways to use less water to produce the same amount of food.



CAUSE AND EFFECT Why are farmers important to California?



Conservation

Water in California is scarce. So many cities in California look for ways to conserve it. For example, most towns have a law that allows people to water their lawns just once a week. This means that many tropical plants cannot survive. Some Californians stopped planting the water hungry plants. They plant a **xeriscape garden** instead. It is filled with native grasses, desert plants, and **drought-tolerant** trees.

Businesses find ways to conserve water also. For example, some hotels do not wash sheets every day. They wait until a guest leaves before they wash the sheets. This means they use a lot less water in their laundry.

Each method of conserving water saves a small amount. But all the efforts put together make a huge difference.



CAUSE AND EFFECT Why is it important to conserve water?



Summary

California's water is so scarce and so valuable, that some have called it Liquid Gold. Californians have many ways of getting water. They build dams in rivers to store water against drought. They transport water in aquifers. They desalinate seawater. They drill wells to get groundwater from the earth.

 In all these ways, water gets to cities and farms. Californians know that water is precious. It must be protected and conserved.

Checklist

	What Can You Do to Conserve Water?
	Take short showers.
	Fix leaky water faucets.
	Turn off the water when you brush your teeth.
	Run only full loads of laundry or dishes.
	Water plants only when it is necessary.

Glossary

-  **aqueduct** (AH kweh duct) A series of pipes that carry water (6)
-  **aquifer** (AH kwi fer) An area underground that holds water (11)
-  **average rainfall map** (AV rij RAYN fawl map) A map that shows how many inches of rain falls in an average year (3)
-  **brackish** (BRAK ish) Seawater mixed with fresh water. (9)
-  **delta** (DEL tuh) A body of water where freshwater from a river empties into the salty ocean water. (9)
-  **desalinization** (dee sal ih ni ZAY shun) The process in which fresh water is made from saltwater (8)
-  **drought** (drowt) A period of time when little or no water falls (4)
-  **drought-tolerant** (drowt TOL uh runt) Being able to go without water (14)
-  **groundwater** (GROWND wah ter) Water found in the rocks and sandy sediments underground (11)
-  **irrigate** (EER ih gayt) To water plants or crops (12)
-  **population density map** (pop yoo LAY shun DEN sih tee map)
A map that shows the number of people that live in an area (2)
-  **reservoir** (RES er vwahr) A lake formed by building a dam (5)
-  **runoff** (run of) Water that drips off houses and roads and runs into waterways (11)
-  **transport** (TRANS port) To move or carry something (6)
-  **watershed** (WAH ter shed) A large region in which water drains into a series of rivers and creeks (11)
-  **xeriscape garden** (ZEER ih skayp gar den) A collection of plantings that do not need much water to live (14)

Think and Write

-  **1.** Where does most of the water in California fall?
-  **2. CAUSE AND EFFECT** How do reservoirs help Californian's get the water they need?
-  **3. MAIN IDEA AND DETAILS** What is a desalinization plant?
-  **4. Letter Writing** Write a letter to a friend in a different state. Explain why California has a problem with water. Then explain to your friend some of the ways that water gets to the people who use it.

Hands-On Activity

Look in newspapers and magazines for information about water issues in your area. Clip articles on water-related topics and make a scrapbook. Summarize the article briefly and paste it in your scrapbook next to the article.

School-Home Connection

Share the reader with a family member. Review the information in the reader together. Then together, discuss the water systems that supply your home with water. Finally, look around your home for ways that you can conserve water.