

Louisiana's Geography

Chapter Preview

People

René-Robert Cavelier, Sieur de La Salle; Louis XIV; Samuel Lockett; Henry Miller Shreve; John Breaux

Places

Mississippi River, Baton Rouge, Pearl River, Gulf of Mexico, Sabine River, Toledo Bend Reservoir, New Orleans, Driskill Mountain, Shreveport, Bossier City, Alexandria, Avery Island, Lake Charles, Gulf Intracoastal Waterway, Lake Pontchartrain, Plain Dealing, Minden, Slidell, LaPlace, Cheneyville

Terms

landform, environment, absolute location, relative location, latitude, equator, longitude, prime meridian, time zone, International Date Line, physical geography, elevation, relief, alluvial soil, estuary, loess soil, erosion, marsh, salt dome, geologist, uplift, navigable, drainage basin, sediment, cutoff lake, raft lake, marsh lake, bayou, weather, climate, precipitation, tornado, hurricane, growing season, wetlands, subsidence, nutria

René-Robert Cavelier, Sieur de La Salle, was born in France and came to North America in 1666 at the age of twenty-three. La Salle spent many years exploring the North American interior, in search of riches and a possible trade route to China. In 1682, he led an *expedition* (a journey for a specific purpose) that reached the mouth of a great river, which we know today as the Mississippi. He named it the River Louis. La Salle also claimed and named the area “Louisiana” in honor of French King Louis XIV. Here is a translation of the claim he made on April 9, 1682:

I, René-Robert Cavelier de La Salle, by virtue of His Majesty's commission, which I hold in my hands, and which may be seen by all whom it may concern, have taken and do now take, in the name of His Majesty and of his successors to the crown, possession of the country of Louisiana, the seas, harbours, ports, bays, adjacent straits, and all the nations, peoples, provinces, cities, towns, villages, mines, minerals, fisheries, streams and rivers, within the extent of the said Louisiana.

Right: This portion of Interstate 10 is elevated over Louisiana's wetlands.





La Salle's claim of Louisiana showed how strongly the French wanted to control the center of North America. This strategy would connect the colony of New France, known today as Canada, with Louisiana.

Part of the lands that La Salle claimed for France would become the American state of Louisiana in 1812. The **landforms** (any natural features of Earth's surface), the water, and the natural resources would continue to support the people who settled within Louisiana's changing borders.

This chapter will focus on the geography of Louisiana and will highlight the state's five natural regions, various and important waterways, and its climate. It will also explore the relationship between its people and their **environment** (surroundings).

Top: This 1844 painting by Theodore Gudin is titled *La Salle's Expedition to Louisiana in 1684*. The ship *La Belle* is on the left, *Le Joly* is in the middle, and *L'Aimable* is on the right.

Middle: Fairview-Riverside State Park near Madisonville is in the flatwoods area of the Terraces region.



Above: The Kisatchie National Forest Longleaf Vista Recreational Area has a 1.5-mile-long interpretive trail.

Below: The Great Seal of the State of Louisiana was officially adopted in 1902 and updated in 2010. **Lower**

Left: Champagne's Cajun Swamp Tours, Breaux Bridge. **Lower Right:** The Caroline Dormon Nature Preserve, Natchitoches Parish.



Louisiana



Louisiana Vital Statistics

- Total area:** 52,378 square miles
- Land area:** 43,204 square miles
- Water area:** 9,174 square miles
 - Coastal water area:** 2,880 square miles
 - Inland water area:** 4,562 square miles
 - Territorial water area:** 1,732 square miles
- Greatest distance north to south:** 275 miles
- Greatest distance west to east:** 300 miles
- Number of parishes:** 64
- Highest point:** Driskill Mountain, 535 feet
- Lowest point:** New Orleans, 8 feet below sea level
- Mean elevation:** 100 feet above sea level

Louisiana Location

- Latitude:** Between 29° and 33° N
- Longitude:** Between 89° and 94° W
- Location within United States:** Western part of the Gulf Coastal Plain
- Bordering states:** Arkansas, Mississippi, Texas
- Geographic center of the state:** Avoyelles Parish, 3 miles southeast of Marksville



Section 1

Location

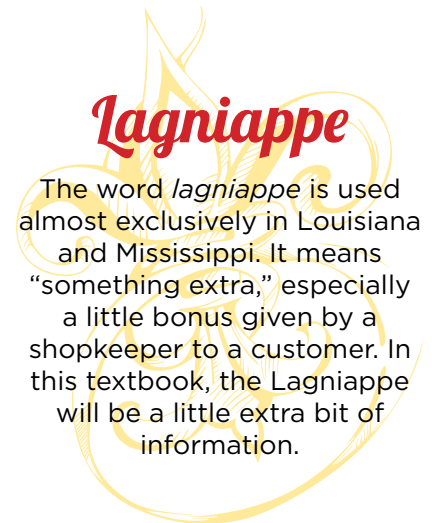
As you read, look for

- ▶ the difference between absolute location and relative location;
- ▶ the absolute location of Louisiana expressed in terms of latitude and longitude;
- ▶ how Louisiana’s boundaries are formed;
- ▶ terms: **absolute location, relative location, latitude, equator, longitude, prime meridian, time zone, International Date Line.**

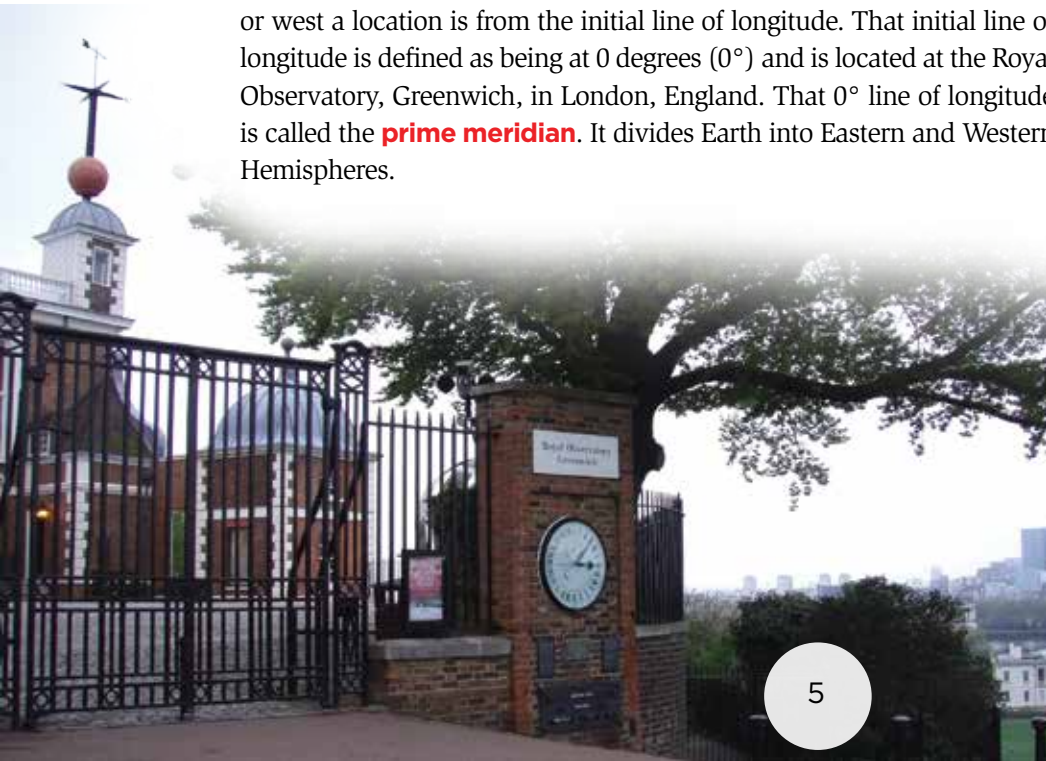
As you study this textbook, you are probably located in a classroom or at home. But how would a geographer answer a question about your location? He or she would talk about your location in absolute or relative terms. **Absolute location** refers to a specific spot on planet Earth. **Relative location** explains where a place is in relation to another place or places. For example, the absolute location of Louisiana’s State Capitol is 900 North 3rd Street in Baton Rouge. The Capitol’s relative location is at the north end of a complex of buildings called Capitol Park.

Louisiana in the United States

Absolute location can also be expressed using a system of lines of latitude and longitude. **Latitude** (also called *parallels*) measures a location’s distance north or south of the equator. The **equator** is an imaginary line on Earth’s surface that is everywhere equally distant from the North and South Poles. **Longitude** (also called *meridians*) measures how far east or west a location is from the initial line of longitude. That initial line of longitude is defined as being at 0 degrees (0°) and is located at the Royal Observatory, Greenwich, in London, England. That 0° line of longitude is called the **prime meridian**. It divides Earth into Eastern and Western Hemispheres.



Left: The prime meridian is based at the Royal Observatory, Greenwich, in London, England. **Below:** A laser projected from the observatory marks the prime meridian line.



Lagniappe

Tourists at the Royal Observatory can stand at the world-famous Greenwich Meridian Line and place one foot in the Western Hemisphere and one foot in the Eastern Hemisphere!

Earth is divided into twenty-four time zones. A **time zone** is a segment of the worldwide system for standardizing time. Seven of the twenty-four time zones are in the United States. The time zones begin at the prime meridian and circle Earth. Moving from one time zone to the next, the difference in time is always one hour per zone. Beginning at the prime meridian and moving east, the time advances by an hour in each zone. As you move west, the time is one hour earlier than in the previous zone. As Map 1.1 demonstrates, the time zone divisions are not always exactly straight. Sometimes the zones are adjusted so that individual islands or island nations are not split into separate time zones. You can see this at the location of the International Date Line located in the Pacific Ocean in the western portion of the world's time zones. The **International Date Line** is an imaginary line, located mainly on the 180° meridian, that marks the divide where the date changes by one day.

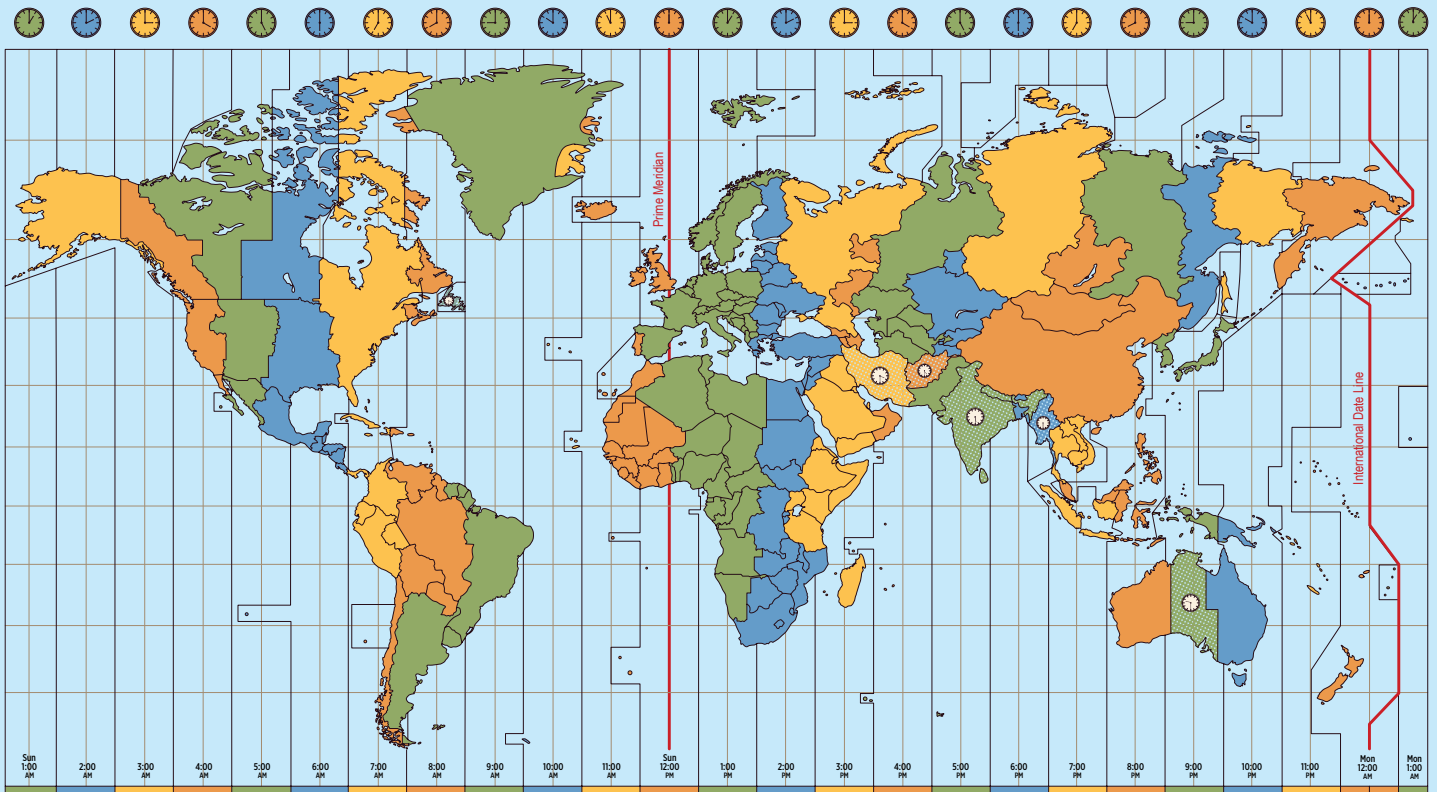
MAP 1.1

World Time Zones

Map Skill: If it is 8:00 p.m. in Louisiana, what time is it in California? in Florida?

Lagniappe

Our forty-eight *contiguous* (adjoining) states have four time zones: Eastern, GMT-5 hours (5 hours earlier than Greenwich Mean Time); Central, GMT-6 hours; Mountain, GMT-7 hours; and Pacific, GMT-8 hours. Puerto Rico and the Virgin Islands are in the Atlantic Time Zone, GMT-4 hours; Alaska is in the Alaska Time Zone, GMT-9 hours; and Hawaii is in the Hawaii-Aleutian Time Zone, GMT-10 hours.





Using the system of latitude and longitude, Louisiana’s absolute location is between 29 degrees north (29° N) and 33 degrees north (33° N) latitude and between 89 degrees west (89° W) and 94 degrees west (94° W) longitude.

Boundaries

The system of latitude and longitude is also used to mark boundaries. Some of Louisiana’s boundaries are defined using this system. The boundary that runs from west to east between Louisiana and Mississippi is located near the 31st parallel north (31° N latitude), while the boundary that runs from west to east between Louisiana and Arkansas is set near the 33rd parallel north (33° N latitude). The 94th meridian west (94° W longitude) separates Louisiana and Texas at our state’s most westerly point.

Waterways form some of Louisiana’s other boundaries. The Mississippi River defines the upper eastern boundary between Louisiana and Mississippi. The Pearl River defines the lower eastern boundary between the two states. The Gulf of Mexico marks Louisiana’s southern boundary. The Sabine River and the Toledo Bend Reservoir separate Louisiana from Texas on the state’s southwestern border.

MAP 1.2

Louisiana in the United States

Map Skill: What four states lie directly north of Louisiana?



Above: A passport is required when U.S. citizens enter or leave the country but not required when they travel within the United States.



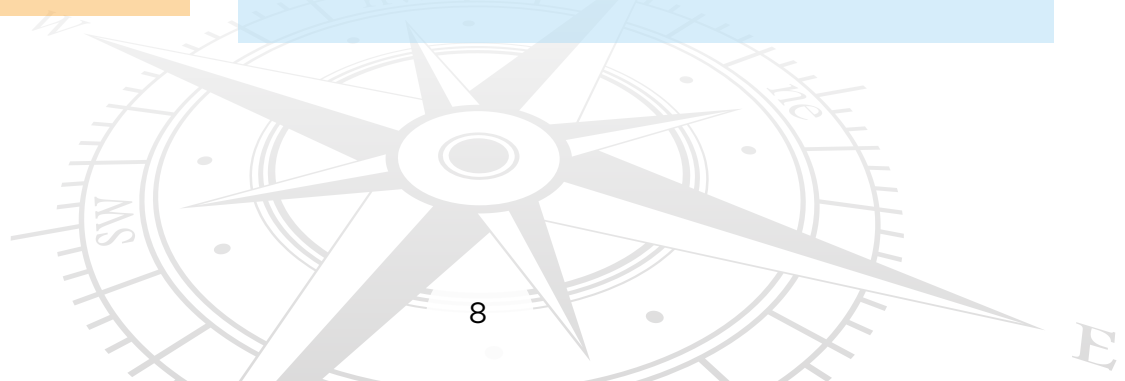
MAP 1.3

Louisiana's Boundaries

Map Skill: What feature forms Louisiana's easternmost boundary with the state of Mississippi?

Reviewing the Section

1. Define in sentence form: relative location, longitude, time zone.
2. What is the northernmost latitude of Louisiana? What is our state's westernmost longitude?
3. Name the waterways that form some of Louisiana's boundaries.



Section 2

Natural Regions

As you read, look for

- ▶ the range in elevation in Louisiana;
- ▶ characteristics of Louisiana’s five natural regions;
- ▶ the plants, animals, and birds that thrive in the different types of terrain;
- ▶ terms: **physical geography, elevation, relief, alluvial soil, estuary, loess soil, erosion, marsh, salt dome, geologist, uplift.**

Because people think of alligators, swamps, and Spanish moss when they think about Louisiana, the diversity of its natural environment can surprise residents and visitors alike. You can explore the water and wildlife of a swamp in an airboat or paddle along slowly in a canoe or kayak. In other parts of the state, you might see a flat prairie covered in grasses and wildflowers, walk through quiet pine forests on beds of fallen needles, or even scramble to the top of a rocky hill that is known—mistakenly—as a mountain.

Physical geography is concerned with observing these differences in the terrain and character of the land in a given place or region. Geographers identify, name, and analyze the regions they study. Dividing an area into regions makes it easier to understand. Natural regions are identified and classified according to characteristics such as relief, soil type, vegetation, and climate.

Geographers have divided the United States into eight natural regions. Louisiana is located in the western portion of the Gulf Coastal Plain. The name Gulf Coastal Plain indicates that it sits near the Gulf of Mexico and has a relatively low elevation in comparison to other regions in the United States. **Elevation** refers to the height of a place above sea level. **Relief** is how geographers describe the difference between the highest and lowest levels in a given area. Elevations in Louisiana range from about 8 feet below sea level in New Orleans to a height of 535 feet above sea level at Driskill Mountain in Bienville Parish. Although Driskill is called a mountain, geographers classify it as a hill. For them, a landform can only be called a mountain when the elevation from its base to its *summit* (highest point) exceeds 2,000 feet.



Only Florida and Delaware have lower high points than Louisiana.

Left: A view of the Mississippi River in Louisiana, with its wide riverbed and natural surroundings.



In 1869, the Louisiana legislature called for a geological survey of the state. Samuel Lockett, who taught at the Louisiana State Seminary and Military Academy (now Louisiana State University), was chosen to lead the expeditions. These continued for the next five years. The survey that Lockett and his fellow workers produced in 1874 identified five major natural regions in the state. These are the Mississippi Floodplain, the Red River Valley, the Terraces, the Marshes, and the Hills. Geologists continue to use these regional classifications today.

MAP 1.4

Land Regions of the Eastern United States

Map Skill: What two other states are entirely in the *Gulf* Coastal Plain region?

MAP 1.5

Louisiana's Land Regions

Map Skill: What major cities are in the Terraces region? the Mississippi Floodplain? the Red River Valley?



Mississippi Floodplain Region

A *floodplain* is the flat land along a river that is likely to flood. The Mississippi Floodplain region runs along both sides of the river in the eastern part of the state. This region has **alluvial soil**, meaning it is made up of sediment carried by a river and deposited along its banks. Alluvial soil is fertile, produces plentiful natural plant life, and is also well suited for growing food. The Mississippi Floodplain region is subdivided into three parts: the natural levee, the swamp, and the passes.

The Natural Levee

Natural levees are created when a river floods and silt is deposited alongside the banks of a river. Natural levees begin within one hundred feet of a river and can cover an area up to five miles wide. Typically, natural levees are only ten to fifteen feet high and cannot reliably keep a river from flooding. Man-made levees have been built to try to keep the Mississippi River inside its banks.

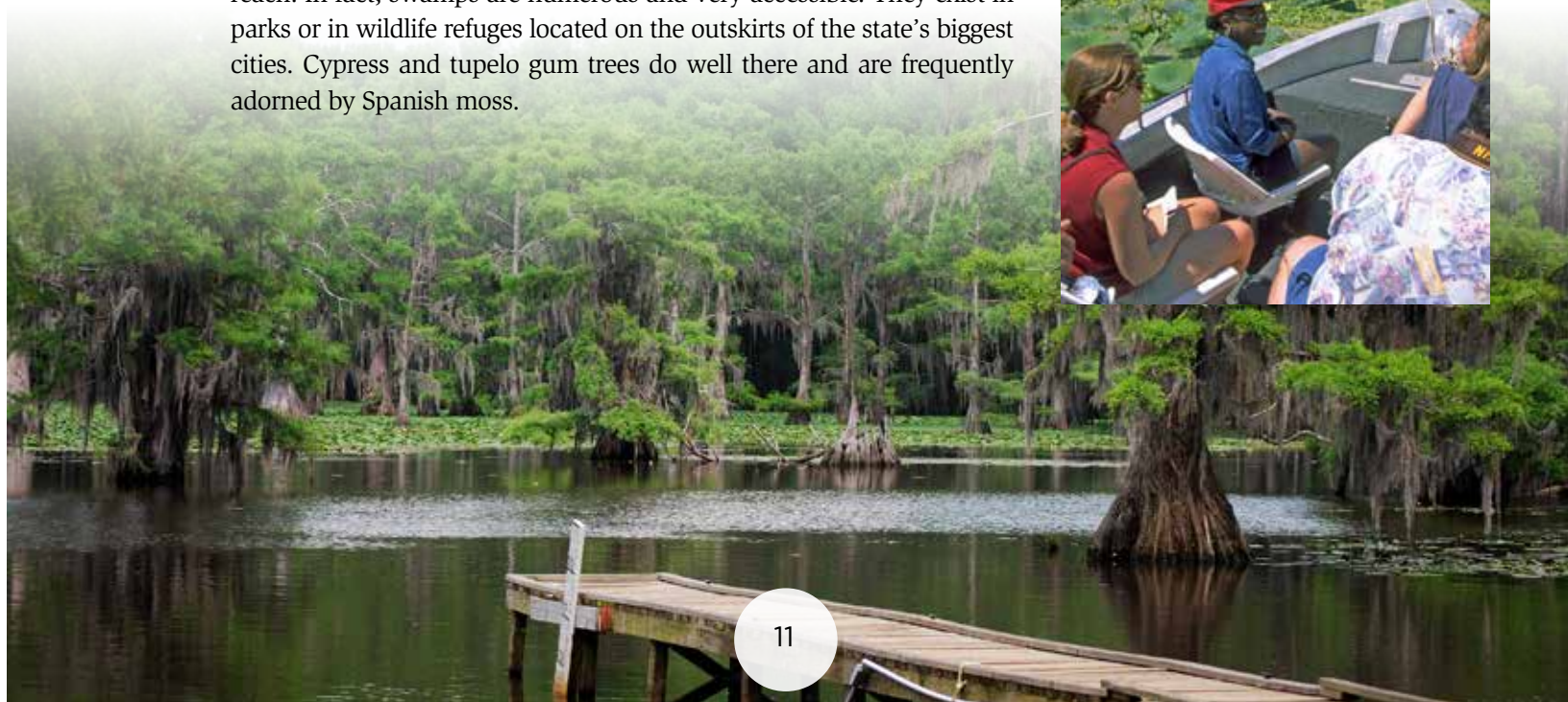
The slope between the top of the natural levee and the river is called the *batture*. Only trees that can survive flooding grow well in this area. When the Mississippi's banks were less heavily populated, the natural levee was often bordered by rows of a long grass called switch cane. Today, switch cane is rare along the river's banks.

The Swamp

The swamp is the lowest part of the river basin, and it exists beyond the natural levee. One definition for swamp is "a seasonally flooded forest." After effective pumps were invented in the early 1900s, swamplands on the edges of New Orleans were drained. The city expanded beyond the natural levee, into areas that had been swamps of the Mississippi Floodplain.

Images of cypress trees, dark water, and alligator hunters shape most people's ideas about Louisiana swamps. Many people think of swamps as *exotic* (strange or unusual) and believe they are remote and difficult to reach. In fact, swamps are numerous and very accessible. They exist in parks or in wildlife refuges located on the outskirts of the state's biggest cities. Cypress and tupelo gum trees do well there and are frequently adorned by Spanish moss.

Below: Nature lovers on the Atchafalaya Experience swamp tour will see alligators, mammals, and many species of birds as they motor through North America's largest river swamp. **Bottom:** Cypress trees thrive in Louisiana's swamps.



The Passes

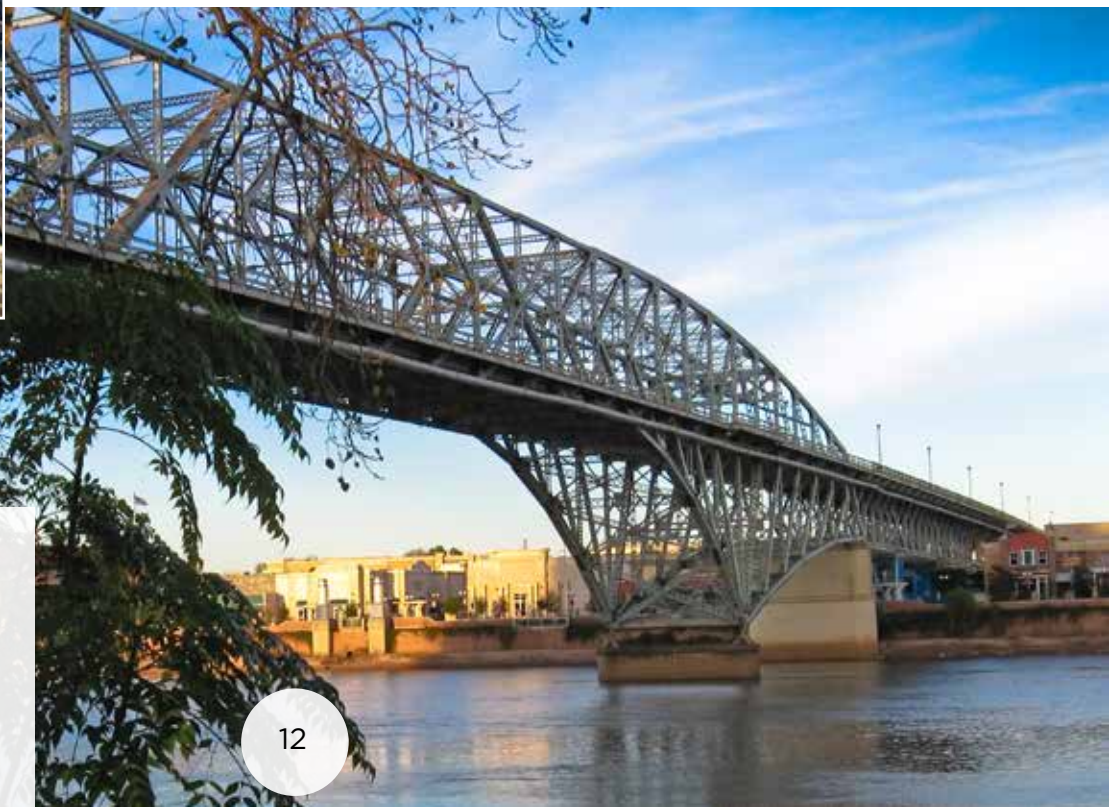
The geological name for the paths the Mississippi River takes as it flows into the Gulf of Mexico is the passes. This area is also called a delta because the mouth of the river is triangle-shaped, like the Greek alphabet letter *delta* (Δ). On a map, the passes can resemble a hand with fingers spread wide. Because this area also looks from the air like the foot of a bird, the passes are also called the “birdfoot delta” of the Mississippi River.

At the **estuary** (the place where the river meets the sea), the water changes from freshwater to saltwater. Here the land and the water continually collide and the landforms shift. As they do, the passes themselves change. The vegetation in the passes is dominated by marsh grasses. They have shallow roots and can survive in the unstable *ecosystem* (everything that exists in a particular environment).

Red River Valley Region

The Red River Valley region borders the Red River as it flows from the northwestern corner of the state to central Louisiana. The region is like a smaller version of the Mississippi Floodplain. It has a single stream with natural levees and lower-lying areas behind them. Both the elevation and relief are low.

Like the Red River, the region gets its name from the rich red soil that the river carries from Oklahoma and Texas into Arkansas and, finally, into Louisiana. When the river flooded, it deposited red-colored soil along the river's banks. Caddo Indians lived in this area before Europeans arrived. American settlement of the area occurred later than in other parts of the state because the river was blocked in places and difficult to navigate. Once its course was cleared, small farmers moved into the area. Later, larger cotton plantations developed. Today the Red River flows between the urban areas of Shreveport and Bossier City and continues southeast through Alexandria.



Above: An aerial view of the Red River between Shreveport and Bossier City.

Right: Five bridges span the Red River between Shreveport and Bossier City.



Left: This cypress swamp is located in the Sam Houston Jones State Park in southwestern Louisiana near Lake Charles.

Terraces Region

The three distinctive types of landforms that make up the Terraces region were all created by the Mississippi River when it flowed into the Gulf along other courses. The river changed its course after every *ice age* (time in the distant past when a large part of the world was covered with ice). Each time it changed its course and developed a new channel, it left behind distinct physical features—what geographers call topography. The three divisions of the Terraces region are the blufflands, the prairies, and the flatwoods.

The Blufflands

The blufflands are the highest part of the Terraces region. These were the natural levees along the river when it flowed there. These levees gained more height when the wind carried a fine soil that landed on the bluffs and built them even higher. This dust is called **loess soil** (windblown dust that builds up and forms a ridge of bluffs as it approaches higher elevations). Because loess soil is light and contains silt, it erodes easily. The **erosion** (wearing away by the action of water or wind) sometimes left nearly vertical slopes on the edges of bluffs. A good place to see such eroded bluffs is in West Feliciana Parish.

The blufflands are home to beautiful forests of holly, ash, and oak trees. The floors of these forests are covered with rich green ferns, mosses, and seasonal wildflowers. Many dogwood and magnolia trees also grow in the region.



The fragrant white flower of the magnolia tree was designated the official state flower of Louisiana in 1900.





The Prairies

The prairies are also part of the Terraces region, but unlike the blufflands, they are flat. In fact, they are so flat that many think they look like parts of the midwestern United States.

In the past, these prairies were covered by tall grasses, some of which could grow as high as six feet tall. One nineteenth-century traveler wrote that the prairie grasses were so tall they brushed the stirrups of his horse's saddle as he rode through.

Some people thought these prairies looked like seas of grass. Using this comparison, some early settlers called a grove of trees around a group of houses an "island" in the prairie. Small prairies were called coves. This is how the community of Roberts Cove in Acadia Parish got its name.

At the time of European settlement, prairie grass covered 2.5 million acres in southwest Louisiana. Many farmers took advantage of the richness of the soil and the ease with which they could clear the land in the prairies region. Widespread agricultural use and development changed the landscape. Today, Louisiana's prairies are considered "critically imperiled" because only about 200 acres of natural prairies remain. However, efforts are underway to restore some of this unique topography. The U.S. Fish and Wildlife Service established four wildlife refuges in the prairies region. The Cameron Prairie, Sabine, Lacassine, and Shell Keys Wildlife Refuges protect plant and wildlife species within their combined 184,000 acres.

Top 2 images: NRCS volunteers transplant native prairie plants from a roadside near Gueydan to a restored prairie.

The Flatwoods

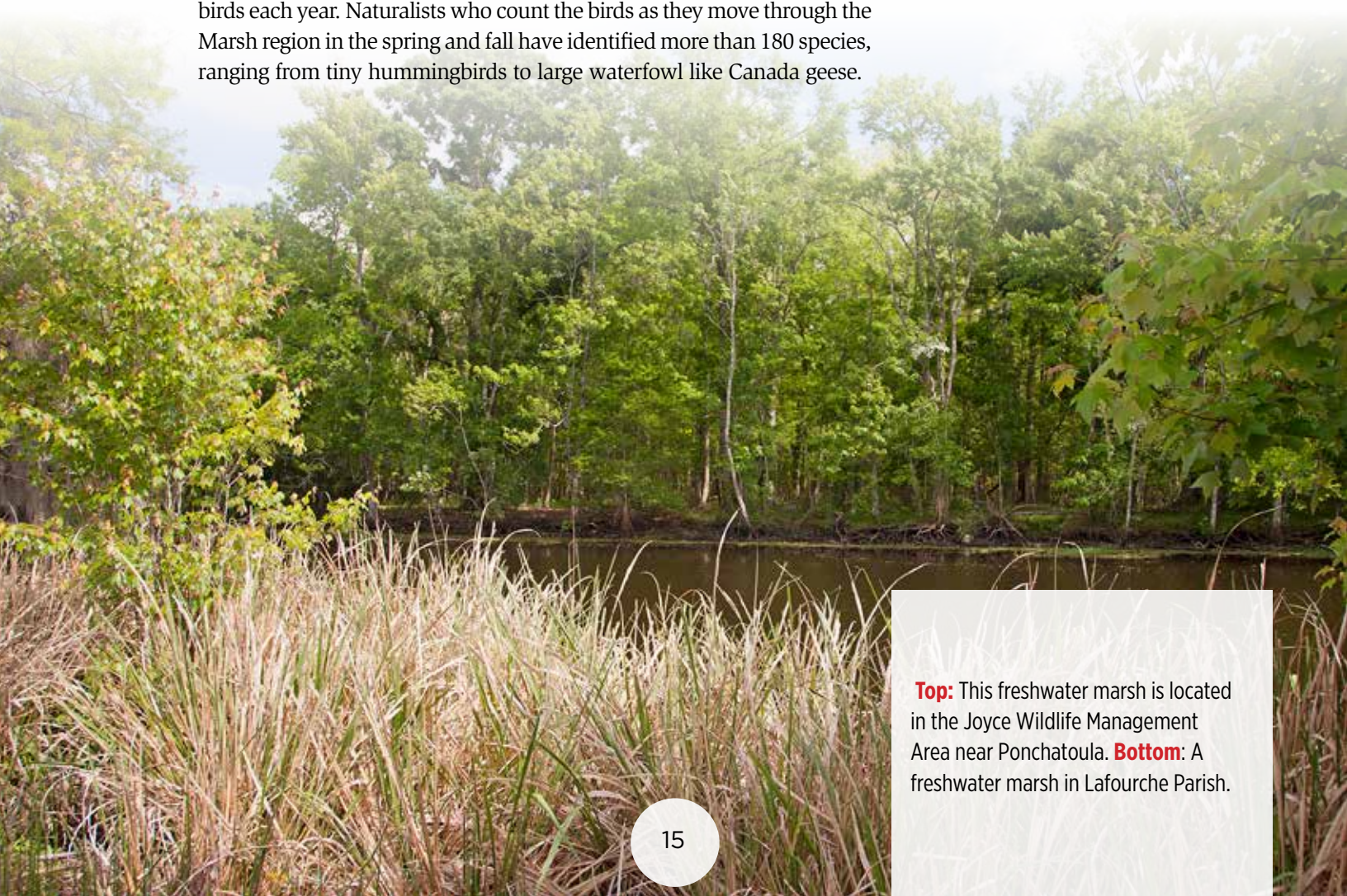
Like the prairies region, the flatwoods areas are very flat. Unlike the prairies, they are covered in trees. The soil in the flatwoods drains better than in the prairies, and this allows the growth of trees. These areas are dominated by a mixture of wire grass, palmetto, and forests of hardwood trees and many varieties of pine. In fact, early settlers called the flatwoods region the “piney woods.” Today there are still many pine forests in this area.



Marsh Region

The Marsh region lies along Louisiana’s border with the Gulf of Mexico. A **marsh** is found only along a coast and is the transition area between land and water. In Louisiana, the Marsh region is a wet, treeless prairie dominated by water and grasses. Louisiana has about 2.5 million acres of marsh.

Most commonly, the marsh is covered by grasses that have shallow roots in the muck and peat soil. The water and abundant rainfall feed the plants. In turn, the marsh serves as an important home for migrating birds each year. Naturalists who count the birds as they move through the Marsh region in the spring and fall have identified more than 180 species, ranging from tiny hummingbirds to large waterfowl like Canada geese.



Top: This freshwater marsh is located in the Joyce Wildlife Management Area near Ponchatoula. **Bottom:** A freshwater marsh in Lafourche Parish.

Salt Marsh

The water in the Marsh region changes the closer it gets to the ocean. The part of the region where salty ocean water and freshwater meet is called the salt marsh. Plants that can thrive in its *brackish* water (a mixture of saltwater and freshwater) include salt grass, cord grass, and various species of mangrove.

Freshwater Marsh

The freshwater marsh supports different species of plants. In this more inland area of the marsh, plants like iris and cattail thrive. When saltwater enters a freshwater marsh, it kills the freshwater vegetation. This process, called *saltwater incursion*, can threaten freshwater ecosystems and shrink this part of the Marsh region's ecosystem.

Salt Domes

Salt domes are geological formations found in Louisiana's salt marsh. Salt domes are covered by layers of rock that, under great pressure, have folded upward, rising above the surrounding marsh in formations that look like domes. Inside, salt domes contain not just salt but also other valuable minerals like sulphur and petroleum. The five largest salt domes are called the Five Islands because they rise above the surrounding Marsh region. They are Avery Island, Weeks Island, Cote Blanche, Belle Isle, and Jefferson Island.

Avery Island is best known as the home of the Louisiana pepper sauce called Tabasco. Until 1999, Weeks Island was home to a Strategic Petroleum Reserve maintained by the U.S. Department of Energy for use in case of emergencies. Cote Blanche is still accessible by land, but Belle Isle is remote and can only be reached by boat.

Lagniappe

Sulphur is often spelled s-u-l-f-u-r. Either spelling is acceptable. This element has been known since ancient times, when it was called "brimstone."



Right: The beautiful Tricolored Heron was once called the Louisiana Heron.

Bottom: The Barataria Preserve, part of Jean Lafitte National Historical Park and Preserve, is located in the freshwater marsh.

Special FEATURE

The Amazing, Disappearing Lake Peigneur

Picture in your head a kitchen sink filled with water. Imagine pulling the plug in the sink and watching the water create a whirlpool as it drains. What if the sink you pictured was a lake instead? Hard to imagine, isn't it? But something like this actually happened in Lake Peigneur in Iberia Parish!

Until 1980, Lake Peigneur was only eleven feet deep and was home to oil drilling rigs and underground salt mines. Fishermen caught fish there, and others just enjoyed the view. On November 21, 1980, however, things changed. An oil rig drill got stuck deep below the lake's bottom. As workers tried to free the drill, a large whirlpool began to grow around the spot where the drill was stuck. The whirlpool eventually sucked in the rig along with eleven barges! Luckily, the men on the rig evacuated in time.

As it turns out, the oil rig workers had drilled in the wrong location by mistake. They bored a hole into the top of an underground salt dome. The water eroded the salt walls, which caused the whirlpool to develop in the lake. Over 3.5 billion gallons of water disappeared into the whirlpool in just three hours. By following an established evacuation plan and helping each other, the fifty men who were working 1,500 feet underground in the flooded salt mine reached the surface safely.

You might be surprised to find out that Lake Peigneur still has water in it. Saltwater from the Delcambre Canal washed into the empty lake basin, creating a 1,300-foot-deep lake over the course of two days. As the lake refilled, there was another surprise. Nine of the eleven lost barges popped to the surface! How do you think this kind of disaster could be avoided in the future?



Above: This chimney is all that remains of a house that fell into Lake Peigneur when sixty-five acres of land were lost to the lake.

Hills Region

The Hills region covers much of northern Louisiana and also a smaller area in southeastern Louisiana. It is the highest region and has the roughest terrain. **Geologists** (scientists who study the origin, history, and structure of Earth) classify the region by focusing on its rock formations.

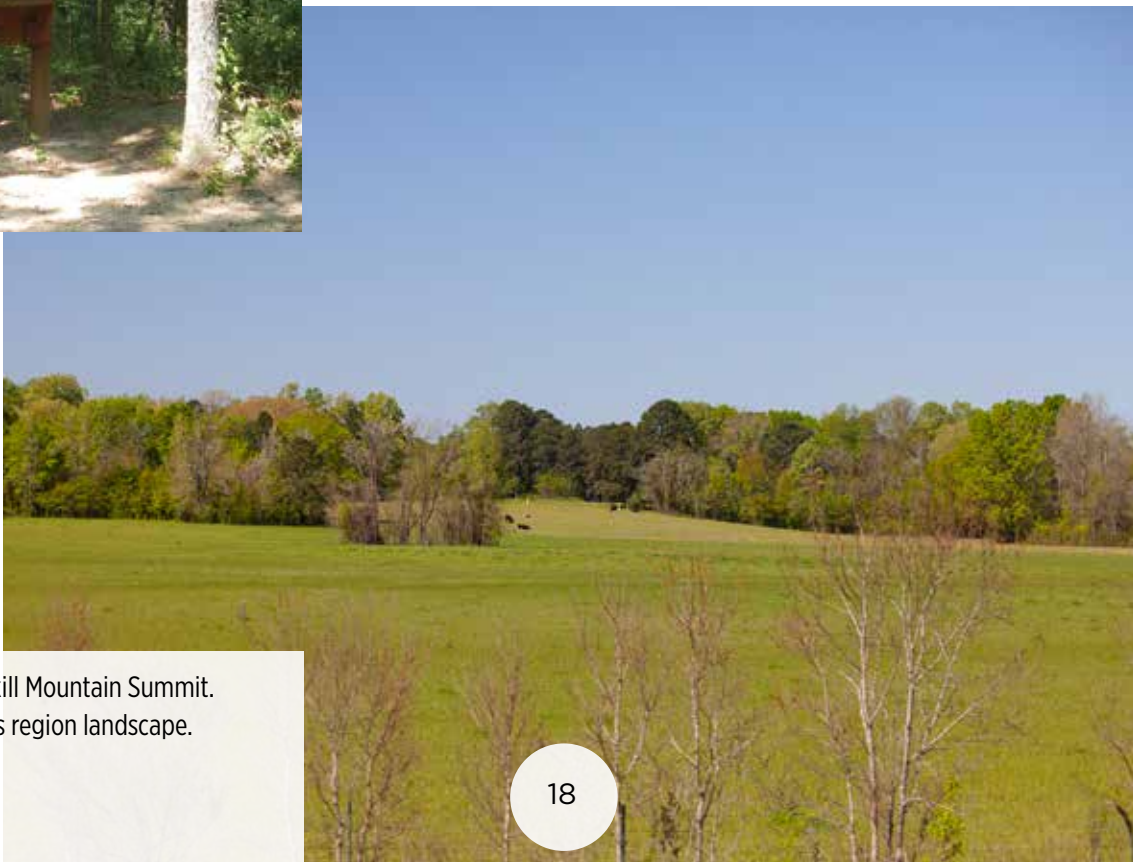
A major part of the Hills is a raised area of rock called the Sabine Uplift and also the Dolet Hills. An **uplift** is caused when rock formations press against each other and fold upward. As erosion wore down portions of the uplifts, ridges were formed. The resulting ridges are called wolds.

The Kisatchie Wold is located in the Kisatchie area of northwest Louisiana. It is home to the highest point in the state, the 535-foot Driskill Mountain, located in Bienville Parish.

The soil that dominates in the Hills region is red in color because it is high in iron. Pine trees are among the few crops that grow well in this soil, and much of the region is now planted in pine tree farms. Even the pines that grow naturally dominate the landscape and crowd out other ground plants.

Reviewing the Section

1. Define in sentence form: alluvial soil, marsh, salt dome.
2. What is the highest point in Louisiana? What is its elevation? In which natural region and parish is it located?
3. What are the passes? Why is this area also called a delta?



Above: Driskill Mountain Summit.

Bottom: Hills region landscape.

Section 3

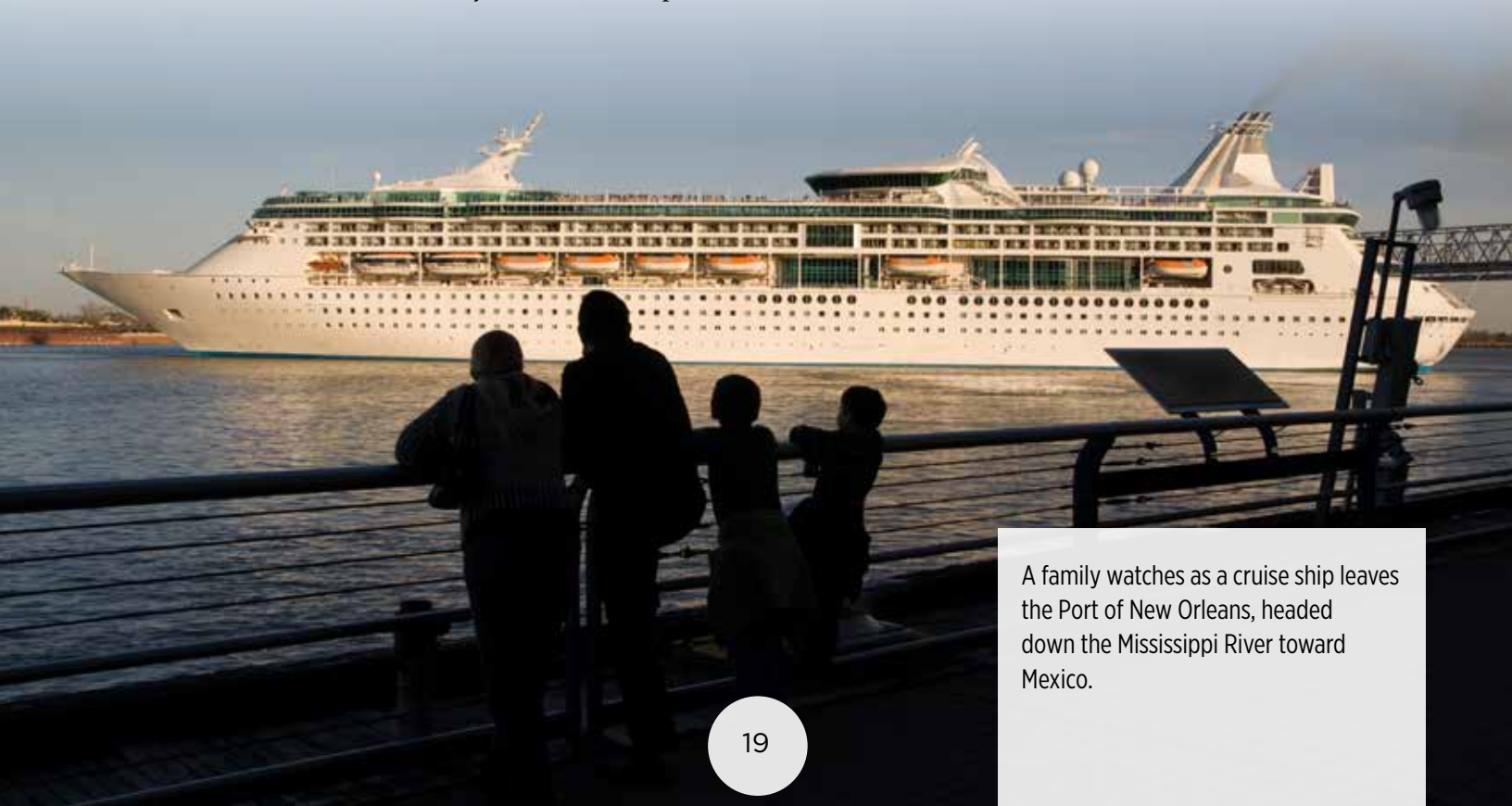
Waterways

As you read, look for

- ▶ the importance of diverse waterways in our state's history;
- ▶ the major rivers in Louisiana;
- ▶ the many different natural and man-made lakes that dot our landscape;
- ▶ the special significance of bayous for our state;
- ▶ terms: **navigable, drainage basin, sediment, cutoff lake, raft lake, marsh lake, bayou.**

Louisiana has nearly five thousand miles of navigable rivers, bayous, creeks, and canals. **Navigable** means that water is deep enough for safe travel by boat. These different types of waterways are the state's dominant physical feature. The locations and physical characteristics of these bodies of water can also help us understand the state's history, its development, and how waterways have always served as central routes for both trade and transportation.

The search for the great continent-long river that we know today as the Mississippi is one of the reasons explorers like La Salle were drawn here. The Mississippi ends its long journey through the center of the United States by emptying into the Gulf of Mexico. The shifting course of the river over thousands of years has also shaped the state's diverse terrain.



A family watches as a cruise ship leaves the Port of New Orleans, headed down the Mississippi River toward Mexico.



MAP 1.6

Louisiana's Rivers and Lakes

Map Skill: What river flows directly into Lake Pontchartrain?

Rivers

The state's most important river was given many names before it became known as the Mississippi. The Native American Algonquin tribe named it *Messipi*, meaning the "great river" in their language. The first Spanish explorers in the region called it *Rio del Espíritu Santo*, which means "river of the Holy Spirit." The French explorer La Salle called it the River Louis.

The Mississippi River's drainage basin covers more than 1,245,000 square miles and includes all or part of thirty-one states and two Canadian provinces. A **drainage basin** is an area of land that drains into *tributaries* (smaller rivers and streams) and eventually into larger rivers.

The river’s basin resembles a funnel across the nation’s center that empties water through its narrowest point into the Gulf of Mexico. Waters drain into the Mississippi basin from as far east as New York and as far west as Montana. The river carries 375 billion gallons of water through Louisiana each day. That drainage process also brings 256 million tons of **sediment** (material that settles to the bottom of a liquid) down the river each year. When the Mississippi flooded the land each year as part of its natural cycle, the sediment helped to create the rich agricultural land along its banks. Because of an extensive flood control system that protects cities along the river’s course, most of that sediment now drains into the Gulf of Mexico.

The Red River dominates the second-largest river drainage system in the state. The Red is formed from several smaller waterways, one of which is a small creek in New Mexico. It ends in Avoyelles Parish, where the river flows into the Atchafalaya and Mississippi Rivers.

The Ouachita River begins as a small stream in the mountains of Arkansas. In Catahoula Parish, the Little River and the Tensas River merge with the Ouachita to form the Black River. The Black River then flows into the Red River just before it joins the waters of the Atchafalaya.

The name Atchafalaya comes from the Choctaw words *hache*, meaning “river,” and *falaia*, meaning “long.” The Atchafalaya has a long history of people trying to change and control the river. In the 1830s, Captain Henry Miller Shreve led efforts to clear the so-called Red River Raft, a 150-mile-long tangle of logs that blocked commerce and travel. Earlier, Shreve had created a shortcut for steamboats at Turnbull Bend. This alteration sent more water from the Red into the Atchafalaya. Today the Atchafalaya still receives waters from the Red River plus 30 percent of the water volume from the Mississippi. That percentage of flow is held steady by river control structures designed and maintained by the U.S. Army Corps of Engineers.

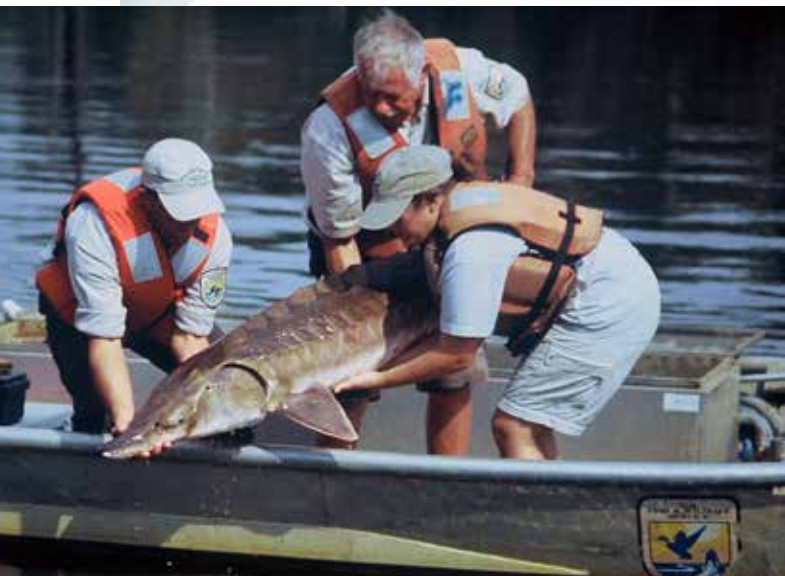


Top: Atchafalaya River at Morgan City. **Middle:** Red River at Shreveport-Bossier City. **Bottom:** Ouachita River at Monroe.

The Pearl River begins in east-central Mississippi and flows into Lake Borgne in Louisiana. After it forms part of our southeastern boundary with Mississippi, the river splits into the East and West Pearl River branches. The area between those two branches is called the Honey Island Swamp and is an important natural habitat for fish and wildlife.

Spotlight Honey Island Swamp

Nearly 70,000 acres of the Honey Island Swamp are a permanently protected wildlife area, with plenty of interesting animals and birds. One of the rare species found in the swamp is the Gulf sturgeon. This species of fish has a prehistoric appearance and is covered by hard, bony plates rather than scales. Gulf sturgeon can grow to eight feet in length and are believed to live for at least forty years. These elusive fish live part of the year in freshwater areas like the Honey Island Swamp, where they *spawn* (produce eggs) and have their young. Juvenile Gulf sturgeon stay in these slow-moving waters for two to three years. In the colder months, mature Gulf sturgeon migrate out to the Gulf of Mexico, where they feed and spend the winter. The Gulf sturgeon is currently classified as an endangered species, and it is illegal to catch them. The only time most people see them is when they jump out of the water as they are migrating toward the Gulf. They are believed to jump in order to keep the groups of migrating fish together.



Above: U.S. Fish and Wildlife officers are returning a Gulf sturgeon to the water.

The Calcasieu River begins in Vernon Parish east of Leesville and flows southward into Lake Charles. In 1926, a deepwater channel was dug to connect Lake Charles to the Gulf of Mexico. Later, a system of man-made canals linked waterways from the Atlantic Ocean in Florida all the way to the Gulf of Mexico. In the west, this system connects the Calcasieu River and the Sabine River on Louisiana's western border with Texas. The entire system of connected waterways, known as the Gulf Intracoastal Waterway, provides a safe and continuous channel for small boats, and also for ships and barges engaged in trade and commerce. Such improvements helped the port at Lake Charles become the third largest in the state.

The Sabine River serves as part of Louisiana's western boundary with Texas. In 1964, the two states began construction of a dam on the Sabine River designed to generate *hydroelectric power* (electricity produced by waterpower) and provide water to nearby communities. Completed in 1969, the project also created a giant lake known as the Toledo Bend Reservoir. A *reservoir* is a lake (usually artificial) where water is stored for people's use. Covering approximately 185,000 acres, the Toledo Bend Reservoir is the largest reservoir in Louisiana and the fifth largest in the United States. The lake is well known for recreational fishing and boating.

Lakes

Toledo Bend is just one of many man-made lakes in Louisiana. Others include Lake D'Arbonne in Union Parish, Lake Claiborne in Claiborne Parish, Sibley Lake in Natchitoches Parish, and Lake Chicot in Evangeline Parish.

The state has many natural lakes as well. The largest of these natural lakes is called Pontchartrain. Each day thousands of commuters cross between the north and south shores of the lake via an almost 24-mile-long span called the Causeway Bridge. The Causeway is one of the two longest bridges in the world.

At 625 square miles, Lake Pontchartrain is very large, but its average depth, ranging between 12 and 14 feet, is quite shallow. The lake is also called a tidal lagoon because it connects to the Gulf of Mexico through a system of narrow channels called the Rigolets. Because it contains a mixture of freshwater from nearby rivers and seawater from the Gulf, its water is classified as brackish. Lake Maurepas is another lake and tidal lagoon with brackish water. It is located to the west of Lake Pontchartrain, and the lakes are connected through a smaller body of water called Pass Manchac. Both lakes were named for French noblemen who served the kings of France.

Cutoff lakes are formed when rivers seek shorter, straighter courses through flat terrain. The former bends or curves in the river become lakes when the river moves to a straighter route. When the Red River shifted its course away from the town of Natchitoches, it left behind a thirty-nine-mile-long cutoff lake. This scenic attraction is called Cane River Lake. It can be confusing to call it both a river and a lake, but in its history, it has been both. Other examples of cutoff lakes in Louisiana include the cleverly named False River in Pointe Coupee Parish, Lake Bruin in Tensas Parish, and Larto Lake in Catahoula Parish.

Lagniappe

In June of 2011, the 26.3-mile-long Jiaozhou Bridge opened in China, making it the world's longest bridge over open water. The Pontchartrain Causeway Bridge, though now only second in the world, can still claim to be the longest bridge over open water in the United States.

Lagniappe

The name Rigolets comes from the French word *rigole*, which means "trench" or "gutter." The locals pronounce it "RIG-uh-leez."



Left: This image shows how Lakes Maurepas and Pontchartrain are connected by Pass Manchac. The urban area below Lake Pontchartrain is New Orleans, along the Mississippi River.



Lakes created when huge logjams blocked the flow of a river are called **raft lakes**. A raft created by masses of logs, tree trunks, and other debris could literally block the flow of a river. The water would then overflow into nearby swamps, forming so-called raft lakes. Caddo Lake in Caddo Parish and Lake Bistineau located in Bossier and Webster Parishes are raft lakes.

Marsh lakes are created behind low groups of ridges located in the marshlands that border Louisiana's Gulf Coast. These ridges rise only slightly above the marsh, but they are dry enough to support the growth of live oak trees along their tops. *Chenier* means "place of oaks" in French, and this is where the ridges get their name. The cheniers trap freshwater from the overflow of nearby rivers headed toward the Gulf. The water then collects behind the cheniers, creating lakes. The water remains fresh because the cheniers block the incoming saltwater that flows into the marsh from the Gulf. White Lake in Vermilion Parish, Grand Lake in Cameron Parish, and Calcasieu Lake in Calcasieu Parish are all marsh lakes.



Bayous

No other waterway is more connected with Louisiana than the bayou. A **bayou** is a waterway that ranges in size from short and shallow to long and navigable. The word *bayou* comes from the Choctaw Indian language and means "creek." Early French settlers called bayous "the sleeping water" in reference to bayous that are slow moving. While some bayous are both short and shallow enough to walk across, others are miles long and are deep enough for large boats. These larger bayous can fill with water and send floodwaters rushing out of their banks.

Hundreds of bayous spread across the state. Some of them have names that refer to local legends or historical figures. Bayou Lafitte is named after the Louisiana pirate. Other bayous were once channels of the Mississippi River. Bayou Lafourche, called "the longest main street in the world," has

supported travel, commerce, fishing, and the development of a distinct way of life among the people who live along this water-road.

Reviewing the Section

1. Define in sentence form: navigable, drainage basin, sediment.
2. What are four names given to our state's most important river?
3. Give one example of a cutoff lake, a raft lake, and a marsh lake.

Above: These kayakers are exploring the waters of Bayou Vermilion in Lafayette Parish.

Section 4

Climate

As you read, look for

- ▶ the difference between weather and climate and the type of climate found in Louisiana;
- ▶ the effects of tornadoes and hurricanes on Louisiana's people, property, and agriculture;
- ▶ the advantages of Louisiana's long growing season;
- ▶ terms: **weather, climate, precipitation, tornado, hurricane, growing season.**

The concepts of weather and climate are related, but they are not the same. **Weather** measures the current condition of the atmosphere on any given day. The daily news forecast gives a weather report, not a climate report. **Climate** is the average weather of an area over a long period of time, say twenty-five to fifty years.

The state has five geographic regions but only two climatic regions: North Louisiana and South Louisiana. The climate of South Louisiana is more affected by the Gulf of Mexico. The climate of North Louisiana is more affected by patterns that originate in parts of the United States north of Louisiana.

Louisiana has a humid subtropical climate. This means the summers are just as hot as in a tropical climate. It is the winter freezes that cause Louisiana to be classified as subtropical. Much of the warm air and moisture that create the state's humid subtropical climate are the result of systems that approach Louisiana and carry huge amounts of moisture. Continental air masses also influence the climate. These systems generally move from west to east across North America. Because there are no mountains to stop them, these continental air masses hit Louisiana full strength and flow across the state.

Temperature, precipitation, and wind are the atmospheric conditions used to describe climate. Although climate is a long-term measurement, the records of daily weather changes and shifts in temperature, precipitation, and wind provide the building blocks for understanding climatic change over time.



Above: The different weather patterns of Louisiana's winter, spring, summer, and fall bring changes to our trees and flowers. **Left:** Some regions of the U.S. are hot and dry while others are cool and lush.

Temperature

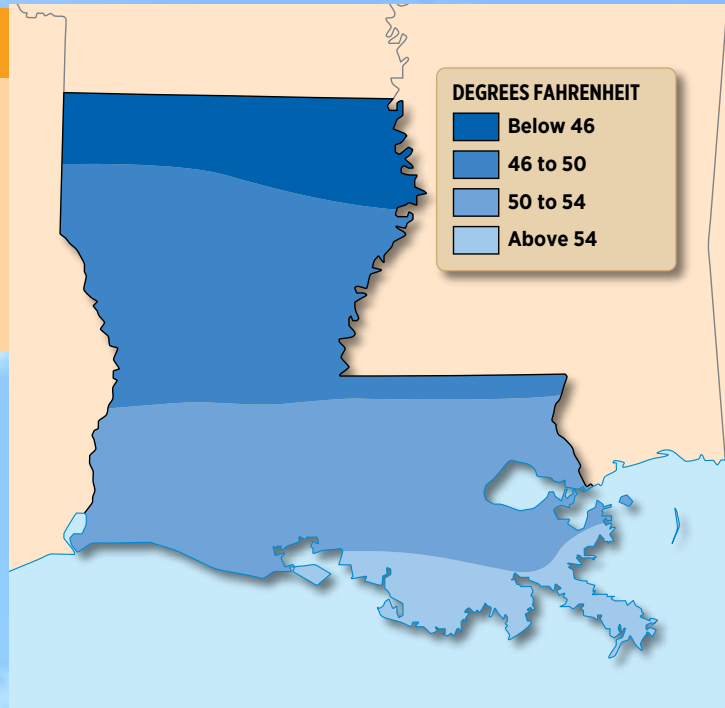
North Louisiana has higher average temperatures than South Louisiana. The reason is that South Louisiana receives the cooling effects of the Gulf of Mexico. The highest temperature recorded, 114°F (Fahrenheit), occurred on August 10, 1936, in Bossier Parish at Plain Dealing. Fewer than fifty miles away, Minden, in Webster Parish, holds the record for the state's lowest temperature of -16°F, on February 13, 1899.

In July, the average temperatures in the state range from 73°F to 93°F. January's average temperatures range between 32°F and 55°F. The greatest temperature ranges occur in northwest Louisiana.

MAP 1.7

Average January Temperatures

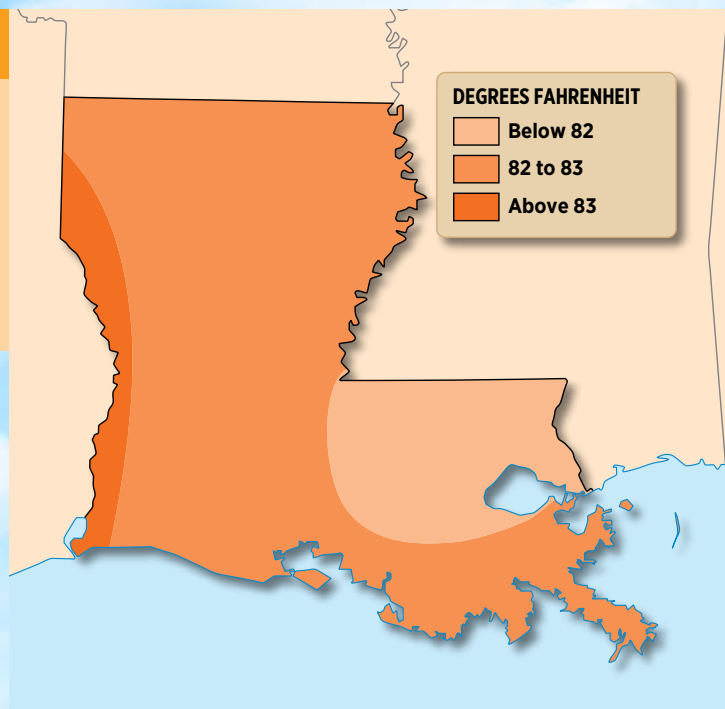
Map Skill: What is the average January temperature where you live?



MAP 1.8

Average July Temperatures

Map Skill: What part of the state has the highest July temperatures?

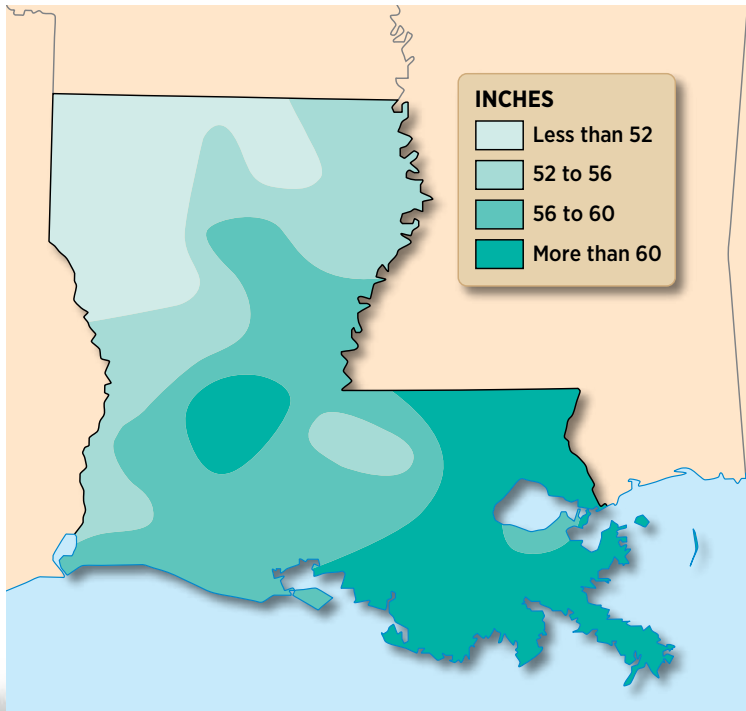


Lagniappe

According to statistics from the National Oceanic and Atmospheric Administration (NOAA), Louisiana's average (mean) temperature is 66.39°F. Only Florida among the forty-eight contiguous states has a higher mean temperature.

Precipitation

Precipitation means any form of water, liquid or solid, that falls from the atmosphere and reaches the ground. Rain is the most common kind of precipitation in Louisiana, with occasional summer hail storms. In winter, *sleet* (frozen or partly frozen rain) is more common than the rare snowfall. The largest amount of rain falls in the southeast, and the least in the northwest. Washington Parish has an annual average rainfall of seventy inches, while Caddo Parish has an annual average of forty-eight inches.



MAP 1.9

Average Annual Precipitation

Map Skill: What is the average annual precipitation where you live?

Lagniappe

In weather reports, the size of a hailstone is often compared to some familiar object, like a pea, marble, quarter, golf ball, baseball, grapefruit, or softball. The largest hailstone ever recorded (in Nebraska) was 18.75 inches in circumference. What size would that be?

Wind

Although you cannot see wind, you can see its effects, and those can be dangerous. Two kinds of windstorms—tornadoes and hurricanes—threaten the state's people and their property each year.

Tornadoes

A **tornado** is a dark funnel-shaped cloud with swirling winds that can measure over two hundred miles an hour. A tornado can form from the clouds of a thunderstorm or when cool air meets a layer of warm air. These storms can develop quickly—in as little as five or ten minutes. Weather radar and computer technology can now spot tornadoes, but because they can form so quickly, people are often unable to get out of a tornado's path.

Once formed, the storm is usually about one hundred yards wide and moves forward at about fifty miles per hour (mph). The high winds inside the funnel cloud circulate around a low pressure center. The extreme low pressure center, called an "eye," is the most dangerous part of the storm.

Figure 1.1

Enhanced Fujita Scale for Tornadoes

Can you remember the order of the descriptions of damage (Minor, Moderate, etc.)? Are these descriptions meaningful to you?

Category	Wind Speed	Potential Damage
EF-0	65-85 mph	Minor damage
EF-1	86-110 mph	Moderate damage
EF-2	111-135 mph	Considerable damage
EF-3	136-165 mph	Severe damage
EF-4	166-200 mph	Devastating damage
EF-5	>200 mph	Incredible damage

Tornados are not uncommon to Louisiana.

Hurricanes

A **hurricane** is a violent storm that forms in the Atlantic Ocean during the summer and fall, with winds that extend over several hundred miles and move counterclockwise around an “eye.” When the wind speed of a tropical storm reaches seventy-four miles per hour, it becomes a hurricane. A hurricane begins over warm, tropical ocean waters and gets its energy from warm, moist air.

As the storm comes ashore, it hits the coastline with high winds and the high water caused by a *storm surge* (an abnormal rise of water generated by a storm’s winds). These walls of water pushed ashore by the winds of the storm can be more than ten feet high. When the storm surge happens during high tide, it may reach even twenty feet high. The storm surge and the heavy rain can cause flooding. Sometimes hurricane winds form tornadoes, which can do even more damage.

Figure 1.2

Saffir-Simpson Hurricane Scale

As the wind speed increases, does the barometric pressure rise or fall?

Category	Wind Speed	Pressure	Storm Surge
1	74-95 mph	28.94"	4-5 ft
2	96-110 mph	28.50-28.91"	6-8 ft
3	111-129 mph	27.91-28.47"	9-12 ft
4	130-156 mph	27.17-27.88"	13-18 ft
5	157+ mph	< 27.17"	19+ ft



Lagniappe

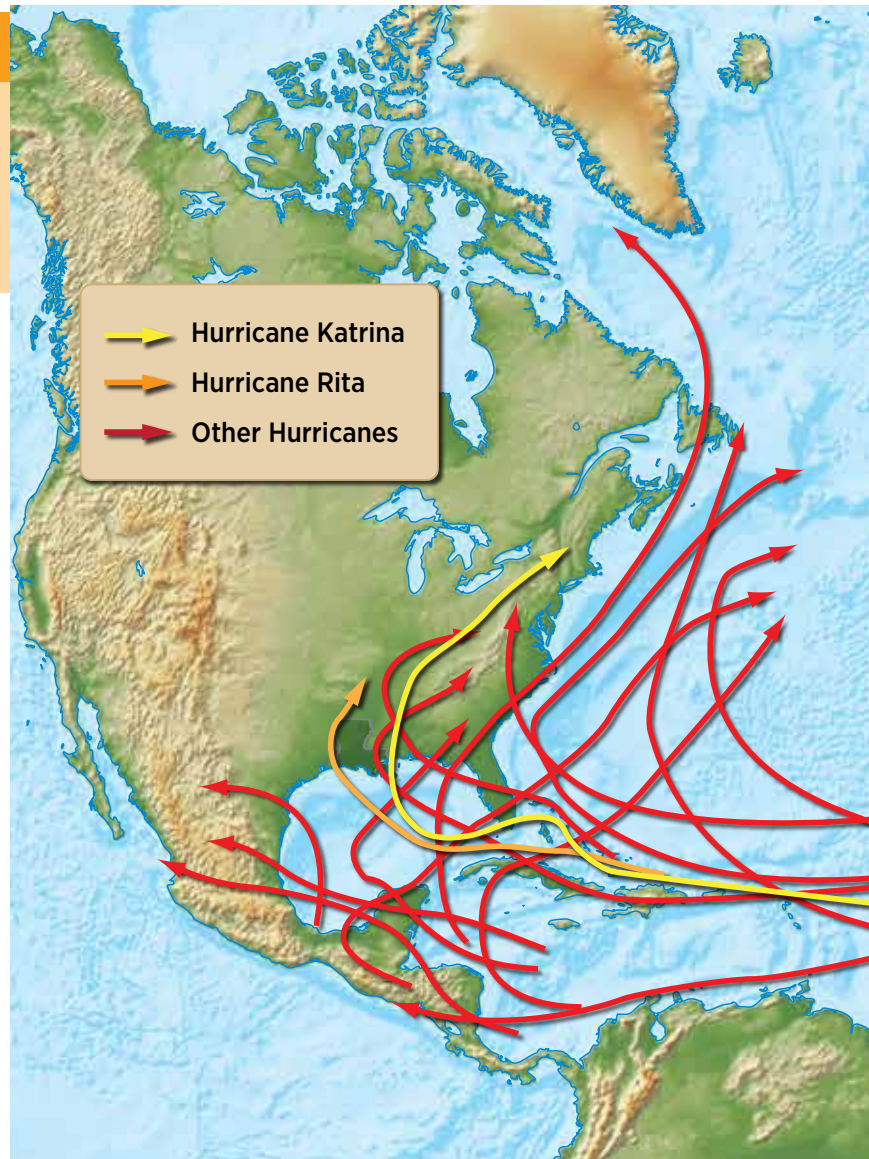
Potential hurricanes are given names when they reach tropical storm force. There are six standard lists of names, which begin repeating in the seventh year. However, when a storm has a major economic impact, its name (Katrina, for example) is replaced on the list.

Above and Left: Devastation left behind by Hurricane Katrina.

Map 1.10

Hurricane Paths

Map Skill: In which direction did Hurricane Katrina travel when it left the Gulf Coast?



The National Hurricane Center reports that more than sixty hurricanes have hit Louisiana since the 1850s. Major hurricanes of the last century include Hurricane Audrey in 1957, which killed more than four hundred people in Cameron Parish; Hurricane Betsy, which flooded parts of New Orleans in 1965; and Hurricane Andrew, which caused \$2.4 billion in damage in 1992.

In 2005, Louisiana suffered the worst hurricane season in its history. On August 29, 2005, Hurricane Katrina came ashore in Plaquemines Parish as a huge and powerful Category 3 storm. Katrina also created a devastating storm surge that drove water from the Gulf and lakes into Plaquemines, Saint Bernard, Orleans, and Jefferson Parishes. The damage spread further when drainage canal walls were *breached* (broken) and water poured into the streets of New Orleans and Metairie.

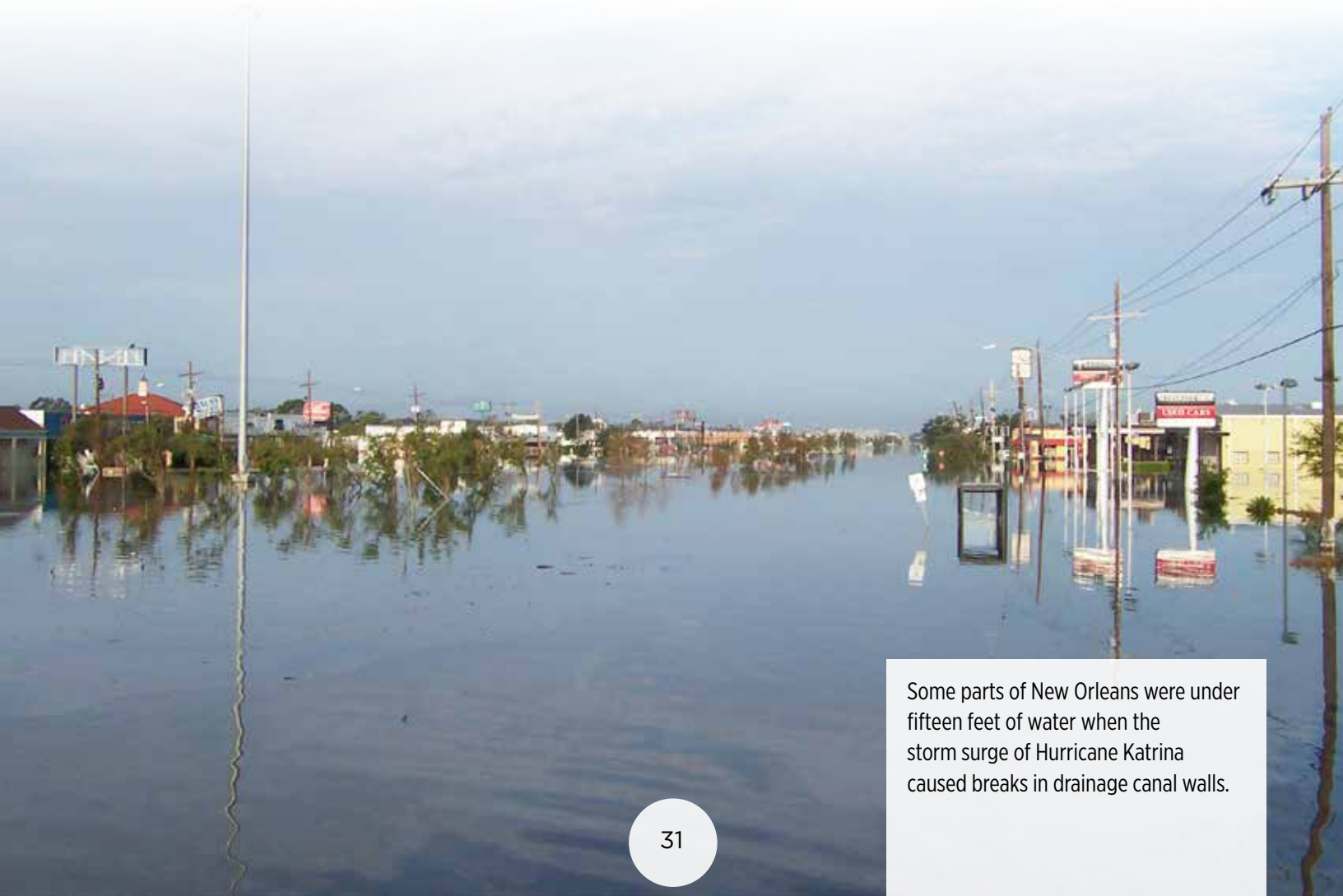
Less than a month later, with the state still suffering from the effects of Katrina, Hurricane Rita hit the southwest coast of the state. This Category 3 hurricane struck with winds above 120 miles per hour and a storm surge more than 15 feet high.

With damages estimated to be \$135 billion, Katrina is believed to be the most costly natural disaster ever to hit the United States. When you add the damages from Rita, the total figure rises to \$150 billion. In Louisiana alone, more than 1,400 people lost their lives.

On August 28, 2012, the evening before the seventh anniversary of Hurricane Katrina, Hurricane Isaac came ashore at the mouth of the Mississippi River. The storm lingered over Louisiana and the Gulf Coast states for two days and brought high winds and several inches of rain. New Orleans did not flood during Isaac, but the nearby communities of Slidell and LaPlace suffered severe flooding as did the east bank of Plaquemines Parish. The floodwaters even caused the closure of the interstate highway between New Orleans and Baton Rouge for several days. Almost half of the state's population lost electricity in the aftermath of the storm.

Climate and Agriculture

The hurricanes of 2005 hit Louisiana agriculture hard. Citrus trees have long thrived in Plaquemines Parish because the temperature rarely drops below freezing. Katrina's storm surge covered many citrus groves with saltwater and killed many trees. In southeast Louisiana, Hurricane Katrina snapped many pine trees like toothpicks. Millions of acres of forest were damaged or destroyed. In southwest Louisiana, the rains and storm surges caused by Hurricane Rita flooded rice fields and cattle pastures.



Some parts of New Orleans were under fifteen feet of water when the storm surge of Hurricane Katrina caused breaks in drainage canal walls.

Lagniappe

Ponchatoula, in Tangipahoa Parish, holds an annual Strawberry Festival that is one of the largest free festivals in the state.

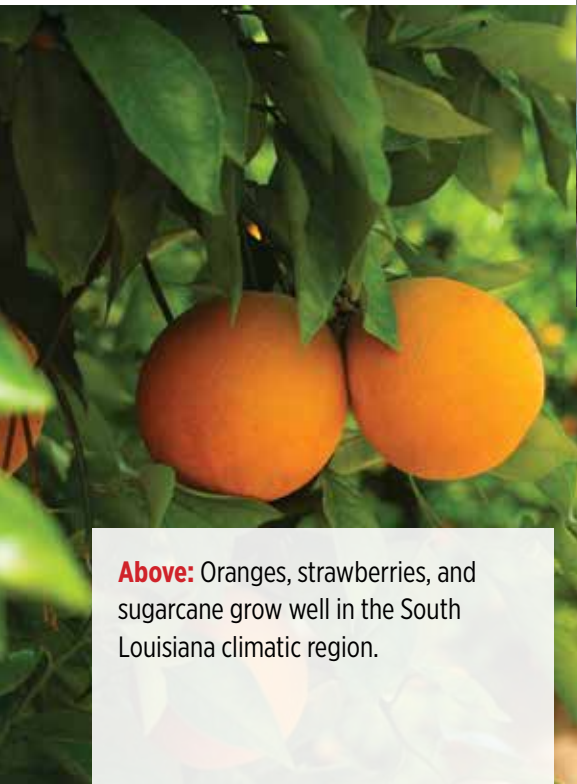
While the state's humid subtropical climate can present risks, it also provides Louisiana's farmers with a long growing season. A **growing season** is the number of days between the last killing frost (below 32°F) in the spring and the first killing frost in the fall. That growing season ranges from 210 days in north-central Louisiana to more than 290 days near the passes.

The strawberry is a fruit that thrives in subtropical Louisiana. The state's early spring gives Tangipahoa Parish strawberry growers an advantage. After only ninety days, their crop is ready to pick and sell. Some of the first strawberries to reach grocery stores in the spring are grown in Louisiana.

Sugarcane is a tropical plant and, in its natural state, has a two-year growing season. But farmers can grow the cane to a point where it can be harvested with a growing season of 250 days. Only the southern part of the state has a growing season this long. If you drive south from Cheneyville in Rapides Parish, you can see where the cotton fields end and the sugarcane fields begin.

Reviewing the Section

1. Define in sentence form: precipitation, hurricane, growing season.
2. What is the difference between weather and climate?
3. What two weather disasters affected Louisiana in 2005?



Above: Oranges, strawberries, and sugarcane grow well in the South Louisiana climatic region.

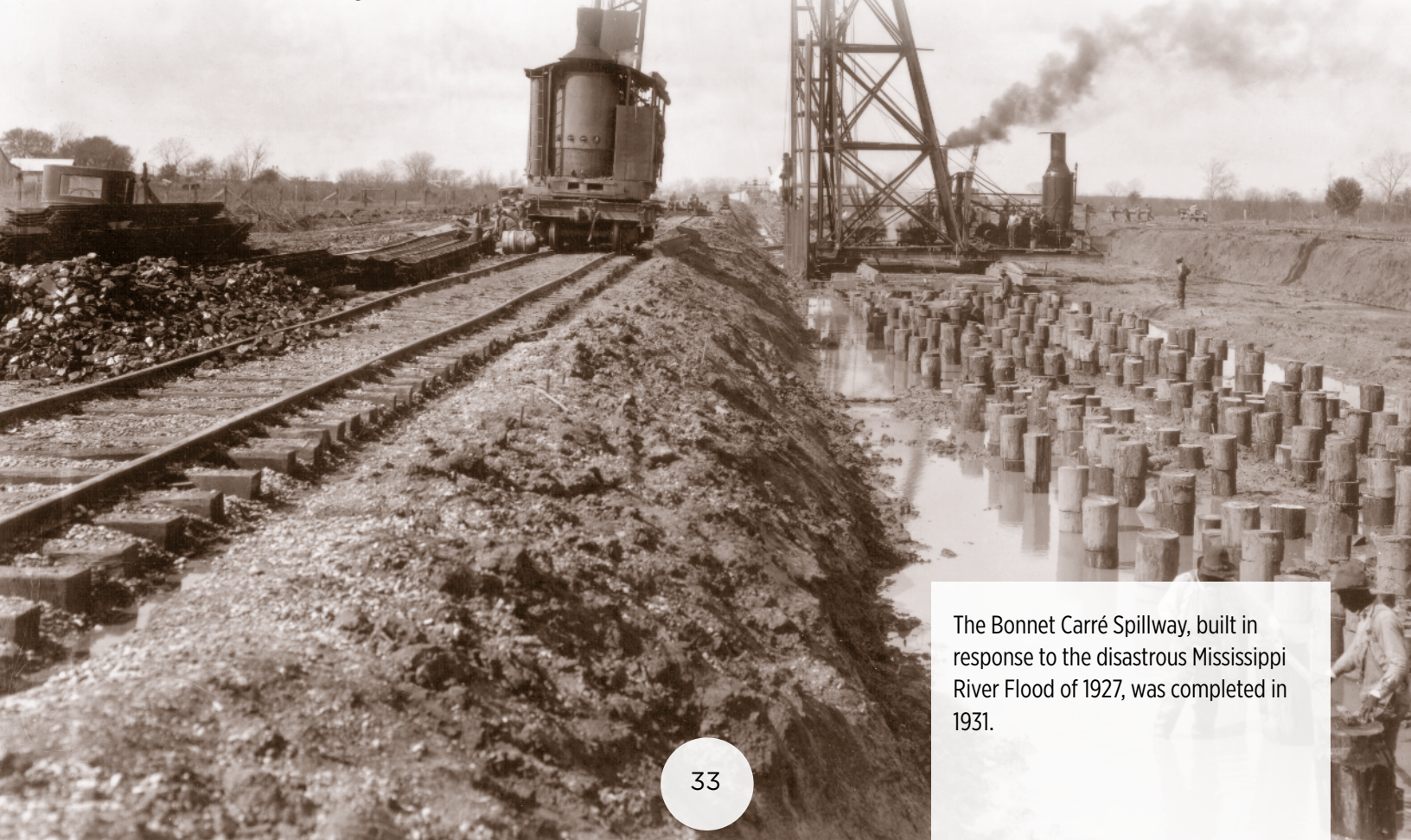
Section 5

People and the Environment

As you read, look for

- ▶ the mixed results of human attempts to control flooding on the Mississippi River;
- ▶ the causes and effects of coastal erosion;
- ▶ ways in which government and private industry have addressed coastal erosion and tried to reverse the effects of man-made environmental disasters;
- ▶ terms: **wetlands, subsidence, nutria.**

Throughout history, people have interacted with the environment in ways designed to meet human needs. Native American populations hunted animals for food and moved large amounts of soil to build earthen mounds. In the 1830s, Henry Shreve spent years clearing the tangle of logs called the Red River Raft to make that river more accessible to trade and navigation. A great deal of the human interaction with nature in Louisiana has centered on the powerful Mississippi River. Attempts to control flooding and maintain the river's course have had mixed results.



The Bonnet Carré Spillway, built in response to the disastrous Mississippi River Flood of 1927, was completed in 1931.

Flood Control

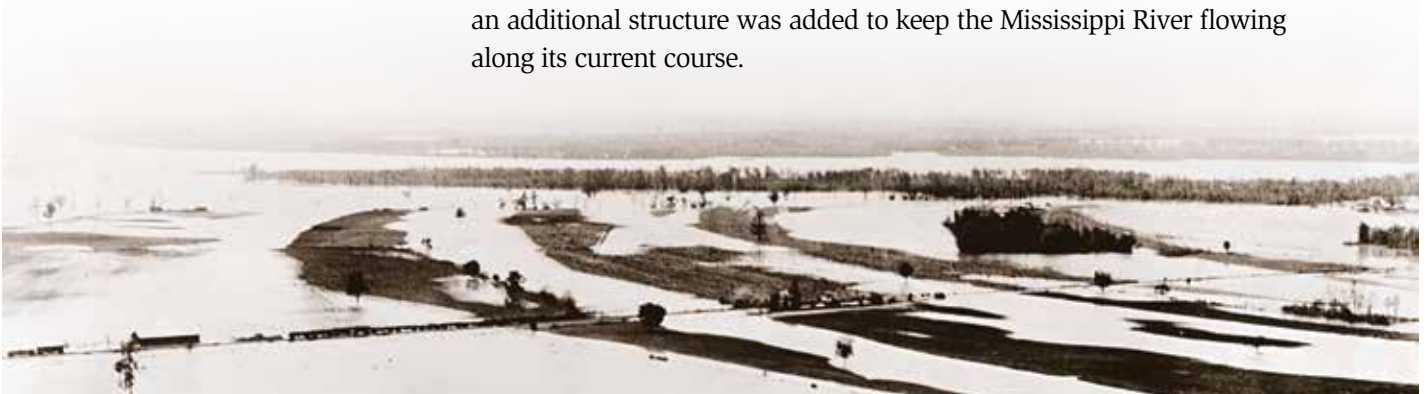
Spring floods are a natural part of the Mississippi River's yearly cycle. For thousands of years, those floods deposited the soil that became the land on which many of us now live. Attempts to control the river's yearly floods began after the French claimed Louisiana and established New Orleans in 1718. At first, building levees was the responsibility of those who owned the land along the river. In 1879, the U.S. government

established the Mississippi River Commission to coordinate flood control efforts all along the river's course. By 1900, the Commission had adopted a levees-only policy to control flooding.

The problems with that policy became clear in the wake of a massive flood in 1927. That spring, the river topped levees and flooded nearby towns and farmland as far north as Illinois. In some places, the flooding stretched for one hundred miles on either side of the river. Hundreds of thousands were left homeless, and it took two

months for the floodwaters to recede completely. After that great natural disaster, the U.S. Army Corps of Engineers added dams, diversion canals, reservoirs, and other flood control structures to its system of Mississippi River levees.

As part of this system, the Corps of Engineers completed the Old River Control Structure in Louisiana in 1963. It was designed to control flooding, but it was also built to prevent the river from changing course and traveling to the Gulf of Mexico through the Atchafalaya River's current course. In 1973, powerful floods almost destroyed the structure. After that, an additional structure was added to keep the Mississippi River flowing along its current course.



Above: The Red Cross maintained tent cities for some of the thousands of Louisianians left homeless by the Flood of 1927. **Right:** The Mississippi River remained at flood stage for 153 days in 1927.



In 1931, the Corps completed another kind of structure called the Bonnet Carré Spillway. The spillway is an 8,000-foot-long concrete bridge with 350 bays that remain closed most of the time. However, when dangerously high spring floods threaten the city of New Orleans, the bays can be opened and water from the Mississippi River can drain through those open bays directly into Lake Pontchartrain. This will lower water levels and ease pressure on the levees below.



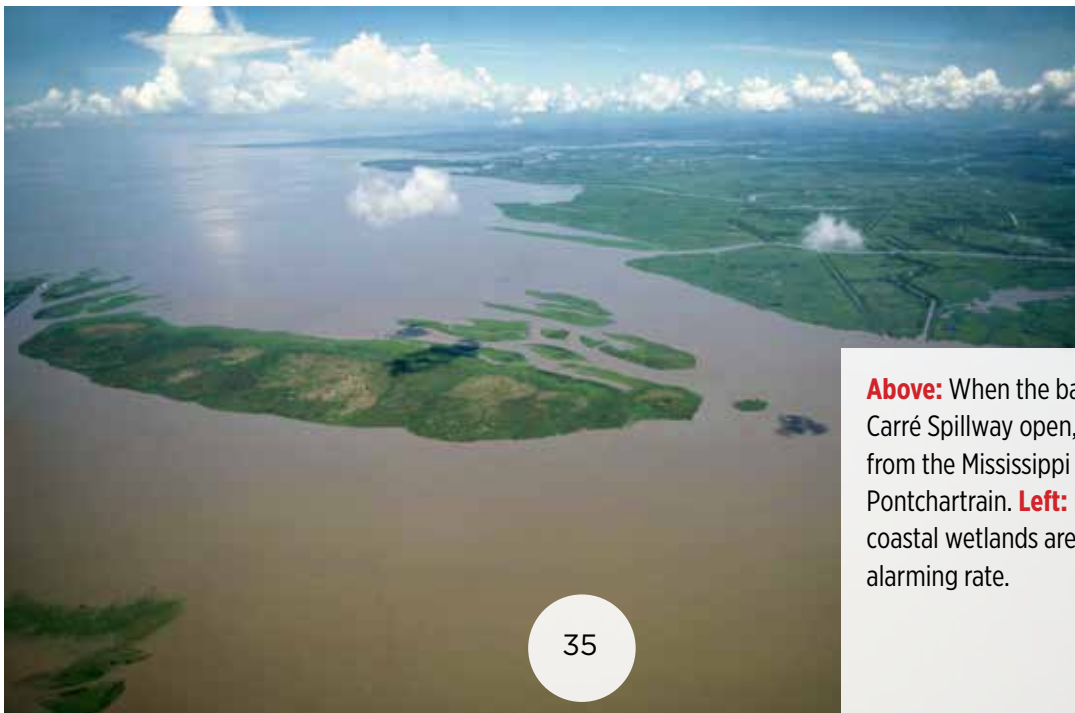
These efforts have been important in keeping people and property safe along the lower Mississippi. However, keeping the river from flooding has had unintended consequences. One of those consequences is that, when the annual flooding ceased, silt stopped being deposited. This resulted in gradual but significant land loss, particularly along the state's Gulf Coast.

Coastal Erosion

Coastal erosion is a serious environmental issue in Louisiana. The effects of Hurricanes Katrina and Rita and the aftermath of the nation's largest oil spill in 2010 have made it clear that the survival of Louisiana's wetlands is also a national concern. The state is home to about 40 percent of the wetlands in the continental United States. **Wetlands** are swamps, marshes, and other areas that have a natural supply of water and are covered or soaked with water at least part of the year. Unfortunately, Louisiana also has the highest rate of coastal erosion (or land loss). Coastal erosion experts say Louisiana has lost 1,900 square miles of land over the last fifty years.

Lagniappe

One way to think about Louisiana's coastal erosion is to picture that the state loses land to coastal erosion at the rate of one football field every hour.




Above: When the bays of the Bonnet Carré Spillway open, water flows from the Mississippi River into Lake Pontchartrain. **Left:** Louisiana's coastal wetlands are eroding at an alarming rate.

Many animal species depend on Louisiana's wetlands. The state's coastal marshes serve as nurseries for 75 percent of the fish that live in the Gulf of Mexico. The commercial harvesting of fish, shrimp, crabs, and oysters from off the coast of Louisiana provide the nation with much of its seafood. Dozens of bird species also depend on the state's coastal marshes and barrier islands for their habitat and *rookeries* (breeding grounds) at different times of the year.

Coastal erosion and wetlands loss also have very serious results for the millions of people who live near the Gulf Coast. Many jobs and industries depend on access to the Gulf of Mexico. This is especially true for oil and gas companies. About 20 percent of the oil imported into the United States comes through Port Fourchon in Lafourche Parish. Oil from oceangoing supertankers is offloaded into tanker trucks that travel inland up Highway 1. Coastal erosion has made this critical transportation route vulnerable to seasonal flooding. Over time, it could threaten the road's very existence.

Causes of Coastal Erosion

There are multiple causes for coastal erosion. Nature and humans have both played roles. **Subsidence** is the slow process of land sinking into the sea. When the Mississippi River flooded annually, new silt was deposited each year, slowing the process of subsidence. Since the 1950s, much of that silt has been trapped upriver behind dams. The remaining silt stays within the levees and runs off into the Gulf of Mexico. The slow rise of sea levels has also played a role. Over the course of the twentieth century, the rise in sea levels has added to the effects of subsidence.



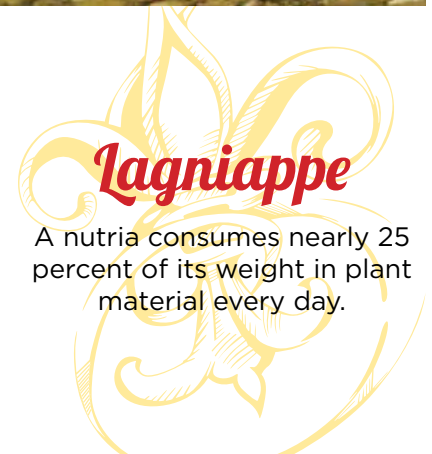
In 2005, Hurricane Rita completely leveled the small community of Holly Beach in Cameron Parish.

Storms, especially powerful ones with high winds and storm surges, can also damage coastal areas. In 1957, Hurricane Audrey's storm surge drove saltwater into freshwater marshes and killed thousands of acres of vegetation. In 2005, Hurricanes Katrina and Rita devastated the state's coastal marshes, destroying more than two hundred square miles of wetlands between them.

Humans have also contributed to coastal erosion. One way they have done so is by introducing nonnative plant and animal species to the state's land and waterways.

The **nutria** is the best-known example. The nutria is a rodent that was once highly valued for its fur. These animals can reach two feet in length and weigh as much as twenty pounds. Hunters and trappers brought them to Louisiana from South America in the 1930s. No one anticipated that once they were released into the wild they would do so much damage. Nutria reproduce rapidly and eat virtually any plant. In the marshes, they feed on the roots of the plants that hold the soil together. They also create trails and burrows that cause even more damage. With populations as high as six thousand animals per square mile, they can sometimes completely remove the vegetation from an area, leaving only barren mudflats behind. These unprotected mudflats are more susceptible to coastal erosion.

Another human activity that has caused unintended damage is cutting canals through Louisiana's coastal wetlands. More than ten thousand miles of canals were created in the twentieth century. Some canals were cut for navigation or to remove valuable logs like cypress from the marsh. Oil and gas companies dug most of the canals to gain access to rich oil and gas deposits or to build pipelines to move the oil and gas inland. Most of these canals were in place before 1980 when new environmental rules limited their construction. The canals already in place widened over time, increasing land loss. Canals that ran into the Gulf of Mexico also provided a way for saltwater to move into freshwater marshes. This saltwater incursion can kill the protective marsh grasses that live only in freshwater.



A nutria consumes nearly 25 percent of its weight in plant material every day.



Top: The nutria is also known as the river rat or coypu. **Right:** The Old River Control Structure regulates the flow of water leaving the Mississippi River into the Atchafalaya.

Special FEATURE



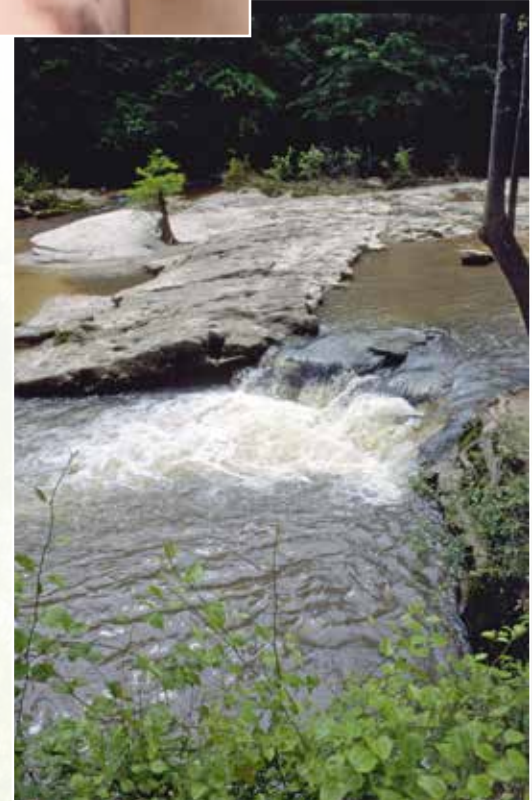
Kisatchie: Our State's National Forest

Did you know that, until the end of the 1800s, over 85 percent of Louisiana was covered with forests? In the 1880s, Louisiana had a lumber boom. Louisiana actually had the highest amount of lumber produced in the nation in 1914. Unfortunately, trees were not replanted appropriately. Louisiana's lumber industry declined just as the Great Depression began in 1929.

In 1930, the Louisiana Forestry Department helped bring about the creation of the Kisatchie National Forest. The name Kisatchie comes from a local Native American tribe, the Kichai, who called themselves "Kisatchie." The U.S. Forest Service began buying land from closed mills in the parishes of Vernon, Rapides, Grant, Natchitoches, and Winn. Over time, the Forest Service continued to buy land from closed mills and expand the national forest.

During the Great Depression, the Civilian Conservation Corps (CCC) was created to give jobs to unemployed young men and to help conserve the United States' natural resources. The Kisatchie National Forest was the first place in Louisiana to get a CCC camp in 1933. The CCC began replanting pine trees in the area as well as building fences, roads, and bridges.

Thanks to the efforts of the CCC and the Forest Service, the Kisatchie National Forest now covers over 604,000 acres in seven parishes of northern and central Louisiana. In fact, it is the only national forest in all of Louisiana. Kisatchie is a great place for camping, fishing, hiking, hunting, picnicking, and many other outdoor activities. What do you think you would like to do if you visited Kisatchie?



Top: The ground skink is one of many reptiles found in the Kisatchie National Forest. **Middle:** A waterfall like this one on Kisatchie Bayou is a rare sight in Louisiana. **Bottom:** The Kisatchie National Forest provides opportunities for camping in all of its districts.

Crisis and Response

The federal government recognized the importance of addressing coastal erosion. It adopted the Coastal Wetlands Planning, Protection, and Restoration Act (CWPPRA) in 1990. This legislation is sometimes called the Breaux Act in honor of John Breaux, a former U.S. senator from Louisiana. He helped create the legislation and worked hard for its passage. Its purpose is to direct funds to protect and rebuild wetlands in Louisiana and other coastal states. In its first twenty years, CWPPRA funds supported 148 projects designed to restore more than 110,000 acres of lost wetlands. Sadly, this progress for the wetlands was followed by yet another crisis.

On April 20, 2010, an explosion on the Deepwater Horizon oil rig set off a chain of events that resulted in the largest and most damaging oil spill in the nation's history. More than 4 million barrels of oil flowed into the Gulf in the months that followed. Oil eventually came ashore in all of the Gulf Coast states. More than 300 miles of coastline were affected in Louisiana alone. Plant, animal, and sea life were all threatened by the oil. Widespread efforts to clean up the oil and protect the fragile coastal marshes and barrier islands were undertaken. Scientists are unsure about the long-term environmental effects of the spill. They continue to check on plant, animal, and sea creatures and the waters of the Gulf of Mexico in order to better understand those effects.

The nation's largest oil spill drew attention to the threatened wetlands once again. Gulf Coast states are trying to make sure that the majority of fines levied against the companies involved go back into reclaiming and protecting this fragile but important part of the coastal environment. This is a problem Louisiana cannot solve on its own. It will take national resolve, resources, and commitment to stem the tide of coastal erosion and its resulting land loss in Louisiana.



Reviewing the Section

1. Define in sentence form: wetlands, subsidence, nutria.
2. How does the Bonnet Carré Spillway help protect the city of New Orleans?
3. How have humans contributed to coastal erosion?

Top: The U.S. Coast Guard places an oil containment boom at Port Fourchon beach. **Above:** This Brown Pelican was covered with oil from the Deepwater Horizon oil spill. Without proper cleaning, the bird cannot survive.

Chapter Review

Chapter Summary

Section 1: Location

- Latitude measures a location's distance north or south of the equator.
- Longitude measures a location's distance east or west of the prime meridian.
- Earth is divided into 24 time zones. The 48 contiguous states have 4 time zones, with Louisiana in the Central Time Zone.
- Louisiana is bordered by Texas to the west, Arkansas to the north, and Mississippi to the east.

Section 2: Natural Regions

- The United States is divided into 8 natural regions. Louisiana is in the Gulf Coastal Plain region.
- The 1874 Samuel Lockett geological survey identified Louisiana's 5 major natural regions: Mississippi Floodplain, Red River Valley, Terraces, Marshes, and Hills.
- The Mississippi Floodplain region is subdivided into the natural levee, the swamp, and the passes.
- The Red River Valley region follows the Red River from northwest to central Louisiana. It has a single stream with natural levees and lower-lying areas behind them.
- The Terraces region includes blufflands, prairies, and flatwoods.
- The Hills region, Louisiana's highest and roughest terrain, covers much of northern Louisiana and a smaller area in southeastern Louisiana.

Section 3: Waterways

- Waterways are Louisiana's dominant physical feature.
- The Mississippi River's name comes from an Algonquin word meaning "great river." The Mississippi River carries 375 billion gallons of water through the state every day.
- The Red River dominates the second-largest river drainage system in Louisiana.
- Lake Pontchartrain is the state's largest natural lake.
- The word *bayou* means "creek" in the Choctaw language. There are many varieties of bayous across the state.

Section 4: Climate

- Weather measures the current condition of the atmosphere on any given day. Climate is the average weather of an area over a long period (25 to 50 years).
- Temperature, precipitation, and wind are the atmospheric conditions that describe climate.
- Louisiana has a humid subtropical climate with 2 climate regions: North Louisiana and South Louisiana.
- North Louisiana has higher average temperatures because South Louisiana receives the cooling effects of the Gulf of Mexico.
- A tornado is a dark funnel-shaped cloud with strong swirling winds that circulate around a low-pressure center (an "eye").
- A hurricane is a violent storm with wind speeds over 74 miles per hour.
- More than 60 hurricanes have hit Louisiana since the 1850s including Hurricane Katrina, which caused record destruction estimated at \$135 billion.

Section 5: People and the Environment

- Spring flooding is a natural part of the Mississippi River's yearly cycle. For thousands of years, those floods deposited soil that became new land.
- The Flood of 1927 demonstrated the problems with the U.S. government's levees-only policy.
- The Bonnet Carré Spillway is designed to drain water from the Mississippi River when floodwaters threaten New Orleans.
- Louisiana is home to about 40 percent of the continental United States' wetlands. Through coastal erosion, the state has lost 1,900 square miles of land over the last 50 years.
- In 1990, the federal government enacted the Coastal Wetlands Planning, Protection, and Restoration Act designed to protect, restore, and rebuild wetlands in Louisiana and other coastal states.
- In 2010, the Deepwater Horizon oil rig explosion led to the largest and most damaging oil spill in U.S. history.

Activities for Learning

Understanding the Facts



1. What is another name for *latitude* and for *longitude*?
2. Which three states border Louisiana?
3. What is Louisiana's absolute location?
4. List the waterways that form part of Louisiana's boundaries.
5. In which of the eight natural regions of the United States is Louisiana located?
6. List the three parts of the Mississippi Floodplain region.
7. Define the term *swamp*.
8. How many acres of marsh are located in Louisiana?
9. What are the three parts of the Marsh region?
10. Which region has the highest and roughest terrain?
11. What is Louisiana's dominant physical feature?
12. Describe the Mississippi River's drainage basin.
13. What is the origin of the name "Atchafalaya" River?
14. Which large natural lake is located to the west of Lake Ponchartrain? Which body of water connects the two lakes?
15. How did early French settlers describe the slow-moving bayous?
16. Compare and contrast "weather" with "climate."
17. What type of climate does Louisiana have?
18. Which parts of Louisiana receive the most annual precipitation?
19. List three hurricanes that have impacted Louisiana in the twenty-first century.
20. How much of Louisiana's coastline was affected by the Deepwater Horizon explosion?

Developing Critical Thinking



1. Using information from Section 1, write five sentences describing Louisiana's location. Use this example as your first sentence: "Louisiana is located in the Western Hemisphere." Now write four additional sentences making each subsequent sentence more geographically precise than the previous one.
2. Why do geographers consider Driskill Mountain a "hill" rather than a mountain?

Exploring Louisiana on the Internet



Go to www.history.com/topics/hurricane-katrina and read the article and watch the video on Hurricane Katrina. Also, review the information provided in your textbook (pages 29-31). Now assume the role of a newspaper reporter and write an article about the destruction caused by this hurricane. Be sure your article answers the essential questions of reporting: Who? What? Where? When? Why? and How?

Building 21st-Century Skills: Using Your Textbook



Making effective use of your textbook is an important skill. Your textbook has two parts: the narrative and visual information. The narrative tells the story of Louisiana while the visual information (charts, illustrations, maps, and timelines) helps make the narrative come alive.

The narrative is divided into fifteen chapters. Each chapter contains several sections with each section identified by a major heading (yellow lettering). Lower-level headings are set in bold dark red letters. Scan the headings before you begin to read to better understand the plan of each chapter.

Try this activity with this chapter and the other chapters in the textbook. Prepare an outline of Chapter 1 using the headings and subheadings in the chapter.



Chicot State Park (Blufflands).