**Chapter 1: New Mexico: The Land**

In 1812 Pedro Baptista Pino of New Mexico wrote a long letter to his ruler, the Spanish king. In Cadiz, Spain, he had this letter printed as *The Exposition of the Province of New Mexico.* An exposition is a statement of facts. This small book told of the land in which Pino, a landowner and rancher, lived. Pino described in detail the people and their problems. He also wrote about the crops, the government, and the geography of his home.

Pino's New Mexico of 1812 was far different from New Mexico today. He wrote, "From north to south New Mexico measures some 340 leagues and from east to west more than 350." A league equaled 2.6 miles. Pino's New Mexico thus stretched 884 miles from north to south. East to west it was more than 910 miles. On a map today, it would include the city of El Paso, Texas, in the south. It would reach into the state of Colorado to the north. In the west it would stretch across Arizona. To the east it would extend into the state of Kansas. Spanish New Mexico was a vast land.

New Mexico today is not that large. But it is still a big state. As students, you need to know more about its unique landscape. (See Special Interest Feature.) You need to learn about New Mexico's location, land surface, water resources, climate, and plants and animals. In other words, you need to study its geography.

**NEW MEXICO'S NATURAL WONDERS**

The forces of nature have formed the land of New Mexico over millions of years. Oceans have covered the land. Volcanos have tortured the landscape. Wind and water continue to change rock and soil. Many natural wonders are the result.

One such wonder in northeastern New Mexico is Capulin Mountain. Near Raton, Capulin Mountain is an almost perfect volcanic cinder cone. It rises 1,000 feet above the plains below. And from the top on a clear day, one can see 90 miles. The cone is 10,000 years old. It was formed in the last great period of volcanic activity in western North America.

To the south is White Sands near Alamogordo. Gypsum from surrounding mountains dissolves and washes into the basin below. There, white, sand-sized grains of gypsum are picked up by the wind. The result is white dunes 30 to 40 feet high. As the forces of nature continue to work, the area covered by the dunes grows.

The forces of nature also formed Carlsbad Caverns. Over millions of years rainwater seeping into limestone has dug huge underground chambers. One cave, the Big Room, has enough floor area for 14 football fields. It is also 22 stories high.

For thousands of years bats have used the caves as a summer home. In the evening up to 5,000 bats a minute come through the main opening to the cavern. Today Carlsbad Caverns along with Capulin Mountain and White Sands and other sites are protected for the public by the National Park Service.

In this chapter you will learn more about the land of New Mexico. As you read, you will find information divided into the following sections:

**LOCATION AND SIZE**

**LAND SURFACE**

**SURFACE AND GROUND WATER**

**PLANT AND ANIMAL LIFE**

**LOCATION AND SIZE**

**New Mexico is a part of the Southwest.** New Mexico is located in the southwestern part of the United States. The Southwest is an area that includes New Mexico and Arizona. It also includes parts of Utah, Colorado, Nevada, Texas, and California. Because of its size and location, New Mexico has boundaries in common with five other states. To the east lie Texas and the western tip of Oklahoma. To the north is Colorado. To the west is Arizona. Utah is the fifth state that borders New Mexico.

New Mexico's northwest corner touches Utah's southeast corner. Colorado's southwest corner and Arizona's northeast corner touch here as well. There is no other place in the United States where four states come together in a single spot. Thus this place is called the Four Corners Area. New Mexico shares its southern border with Texas and Mexico.

**New Mexico is a large state.** You can see where New Mexico is located and who its neighbors are by looking at the map on page 5. You can also see that except for its southwest corner the state is nearly square. From north to south New Mexico measures 391 miles. From east to west the distance is 352 miles.

The state's total area is 121,666 square miles. If you have crossed the state by car, bus, or train, you know how large New Mexico is. Cities, towns, and other points of interest are often far apart. In fact, New Mexico is the fifth largest state in the Union. Only Alaska, Texas, California, and Montana are bigger in size.

***SECTION REVIEW***

1. In what part of the United States is New Mexico located?

2. What five states border New Mexico?

3. What is the size of New Mexico?

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**LAND SURFACE**

**WORDS TO KNOW: geographical conditions --- plains --- plateau --- basin**

**The land in New Mexico has different physical provinces.** Again because of its size and location, New Mexico has certain **geographical conditions.** By geographical conditions we mean such things as the surface of the land, rainfall, altitude, and temperature. In general, four distinct provinces make up New Mexico's land surface. These four are plains, mountains, plateau, and basin and range.

The **plains** province is an extension of the Great Plains. The Great Plains form the western fringe of the North American lowland. Plains are vast areas that are flat and treeless. The plains in New Mexico cover the eastern third of the state. The *Llano Estacado,* which means staked plains, is located here. Some of the earth's flattest land, the Llano lies between the Canadian and Pecos rivers. It stretches to the southeast corner of the state.

The mountains province runs through north-central New Mexico. The mountains here are part of the Rocky Mountains. These high and rugged mountains extend southward from Colorado. They stop at a point just south of Santa Fe. The state has other mountains, but they are not part of the mountains province.

The **plateau** province is part of the Colorado Plateau. A plateau is an elevated area of mostly flat or level land. To the east of the Colorado Plateau lie the Rocky Mountains. To the west are the mountain ranges that run along the Pacific coast. The Colorado Plateau itself is an area where the Colorado River and the streams that flow into it have dug canyons. Where the water has dug through many layers of rock, the canyons are deep. In New Mexico the Colorado Plateau extends across the northwestern part of the state.

**The basin and range province is the largest.** The fourth and final province is the basin and range province. It is the state's largest province. It extends across the southwestern, central, and south-central parts of the state. This province consists of mountain ranges separated from one another by **basins.** Basins are broad, dry drainage areas. Two such basins are the Estancia Basin and the Tularosa Basin. Two other basins are the Plains of San Agustin and the Rio Grande Valley.

The mountain ranges in this province are many. The Sandia and Manzano mountains are east of Albuquerque. Between Alamogordo and Roswell is the Sacramento Range. To the west of Socorro are the San Mateo Mountains. Between Socorro and Las Cruces are the San Andres Mountains. And in southwestern New Mexico are the Mogollon Mountains. There are other mountains as well.

***SECTION REVIEW***

1. What are the four provinces that make up New Mexico's land surface?
2. Where is each of these four provinces located?

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**SURFACE AND GROUND WATER**

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**WORDS TO KNOW**

* **surface water**
* **rainfall**
* **continental divide**
* **irrigation**
* **ground water**
* **drought**

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**New Mexico is a dry land.** The state's physical features do, of course, affect where and how people live. But other conditions have an effect as well. In New Mexico water is the key factor. Where people can live in New Mexico depends largely on the supply of water.

The fact is that New Mexico, a large state, has little water. Its **surface water** area is only about 250 square miles. Surface water is water on top of the earth's surface. In addition, New Mexico's average precipitation rate is only 15 inches a year. The precipitation rate includes all forms of moisture from the sky. The term **rainfall** is often used in place of the term precipitation. The term rainfall is used here to include all types of moisture.

It is also a fact that not all parts of the state receive equal rainfall. The Sangre de Cristo Mountains in the northern part of the state receive more than 40 inches of moisture a year. So, too, mountains elsewhere in the state have a higher than average rainfall. The plateau and plains areas are average in rainfall. They receive between 12 and 17 inches of moisture year.

The rainfall is below average in the south-western, central, and south-central parts of the state. Here are the driest areas. Some of these low areas receive fewer than 10 inches of rainfall yearly. These low areas include the broad, dry basins of the basin and range province. Some of these low-lying areas are nearly true deserts.

**New Mexico's rainfall is useful.** But it is not just the amount of rainfall that determines where and how people can live. When the rainfall occurs is also important. New Mexicans are fortunate that they receive about three-fourths of their rainfall between June and September. This is the growing season.

The remainder of the moisture comes mostly during the winter. Snow falls in the mountains and higher elevations, while rain falls in the lower elevations. The snow in the mountains then melts in the spring and flows into the streams and rivers. The rivers, in turn, bring water to people. They allow people to live where it might otherwise be too dry. Rivers have, of course, always supplied needed water. New Mexico's rivers have been no exception.

**New Mexico has important rivers.** The most important of New Mexico's rivers are the Rio Grande, Pecos, Canadian, San Juan, and Gila. The Rio Grande is the third longest river in the United States. It is also the state's main river. You can see on the map on page 6 that the Rio Grande flows through the center of New Mexico. It crosses the entire state from north to south.

Also on the map, you can see the location of the other major rivers. So, too, you can see where the **continental divide** crosses the state. A fold in the earth's surface, the continental divide separates the direction in which North America's rivers flow. East of the divide rivers drain into the Atlantic Ocean. Rivers west of the divide drain into the Pacific Ocean.

Whether east or west of the continental divide, New Mexico's rivers have supported life for hundreds of years. They have provided water for **irrigation.** Irrigation is the artificial watering of crops. People have irrigated crops in the Rio Grande Valley for more than 400 years.

Dams on the Pecos have in this century controlled flooding along that river. As a result of flood control, thousands of acres along this river are now used for farming. Much of this land is near the cities of Carlsbad and Roswell. The Conchas Dam on the Canadian has provided water for irrigating land near Tucumcari since 1940. There are somewhat smaller irrigation projects along the San Juan and the Gila.

**New Mexico's ground water is also important.** The rivers have allowed people to irrigate crops in places otherwise too dry for farming. This has been most true for hundreds of years for people living along the Rio Grande. Besides river water, there is one more important source of water in New Mexico. This source is **ground water.** Ground water is water under the ground that people pump to the surface.

New Mexicans today use much ground water. Indeed, they get more than half their water for irrigation from ground water sources. An underground flow of water beneath the city of Albuquerque supplies its people with water for drinking and other needs. Ground water also meets the needs of people who live in many other New Mexico cities and towns.

Still, water has always been a major concern. New Mexico's rainfall has at times been unreliable. The people have suffered from **droughts.** Droughts are long periods without rainfall. In addition, scientists disagree on how much ground water remains in various parts of the state. Some New Mexicans could run short of water.

***SECTION REVIEW***

1. What is New Mexico's average rainfall?
2. What are New Mexico's most important rivers?
3. Why are New Mexico's rivers important?
4. What is ground water, and why is it important to New Mexicans?

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**PLANT AND ANIMAL LIFE**

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**WORDS TO KNOW**

* **altitude**
* **latitude**
* **life zone**

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**New Mexico's altitude affects plant and animal life.** Besides its land surface and its water supply, New Mexico's **altitude** has affected ways of living. Altitude is the elevation above sea level. It differs from one region of the state to another. For the most part, the state slopes from north to south and from west to east.

Wheeler Peak near Taos is part of the Rocky Mountains. It rises to an altitude of 13,160 feet. This is the highest elevation in the state. The lowest elevation is in the southern part of the state. Red Bluff on the Pecos south of Carlsbad has an altitude of only 2,817 feet.

But most of New Mexico has a high altitude. Indeed, 85 percent of the state has an altitude greater than 4,000 feet. And why is altitude important? Altitude is important because plant life changes with both altitude and **latitude.** Latitude is the number of degrees north or south of the equator.

New Mexico's location north of the equator is fixed. But its high altitude has the effect of moving the state's climate farther north. Each 500 foot rise in altitude is equal to moving about 100 miles nearer the North Pole at sea level. Higher elevations are colder than lower elevations.

**New Mexico has different life zones.** New Mexico's differences in altitude have created six different **life zones.** By life zones we mean areas that have similar climates, plants, and animals. New Mexico's life zones become colder and wetter as they become higher in altitude. The plants and animals become different as well.

You can see cactus, lizards, and snakes in the lowest life zone. In two of the mountain life zones, you can see grass and big trees. You can also see animals and birds that make their homes in mountain forests. New Mexico's highest life zone rises above 12,500 feet. It supports very few plants or animals. The chart below names the six life zones.

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**SIX LIFE ZONES IN NEW MEXICO**

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| **ZONE** |  | **DESCRIPTION AND USE** | **COMMON VEGETATION** | **COMMON ANIMALS** |
| Lower Sonoran | 2,817-5.000 | Most important agricultural region. Located in river valleys in southern part of state. | mesquite, cactus, valley cottonwood, black grama grass | desert fox, rabbits, kangaroo rats, squirrels |
| Upper Sonoran | 5,000-7,000 | Covers three-quarters of the state. Ranching, dry land farming here. | juniper, piñon, willow, blue grama grass, sagebrush | deer, coyotes, antelope, prairie dogs |
| Transition | 7,000-9,000 | Major timber zone. Some range for stock. | Ponderosa pine, scrub oak | mountain lions, bears, mountain bobcats, deer, elk |
| Canadian | 8,500-11,500 | Very important for water supplies from melting snow in spring. | aspen, Douglas fir, spruce | elk, deer chipmunks, varieties of squirrels |
| Hudsonian | 11,500-12,500 | Narrow zone at the timber line. Some summer grazing. | Siberian juniper, Engelmann spruce, berries | Rocky Mountain woodchucks, coney, mountain sheep |
| Arctic-Alpine | Above 12.500 | Smallest zone in New Mexico. Above the timber line at the tops of mountains. | Very hardy grasses and flowers | Some come in summer from lower zones |

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People do, of course, have some control over what grows in life zones. You know that irrigation allows people to grow crops where rainfall is scarce. In fact, New Mexico's main farming area is the area of the state's lowest-lying life zone. This area has little rainfall, but there is still water for irrigation. The temperature here is mild.

Indeed, a mild or moderate climate is typical of most of the state. This means that the climate is neither extremely hot nor extremely cold. At the same time, temperatures in a single day often vary as much as 40 degrees Fahrenheit. New Mexico's dry air quickly gains heat during the day and quickly loses heat at night.

**New Mexico has shortcomings.** The geographical conditions present in New Mexico have clearly affected ways of living. Today, the mountains provide scenery and recreation for the people of the state. They are a source of water. In the spring their snow melts and runs off into lower areas. The flat lands of the plains, plateaus, and basins support most of the state's population. Land is available for farming in all these areas. Farming, however, requires good soil and a good growing season. In many areas it requires water for irrigation.

And the fact remains that New Mexico has shortcomings. The land itself has discouraged growth. The shortage of water, both rainfall and surface water, has been the biggest shortcoming. Not only is the state dry, but rainfall has also been unreliable at times.

In addition, the surface waters, namely the rivers, have not provided a source of transportation. While rivers elsewhere were America's first highways, people moving through New Mexico had to travel on foot. Later explorers and settlers had only horses and oxen. These conditions tended to separate New Mexico from other centers of population. They tended to isolate New Mexico.

In the remainder of this book, you will read about people and their adjustments to conditions in New Mexico. You will also learn how New Mexico became less isolated.

***SECTION REVIEW***

1. Why is altitude an important geographical condition in New Mexico?

2. How many life zones are there in New Mexico?

3. What happens to the climate when the altitude becomes higher?

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**Chapter Review**

**Words You Should Know**

Find each word in your reading and explain its meaning.

1. geographical conditions

2. plains

3. plateau

4. basin

5. surface water

6. rainfall

7. continental divide

10. drought

11. altitude

12. latitude

13. life zone

8. irrigation

9. ground water

**Places You Should Be Able to Locate**

1. Four Corners Area

2. Great Plains

3. Llano Estacado

4. Rocky Mountains

5. Colorado Plateau

6. basin and range province

7. Rio Grande

8. Pecos River

9. Canadian River

10. San Juan River

11. Gila River

12. continental divide

**Facts You Should Remember**

Answer the following questions by recalling information presented in this chapter.

1. In which of the four provinces do most New Mexicans live? Why do they live there?

2. When does New Mexico receive its rainfall? Why is this timing of rainfall important?

3. What are the sources of water in New Mexico?

4. What does a supply of water allow people in New Mexico to do?

5. What are the shortcomings of New Mexico's geographical conditions?