CLIMATE OF COLORADO

TOPOGRPHIC FEATURES – Colorado Lies astride the highest mountains of the Continental Divide. Nearly rectangular, its north and south boundaries are the 41° and 37° N. parallels, and the east and went boundaries are the 102° and 109° W. meridians. It is eighth in size among the 50 states, with an area of 104,247 square miles. Although primarily a mountain state, nearly 40 percent of its area is taken up by the eastern high plains.

The principal features of the Colorado geography are its inland continental location in the middle latitudes, and the mountains and ranges extending north and south approximately through the middle of the State. With an average altitude of about 6,800 feet above sea level, Colorado is the highest State in the Union. Roughly three-quarters of the Nation's land above 10,000 feet altitude lies within its borders. The State has 54 mountains 14,000 feet or higher, and about 830 mountains between 11,000 and 14,000 feet in elevation.

Emerging gradually from the plains of Kansas and Nebraska, the high plains of Colorado slope gently upward for a distance of some 200 miles from the eastern border to the base of the foothills of the Rocky Mountains. The eastern portion of the State is generally level to rolling prairie broken by occasional hills and bluffs. The northern art of the plains area slopes to the northeast and the southern part to the southeast, divided by higher country and hills extending eastward from the mountains near the center of the State. Elevations along the eastern border range from about 3,350 feet at the lowest point in the State (where the Arkansas River crosses the border) to near 4,000 feet.

At elevations between 5,000 and 6,000 feet the plains give way abruptly to foothills with elevations of 7,000 to 9,000 feet. Backing the foothills are the mountain ranges above 9,000 feet with the higher peaks over 14,000 feet. West of these "front ranges" are additional ranges, generally extending north and south, but with many spurs and extensions in other directions. These ranges enclose numerous high mountain parks and valleys. Farther westward the mountains give way to rugged plateau country in the form of high mesas (some more than 10,000 feet in elevation) which extends to the western border of the State. This land is often cut by rugged canyons, the work of the many steams fed by accumulations of winter snow.

All rivers in Colorado rise within its borders and flow outward, with the exception of the Green River, which flows diagonally across the extreme northwestern corner of the State. Four of the Nation's major rivers have their source in Colorado: the Colorado, the Rio Grande, the Arkansas, and the Platte.

GENERAL CLIMATE – Most of Colorado has a cool and invigorating climate that could be termed a highland or mountain climate of a continental location. During summer there are hot days in the plains, but these are often relieved by afternoon thundershowers. Mountain regions are nearly always cool. Humidity is generally quite low; this favors rapid evapotranspiration and a relatively comfortable feeling even on hot days. The thin atmosphere allows greater penetration of solar radiation and results in pleasant daytime conditions even during the winter. This is why skiers at high elevations are often pictured in very light clothing, although surrounded by heavy snow.

The climate of local areas are profoundly affected by differences in elevation, and to a lesser degree, by the orientation of mountain ranges and valleys with respect to general air movements. Wide variations occur within short distances. The difference (35°) in annual mean temperature between Pikes Peak and Las Animas, 90 miles to the southeast, is about the same as that between southern Florida and Iceland. The average annual snowfall at Cubres in the southern mountains is nearly 300 inches; less than 30 miles away at Manassa in the San Luis Valley, snowfall is less than 25 inches. While temperature decreases, and precipitation generally increases with altitude, these patterns are modified by the orientation of mountain slopes with respect to the prevailing winds and by the effect of topographical features in creating local air movements.

As a result of the State's distance from major sources of moisture (the Pacific Ocean and the Gulf of Mexico), precipitation is generally light in the lower elevations. Prevailing air currents reach Colorado from westerly directions. Eastward-moving storms originating in the Pacific Ocean lose much of their moisture falls as rain or snow on the mountaintops and westward-facing slopes. Eastern slope areas receive relatively small amounts of precipitation from these storms.

Storms moving from the north usually carry little moisture. The frequency of such storms increases during the fall and winter months, and decreases rapidly in the spring. The accompanying outbreaks of polar air are responsible for the sudden drops in temperature often experienced in the plains sections of the State. Occasionally these outbreaks are attended by strong northerly winds which come in contact with moist air from the south; the interaction of these air masses causes a heavy fall of snow and the most severe of all weather conditions of the high plains, the blizzard. This cold air is frequently too shallow to cross the mountains to the western portion of the State so while the plains are in the grip of a very severe storm, the weather in the mountains and western valleys may be mild.

Occasionally, when the plains are covered with a shallow layer of cold air, strong westerly winds aloft work their way to the surface. Warmed by rapid descent from higher levels, these winds bring large and sudden temperature rises. This phenomenon is the "chinook" of the high plains and temperature rises of 25 degrees to 35° within a short time are not uncommon. Chinook winds greatly moderate average winter temperatures in areas near enough to the mountains to experience them frequently.

Warm, moist air from the south moves into Colorado most frequently in the spring. As this air is carried northward and westward to higher elevations, the heaviest and most general rainfalls of the year occur over the eastern portions of the State. Frequent showers and thunderstorms continue well into the summer. At times during the summer, winds shift into the southwest and bring hot, dry air over the State from the hottest weather of the year over the eastern plains, but such hot spells are usually of short duration.

CLIMATE OF THE EASTERN PLAINS – The climate of the plains is comparatively uniform from place to place, with characteristic features of low relative humidity, abundant sunshine, light rainfall, moderate to high wind movement, and a large daily range in temperature. Summer daily maximum temperatures are often 95° F or above, and 100° F temperatures have been observed at all plain stations. Such temperatures are not infrequent at altitudes below 5,000 feet; above that elevation they are comparatively rare. The highest temperatures in Colorado occur in the northeastern plains, and sometimes exceed 115° F. Because of the very low relative humidity accompanying these high temperatures, hot days cause less discomfort than in more humid areas. The usual winter extremes in the plains are from zero to 10° F or 15° F below zero.

An important feature of the precipitation in the plains is the large proportion of the annual total that falls during the growing season – 70 to 80 percent during the period from April through September. Summer precipitation in the plains is largely from thunderstorm activity and is sometimes extremely heavy. Strong winds occur frequently in winter and spring. These winds tend to dry out soils, which are not well supplied with moisture because of the low annual precipitation. During periods of drought, high winds give rise to the dust storms which are especially characteristic of the southeastern plains.

At the western edge of the plains and near the foothills of the mountains, there are a number of significant changes in climate as compared to the plains proper. Average wind movement is less, but areas very near the mountains are subject to periodic, severe turbulent winds from the effects of high westerly winds over the mountain barrier. Temperature changes from day to day are not as great; summer temperatures are lower, and winter temperatures are higher. Precipitation, which decreases gradually from the eastern border to a minimum near the mountains, increases rapidly with the increasing elevation of the foothills and increases rapidly with the increasing elevation of the foothills and proximity to higher ranges. The decrease in temperature from the eastern boundary westward to the foothills is less than might be expected with increasing altitude. This results from mountain and valley winds and greater frequency of the chinook. Below the Royal Gorge of the Arkansas, the mountain and valley winds are strong enough to modify the climate over a considerable area. Descending air currents frequently prevent the stratification of air necessary for the occurrence of excessive cold. As a consequence, the winter climate is milder than elsewhere in the State.

CLIMATE OF WESTERN COLORADO – The rugged topography of western Colorado causes large variations in climate within short distances, and few climatic generalizations apply to the whole area. At the summits of mountains, temperatures are low, averaging less than 32° F over the year. Snow-covered mountain peaks and valleys often have very cold nighttime temperatures in winter, when skies are clear and the air is still – occasionally to 50° F below zero. Summer in the mountains is a cool and refreshing season. At typical mountain stations the average July temperature is in the neighborhood of 60° F. The highest temperatures are usually in the seventies and eighties, but may reach 90° F to 95° F. Above 7,000 feet, the nights are quite cool throughout the summer, while bright sunshine makes the days comfortably warm.

The lower western valleys of the State are protected by surrounding high terrain, and have a greater uniformity of weather than the eastern plains. They experience high summer temperatures, comparable to those of the eastern plains, while average winter temperatures are somewhat lower than at similar elevations in the plains, due largely to the relative infrequency of chinook of other warming winds.

Precipitation west of the Continental Divide is more evenly distributed throughout the year than in the eastern plains. For most of western Colorado, the greatest monthly precipitation occurs in the winter months, while June is the driest month. In contrast, June is one of the wetter months in most of the eastern portions of the State.

SEVERE STORMS – Thunderstorms are quite prevalent in the eastern plains and along the eastern slopes of the mountains during the spring and summer. These often become quite severe, and the frequency of hail damage to crops in northeastern Colorado is quite high. Tornadoes almost never occur in the mountains or in the west. They are also relatively infrequent over the eastern plains, where fatality rates and mean property loss rates are lower than in States farther east. Other severe storms include the winter blizzards of the eastern high plains, but these also are less frequent and not as severe as those in States farther east and north. Heavy snows in the high mountains create the danger of avalanches, a serious problem to residents and road maintenance crews.

A spring flood potential results from the melting of the snow pack at the higher elevations. In a year of near-normal snow accumulations in the mountains and normal spring temperatures, river stages become high, but there is no general flooding. In rears when snow cover is heavy, or when there is a sudden warming in the spring at high elevations, there may be extensive flooding. Heavy thunderstorms in the eastern foothills and plains occasionally cause damaging flash floods. Although these usually affect only small areas, under extreme conditions they have caused widespread heavy damage to property and crops. Similar flash floods occur on the western slopes, but with somewhat lower frequency.

AGRICULTURE – As in other sections of the semiarid West, water is of prime importance to human activities in Colorado. In the eastern plains and in the flat valley areas, where agricultural activities are practicable, local precipitation is deficient. However, the heavy winter snow in the mountains, which accumulates 10 to 20 feet or more, provides a year-around source of water for streams and rivers. Many large reservoirs conserve the heavy spring runoff and often furnish power, in addition to serving irrigation purposes. Highly productive irrigated agricultural areas

have been developed along the South Platte and Arkansas Rivers in the Eastern plains, as well as in many of the western valleys.

As a result of its varied climate, Colorado has a highly diversified agriculture. Northeastern Colorado has a growing season averaging about 140 days, which is suitable for the major crops of wheat, spring grains, corn, alfalfa, sugar beets, and, near the mountains, potatoes and fruit. The protection offered by the mountains has favored the development of orchards, principally cherry, in the Loveland-Longmont area. Large feeding lots for fattening cattle are maintained in the northeastern portion. Southeastern Colorado has a growing season which averages 160 days but increases to nearly 180 days in the extreme southeastern corner. Vegetables, melons, sugar beets, and alfalfa are grown in the highly productive irrigated sections of the Arkansas Valley. Throughout the eastern plains "dry farming" is practiced in unirrigated areas, and the principal crops are wheat, spring grains, corn and broomcorn. In wet years excellent crop yields are realized, but the erratic variation in precipitation from year to year can seriously affect production. Periodic droughts, extending from one or two to several years, create severe agricultural and economic problems.
The portion of Colorado from the mountains west is so varied in terrain and climate that no overall description of the agriculture of the region is practicable. By irrigating with water stored in the mountain snow cover to the west, and by tapping underground supplies of water, the San Luis Valley has become a major agricultural area. Sugar beets, vegetables, alfalfa, wheat, and spring grains are among the principal crops, with potatoes the most important single crop. At the higher western elevations, livestock raising is the most important agricultural activity. Cattle raising predominates, but large herds of sheep are also found, especially in the semiarid northwestern portion of the State. The sheltered valleys of western Colorado are very fertile and the climate is generally mind. These areas produce vegetables, wheat, spring grains, alfalfa, and some sugar beets. The valleys of the Gunnison, Dolores, and Colorado Rivers, in the extreme western portions, have areas favorable for growing apples, peaches, pears, and apricots. These valleys have a long growing season, with an average of 160 to 190 days in the Grand Junction area. Excellent meadows are pastures are found in many of the higher river and creek valleys, and hay is one of the large and profitable crops.

RECREATION – One of the largest "industries" in Colorado is the tourist trade. Visitors are attracted by the climate and the recreational activities afforded by the Rocky Mountains, the two National Parks are Rocky Mountains, lying along the high backbone of the Rockies, and Mesa Verde in the southwestern corner of the State. The several National Monuments include the Black Canyon of the Gunnison, the Great Sand Dunes in the San Luis Valley, Colorado National Monument near Grand Junction, and Dinosaur in the northwest corner. Large portions of the mountainous sections of the State are in the National Forests and provide camping grounds and trails. The numerous streams and lakes offer excellent fishing, and the mountain areas off excellent wild game hunting. The principal attractions of the mountains, however, are sight-seeing and the relief they provide from the high summer temperatures at lower elevations.

Winter sports have been increasing in popularity in recent years. Many chair lifts and other installations have helped to develop skiing into one of the most popular winter sports in Colorado. The abundant snowfall means good skiing in many areas from November to as late as May. Winter sports areas are accessible throughout the winter, since the principal mountain passes are kept clear of snow and remain open except for short periods during and immediately after heavy snows.