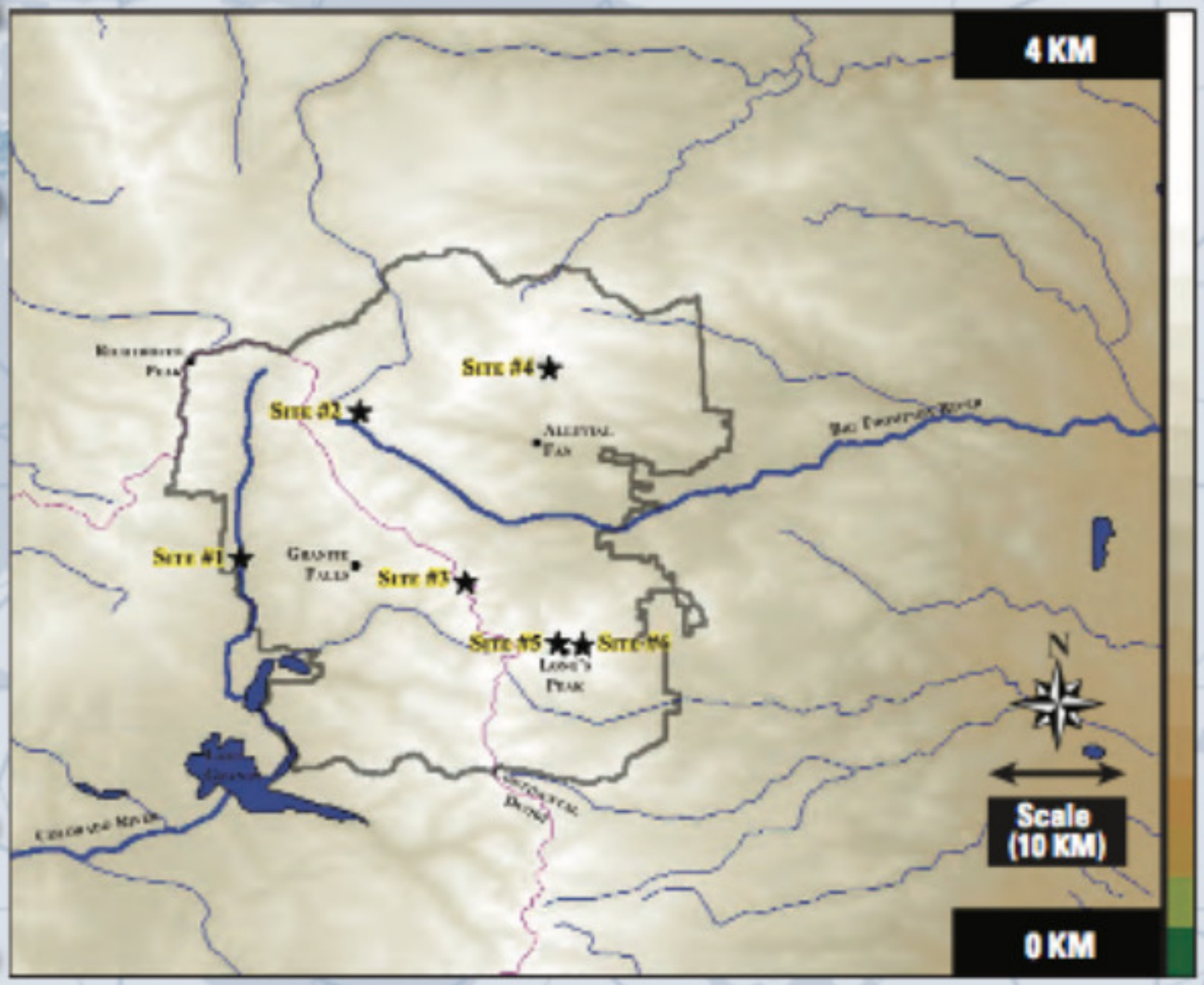
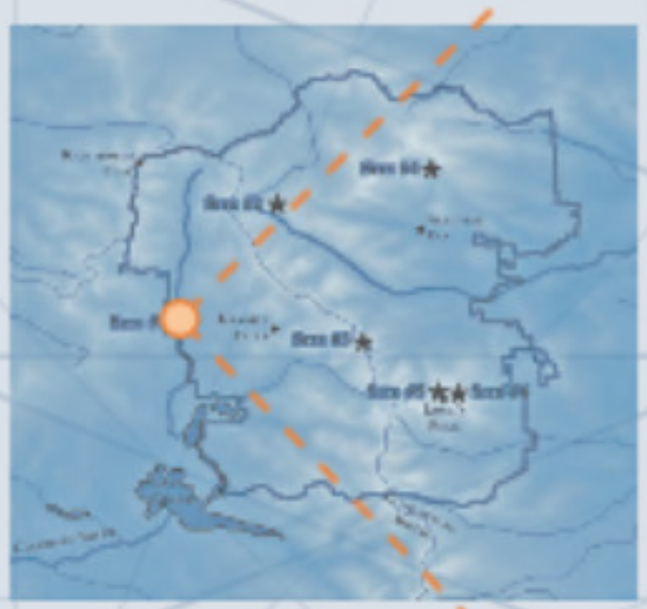
Rocky Mountain NATIONAL PARK

Elevation Map



Site 1

Colorado River



Site 2

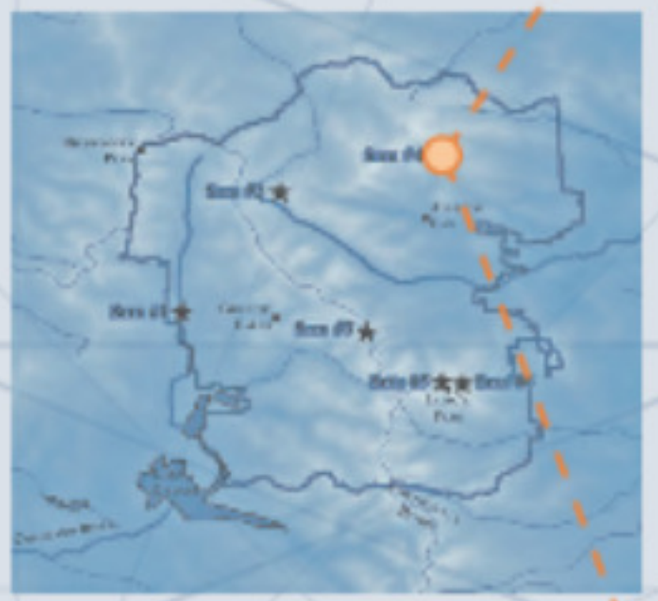
Never Summer Range

Site 3

Tyndall Glacier

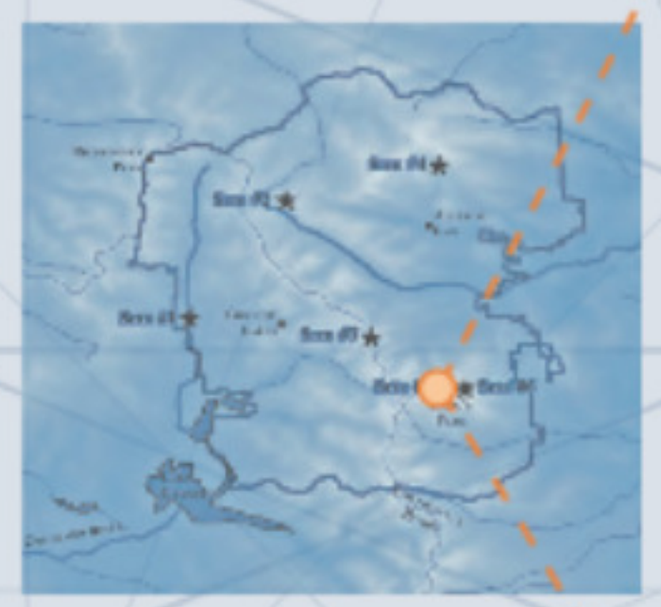
Site 4

Lawn Lake



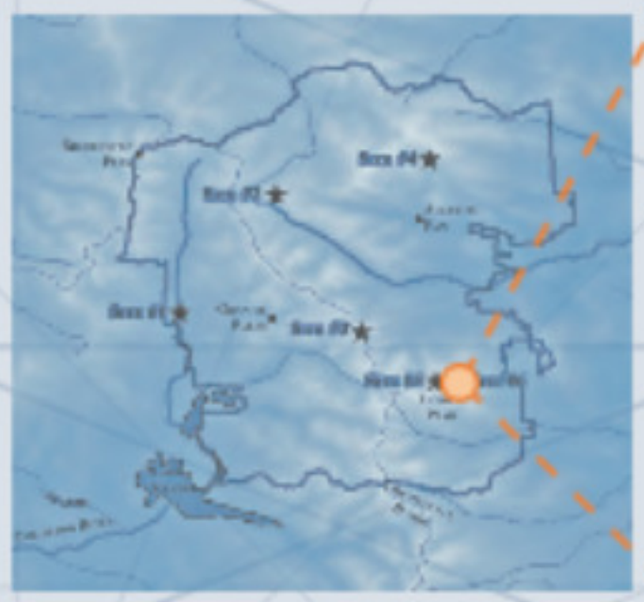
Site 5

The Keyhole



Site 6

Chasm Lake



Water in Rocky Mountain National Park

Rocky Mountain National Park is in Colorado. This park is a small part of a large mountain range called the Rockies. This mountain range extends from Canada in the north to New Mexico in the south. The eastern ridge of mountains is called the Front Range. Rocky Mountain National Park is part of the Front Range. The mountain landscape is not as old as the Appalachian Mountains, but the rock is very old (over 2 billion years).

Climate and Atmosphere

There is a wide range of weather conditions because of how high the mountains are. Precipitation varies in the park. The higher mountains receive more precipitation, mainly snow. Most precipitation falls on the western side of the mountains. In the summer, the high peaks of the mountains remain cool. The temperature in the valleys is warmer, but is not very hot. The ridge at the right is part of Front Range. Notice how much snow covers the mountains.

Wind causes much of the erosion and deposition in the park today. Also, the freezing temperatures followed by thawing ones cause rock to break apart. This kind of weathering is called freeze-thaw weathering.

Glaciers

There are over 30 places in the park where there is ice during the whole year. These areas are usually small in size and not all of them are glaciers. To be considered a glacier, the ice must flow. At least 5 of these bodies of ice qualify as glaciers. Even though they are glaciers, they are not eroding the land very much today.

The landforms in the park are mostly the result of erosion by glaciers that used to be here. There are many signs of this erosion. For instance, there are sedimentary deposits left by glaciers and very large boulders left in open fields. Sometimes, marks or grooves in the rock show the direction of ancient ice flows. Finally, bowl-shaped depressions in the earth and U-shaped valleys are also good evidence of glacial erosion.

Lakes and Oceans

There are almost 150 lakes in the park. Many of them formed as a result of retreating glaciers. The depressions left in the valleys stay full of water. While there is a lot of precipitation, there is not much infiltration or evaporation. Below is a view of Chasm Lake from Long's Peak. Like many of the lakes in the park, glaciers left a bowl shaped depression at the top of the valley. This depression is what now forms the lake.

Lakes and Oceans

Some of the smaller lakes and ponds are formed by the weathering and erosion of rock today. These ponds are unusual because they do not have streams flowing into or out of them. They stay full of water because of precipitation.

There are no oceans near the park. If you look on your map, you can see a line labeled Continental Divide. This line marks the ridge of mountains that separates rivers that flow into the Atlantic Ocean from rivers that flow into the Pacific. On your map, the rivers on the right side of the line eventually flow into the Atlantic. The ones on the left side of the line flow into the Pacific.

Rivers and Streams

The main streams are not very steep because they flow through the valleys. The smaller streams that flow into the main streams can be very steep because they flow from the high mountains. Because the main streams are not very steep, they do not flow in straight lines but wind around. Floods are not unusual in the park. They are usually caused by snowy winters or rainstorms. In the spring when the winter snows melt, it can cause flooding. These floods can lead to a lot of erosion. For instance, in 1976 the Big Thompson River flooded. This flood caused a lot of erosion in the park. It was such a powerful flood that it moved a boulder that was 23 feet across. A flood along Roaring River, above, moved the large boulders. The dents in the rock were made by rocks banging into each other.

Groundwater

Because of the rock types found in the park, water does not infiltrate the surface very well. The rocks do not allow much water to move through. The only way water can get below the surface is when rocks are broken apart.

The surface of the valley is made of sediment that was deposited by the glaciers, like Horseshoe Park. It is easier for water to infiltrate sediment than in rock. Groundwater can be found more easily in these places. Groundwater springs also form in the valleys.

Soil, Plants, and Animals

Because the park has a wide range of elevations, from high mountains to valleys, there are a lot of different ecosystems within the park. For instance, many of the mountain peaks have no trees, while the sides have large numbers of pine and aspen trees. Because the valleys are not very steep, they form wetlands and meadows. The wide range of environments supports large animals like moose, bighorn sheep, and mountain lions.

Rock in Rocky Mountain National Park

The rock in Rocky Mountain National Park is very old even though the mountain landforms are much younger. Some of the rock in the park formed almost 2 billion years ago. Mountain building began in the park about 70 million years ago. Rivers, ice and wind continue to erode this uplifted landscape. However, it was the activity of past glaciers that caused most of the landforms seen in the park today.

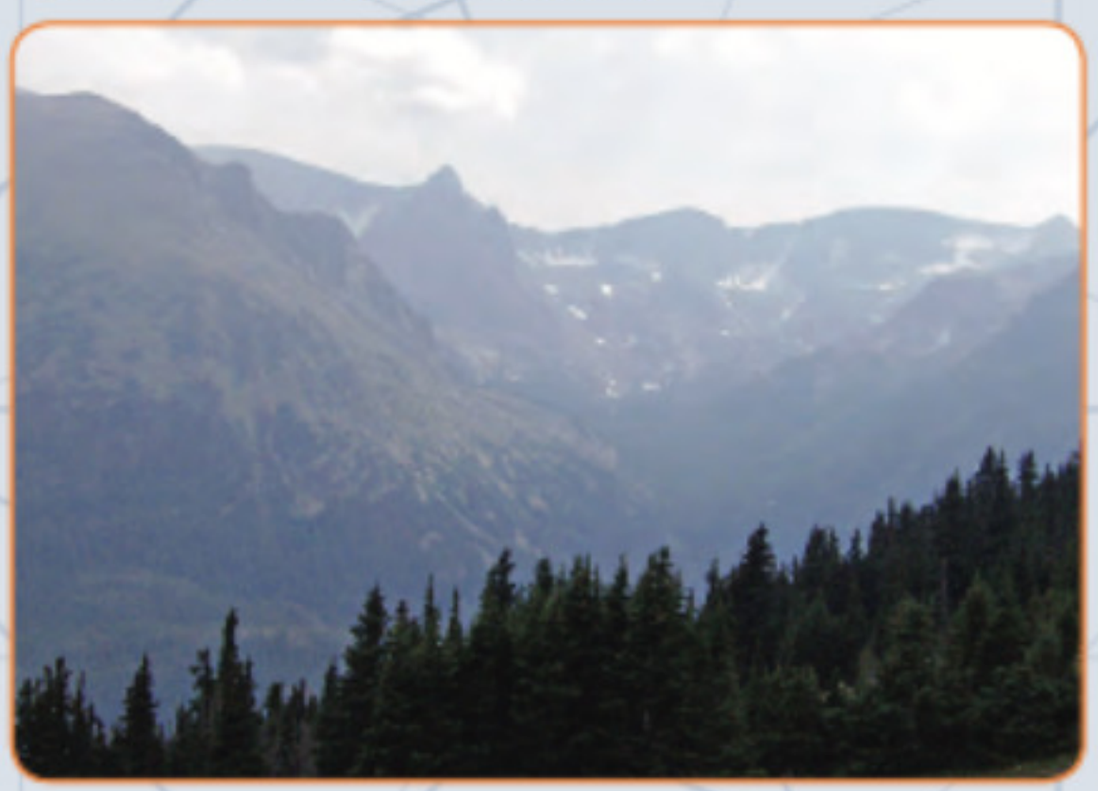
Sedimentary Rock

It is not easy to find sedimentary rock in the park. Nearly 300 million years ago an ocean covered this area. All of the rock that formed during that time has been eroded away. However, just outside the park there is rock that can help scientists figure out what happened. Along the northwestern edge of the park there is a group of mountains called the Never Summer Mountains. On the peaks of these mountains, scientists have found shale. Shale is a type of rock that formed from ancient ocean floor deposits. The tilted layers of rock in the photograph show the region experienced a lot of uplift after the rock formed.

Igneous Rock

Much of the rock in the park is igneous. There were two periods of time when igneous rock formed. Granite rock formed about 1.5 billion years ago. There was also some basalt rock formed at this time, but it is more rare than the granite.

About 30 million years ago, more igneous rock formed. This rock was formed by volcanic eruptions. This rock is similar to the older granite, but because it erupted out of a volcano, it has a different name. It is called rhyolite. The highest mountain in the Never Summer Range, Mount Richthofen, is made of rhyolite. This used to be the main vent of a volcano. The rock on this mountain formed more recently than some of the other igneous rock in the park.



Metamorphic Rock

The oldest rock in the park is metamorphic. The metamorphic rock was originally ancient sedimentary rock that metamorphosed. It changed into schist and gneiss. In some places you can still see some of the features of the original sedimentary rock.

Alluvial Fan – The Lawn Lake flood deposited this large fan of sediment all at once.

Weathering, Erosion, Deposition, and Uplift

The igneous rock in the park is made up of crystals, so very little water infiltrates it. This also means that it is more resistant to erosion by water.

Ancient rivers carved out many V-valleys and removed almost all of the less resistant sedimentary rock. Then the glaciers came and carved out more of the land creating, U-valleys.

Extreme flooding events occur today that are responsible for large amounts of erosion and deposition downstream in the park. In the picture, you can see the triangle shaped fan of sediment that got deposited after the Lawn Lake flood.

There is a large amount of faulting and uplift in the region. Some scientists think that this explains why the mountains are so much higher than the nearby lowlands. Other scientists believe that this difference is caused by different rates of erosion.

Sometimes it is hard to tell the difference between waterfalls that are formed because of differences in erosion and those that are formed as a result of uplift. In the following picture, there is a waterfall that is near a large fault that produced a lot of uplift. Granite Falls was created by uplift. The water has eroded the rock, making it smooth.