

## **Wyoming's Bentonite and Trona Resources**

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Many of the Earth's minerals are used for industrial purposes, but consumers may not realize they also benefit from these minerals in a number of their everyday products. Bentonite and trona are two such resources, with Wyoming being home to some of the largest deposits in the world and leading the nation in their production.

Bentonite is an important mineral to the energy industry because of its use in drilling mud for oil and natural gas wells. Consumers use bentonite when they buy kitty litter and cosmetics.

Many industrial minerals have unique characteristics that make them particularly useful. Bentonite, for example, can swell up to 16 times its original size and hold up to 10 times its weight in water. Known as the "clay of 1,000 uses," the mineral is also used in pharmaceuticals and as a bonding agent in molds for castings in iron and steel foundries, among many other uses.

Wyoming has 70 percent of the known bentonite deposits in the world. In 2013, the state mined more than 4 million tons of bentonite. While much of this resource is used in cat litter, recent increases in overall mining and production of bentonite in the state can be directly linked to oil and gas drilling.

The same is true for trona. It has a wide variety of manufacturing uses as well as consumer uses. Trona is mined to make soda ash, which is used to make flat glass for the automotive and construction industries. On the consumer side, trona is also used to make a variety of glass bottles. Many people may not know that baking soda, the orange box in countless refrigerators, is soda ash.

Wyoming is a major world contributor of natural soda ash, processed from trona. The state has the largest known trona deposits in the world in the Green River Basin, in southwestern Wyoming. China is also a major producer of soda ash. However, the majority of their supply is produced synthetically because the country does not have a trona resource and yet they need soda ash to make a variety of products. In 2013, Wyoming mines produced more than 19 million tons of trona, supplying 90 percent of the nation's soda ash. Trona is mined from the Green River Formation, west of Rock Springs, in layers 800 to 2,200 feet below the surface.

Bentonite mining in Wyoming dates back 125 years. But even before then, early records indicate it had many historical uses. American Indians used the material for natural healing remedies, called "ee-wah-kee." Pioneers used it to lubricate wagon wheels and as a soap to wash clothes.

Trona was also used historically to make glass and ornaments. Glass decorations made from trona date back as far as 3,500 B.C. in ancient Egypt. Today, trona processed into

soda ash is also used for making soaps, detergents, paper, textiles, and for water treatment products.

Geologically, both have similar stories when it comes to their origin. Only one formed in a marine environment and the other in a freshwater lake. Bentonite originated from the alteration of volcanic ash in seawater where it was deposited millions of years ago. It is primarily montmorillonite, a member of the smectite group of clay minerals. Bentonite originated as “ash falls” from volcanic activity that occurred 94 to 98 million years ago, which comprises much of the Mowry Shale deposited during the Late Cretaceous Epoch, a time when the ancient Western Interior Seaway covered a large portion of Wyoming.

Trona, on the other hand, is a non-marine mineral that formed and precipitated from supersaturated water in a large freshwater lake called Lake Gosiute during the Eocene Epoch, approximately 45 to 50 million years ago. Water flowing into Lake Gosiute was high in sodium and other alkaline constituents, which were eroded from volcanic ash deposits and other source rocks and transported and deposited into the lake.

As a result of these past geologic events and conditions, Wyoming has been able to produce its bentonite and trona resources, which have long been valued for their mineral uses.