

CHAPTER 2.0. LOCATION AND GEOLOGICAL BACKGROUND

LBNM was established in 1925 with assistance from cave enthusiast J.D. Howard. Much of the park was developed through the hard work of the Civilian Conservation Corps ⁽¹⁾. “As part of the National Park System, Lava Bed’s mandate includes the protection and preservation of natural and cultural resources. This mandate is derived from the National Park Services Organic Act of 1916 which outlines the fundamental purposes of the National Park System ⁽²⁾.”

Previously, adventurers used the area unimpeded, leading to unnatural damage of many exhibit areas. The goal of this study is to apply non-destructive and non-invasive geophysical methods for locating lava tubes and to continue the preservation of these protected unique geological features.

The LBNM area contains several hundred known lava tubes from over 30 separate flows making it the largest concentration of lava tubes in the continental United States ⁽³⁾. LBNM resides within the extensive flood basalts of the Modoc Plateau in northern California. The area is bounded by the Cascade Mountain Range, which contains extensive dormant volcanoes, to the west and the northern extremes of the Sierra Nevada to the south. This broad volcanic plateau extends northward across Oregon, and fades eastward into the Basin and Range of northern Nevada (figure 1).

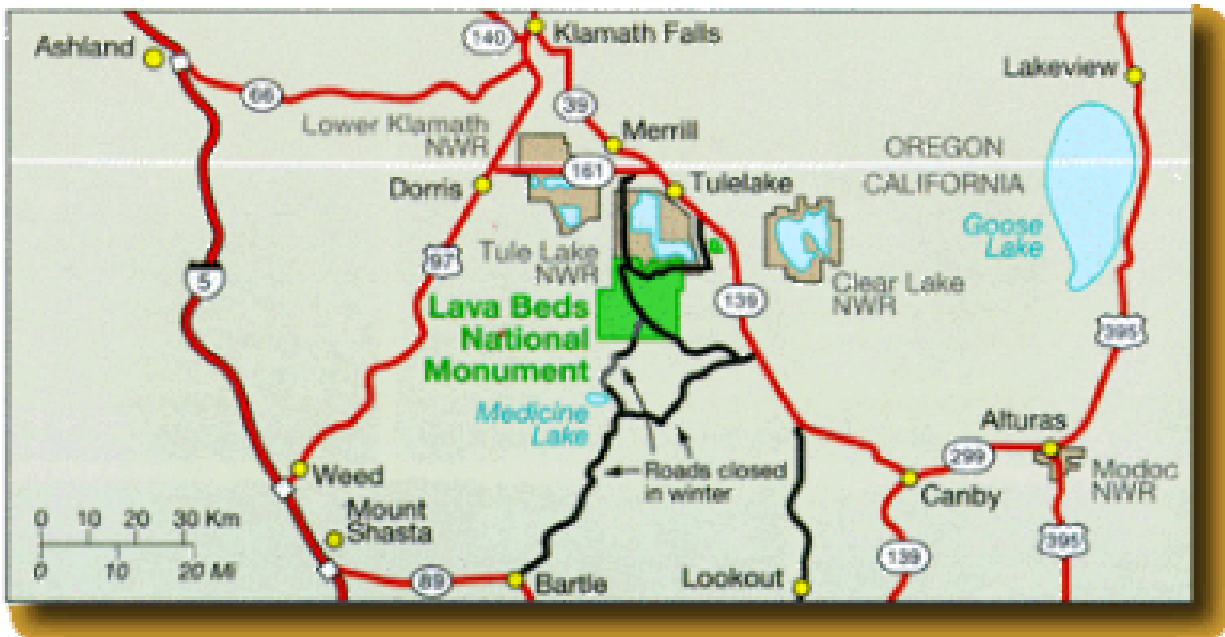


Figure 1. Map. Site Map of Lava Beds National Monument. ⁽⁴⁾

The flood basalts of the Modoc Plateau, covering hundreds of square miles, are among the youngest of the immense flows occurring globally in the past 250 million years. Locally, LBNM is located on the northeast side of Medicine Lake Volcano, an enormous shield volcano that

initially erupted nearly two million years ago, with at least six different eruptions from four distinct events occurring in the last 2,000 years ⁽⁵⁾.

Basically, there are two different types of lava tubes in LBNM. First, “surface tubes” are created when the top and sides of the lava flow cool due to their exposure to the air. This cooled lava solidifies creating a hard cast surrounding the flowing lava, which may then be covered by subsequent flows. Generally, surface tubes that are only a few meters in diameter are abundant at the LBNM. The second type of lava tube is formed when lava flows down a pre-existing channel, such as riverbed or a depression. The roof of the lava, being exposed to air, cools and hardens forming the eventual tube roof. Such tubes can be quite large, with some at LBNM exceeding 15 m (50 ft) in diameter. In both cases, the lava tube eventually drains to become a subsurface void, filled with air, water, or collapsed overburden. It is also common for tubes to be stacked on top of each other, often connected by intervening “skylights” ⁽⁶⁾.

Geophysical surveys were conducted in the vicinity of Cave Loop Road in the southern end of LBNM at three locations: Indian Well Cave, Golden Dome Cave, and Hercules Leg. Two other locations, Merrill Cave, approximately 3 km (1.86 mi) northwest of the Visitor’s Center, and Monument Road Cave along Hill Road near Devil’s Homestead Flow were also investigated.