Simulating the moon at the Cinder Lakes Crater Fields

November 3 2014, by Jason Major

Apollo 15 astronauts David Scott and James Irwin practice LRV operations in Arizona, Nov. 2 1970. Credit: NASA. Research by J.L. Pickering

Between the years of 1969 and 1972 the astronauts of the Apollo missions personally explored the alien landscape of the lunar surface, shuffling, bounding, digging, and roving across six sites on the Moon. In order to prepare for their off-world adventures though, they needed to practice extensively here on Earth so they would be ready to execute the long laundry lists of activities they were required to accomplish during their lunar EVAs. But where on Earth could they find the type of landscape that resembles the Moon's rugged, dusty, and—most importantly—cratered terrain?

Enter the Cinder Lakes Crater Fields of Flagstaff, Arizona.

The Cinder Lakes Crater Fields northeast of Flagstaff, near the famous San Francisco peaks and just south of the Sunset Crater volcano, were used for Apollo-era training because of the inherently lunar-like volcanic landscape. LRV practice as well as hand tool geology and lunar morphology training were performed there, as well as ALSEP – Apollo Lunar Surface Experiment Package – placement and setup practice.

The photo above shows Apollo 15 astronauts Dave Scott and Jim Irwin driving a test LRV nicknamed Grover along the rim of a small "lunar crater." (This particular exercise was performed on Nov. 2, 1970… 44 years ago today!)

Although the craters might look similar to the ones found on the Moon, they were actually created by the USGS in 1967 by digging holes and filling them with various amounts of explosives, which were detonated to simulate different-sized lunar impact craters. The human-made craters ranged in size from 5-40 feet (1.5-12 meters) in diameter.

The two crater field sites at Cinder Lakes were chosen because of the specific surface geology: a layer of basaltic cinders covering clay beds, left over from an eruption of the Sunset Crater volcano 950 years ago.

After the explosions the excavated lighter clay material spread out from the blast craters and across the fields, like ejecta from actual meteorite impacts. A total of 497 craters were made within two sites comprising 2,000 square feet.

Detonation of a “lunar crater” in 1967. Credit: USGS

Detonations were done in series to simulate ejected debris from

cratering events of different ages. And one of the areas of Cinder Lakes was designed to specifically replicate craters found within a particular region of the Apollo 11 Mare Tranquillitatis landing site.

Today only the largest craters can be distinguished at all in the publicly-accessible Cinder Lakes field, which has become popular with ATV enthusiasts. But a smaller field, fenced off to vehicles, still contains many of the original craters used by Apollo astronauts, softened by time but still visible.

The completed Cinder Lakes Crater Field #1 in October 1967. Credit: USGS

A couple of other areas were used as lunar analogue training fields as well, such as the nearby Merriam Crater and Black Canyon fields—the latter of which is now covered by a housing development. Geology field training exercises by Apollo astronauts were also performed at locations in Texas, New Mexico, Nevada, Oregon, Alaska, Iceland, Mexico, the Grand Canyon, and the lava fields of Hawaii. But only in Arizona were actual craters made to specifically simulate the Moon!

Read more about the Cinder Lakes Crater Field in a presentation document (my main article source) by LPI's Dr. David Kring, and you can find more recent photos of the Crater Lakes sites on this page by LPI's Jim Scotti.

Apollo 12 astronauts Pete Conrad and Alan Bean during geology training at Cinder Lakes on October 10, 1969. Credit: NASA

Source: Universe Today