

Oregon Caves Restoration Underway

By Jonathan B. Jarvis

Oregon Caves, the principal resource of Oregon Caves National Monument (ORCA), are a series of limestone caverns located at 4800 feet in the Siskiyou Mountain of Southern Oregon. A perennial stream flows through the cavern floor and the features are primarily composed of marble, unusual for the Northwest. Receiving approximately 200,000 visitors a year, the cavern is a significant unit of the National Park System.

Management actions born of ignorance, coupled with benign neglect, can have significant impacts on a park resource. It may not always be so clearly illustrated as it has been at Oregon Caves. To create a "showcase," easily accessible to the public, with illuminated features, early administrators took actions that have had far reaching impacts on the cave. Those actions were:

- Altering the natural cave openings, enlarging some, closing others.
- Constructing connecting tunnels between natural passageways.
- Constructing a 400-foot exit tunnel blasted into the rock.
- Installing an asphalt trail the length of the tour route.
- Hiding all material generated by trail and tunnel construction in alcoves, side tunnels, and on natural shelves within the cave.
- Installing a lighting system of numerous three-foot fluorescent lights.
- Diverting the cave stream into culverts.
- Allowing and even encouraging the handling and removal of cave features, such as speleothems, by visitors.

The results, subtle at times, are now better understood. Alteration of the cave entrances had affected the natural airflow, an important factor in continued speleothem growth. Addition of the connecting and exit tunnels created a chimney effect that dries the cave in summer and cools it in winter. Cool moist air pools in the cave, freezing the wet features, leaving extensive frost cracking and "delamination" of flowstone. The material left behind during cave trail construction obscures features and creates a claustrophobic atmosphere. Material left in contact with wet features for many years had become "glued" in the cave formation process, thereby destroying the features' integrity. The intensive fluorescent lighting, along with the moisture, has created greenhouse conditions for luxuriant growth of mosses, algae and ferns. Exotic plant growth in turn damages the features and presents an unnatural appearance.

Diversions and culverts have buried the stream deep below the trail, removing an important visitor experience. The asphalt of the trail has been breaking up for years and pieces of black asphalt now line the visible section of the cave stream. Handling of cave features has discolored them with body oils. Vandalism of speleothems needs no further explanation.

In 1985, with plans to revamp the cave lighting

system, a full scale cave restoration was undertaken. A cave management consultant from Ozark Underground Laboratories was brought to ORCA to recommend restoration and management procedures. Other cave specialists were consulted and the restoration process began. (See *Park Science* Winter 1986, p. 9, "Green Sickness Prevention" by Tom Aley)

Exotic Plants: The first step was to treat the exotic plant growth with a 5.25% sodium hypochlorite (undiluted standard household bleach). The solution was applied by hand sprayers directly to the vegetation. The dead vegetation was then removed by hand. Retreatment was used where necessary.

Cave Rubble Removal: A 10-person crew began removing past construction rubble. Because the cave trail is narrow and broken by several sets of stairs, the material had to be hauled by a relay system using five-gallon buckets and then by toy wagons. Material was stockpiled outside the cave entrance and later hauled out of the Monument. During the winter of 1985-86, 270 cubic yards of rubble were removed from the main entrance to the 110-foot entrance. Extreme care was used to separate rubble from undamaged features.

Cave Washing: Once the bulk of the rubble was removed from an area, a thin film of soil usually remained on the previously buried features, creating a dull brown color rather than the white of limestone. Features were washed with a light mist of water, with pressures kept to a minimum to prevent speleothem damage. Mud was collected in small check dams along the cave trail. Volume also was kept to a minimum to prevent impact to the River Styx which flows through the cave. Downstream impacts in Cave Creek were monitored by observing the large stocked rainbow trout located in visitor viewing pools just outside of the cave entrance.

Airflow: A study was conducted of the unnatural airflow through the cave. Temporary air locks were installed and measurements taken at various locations. Radon gas measurements also were taken relative to the air movements.

All of the above operations took place during normal visitor use. Rather than a hindrance to visitors, the restoration was used as an opportunity for interpretation. Visitors seemed wholeheartedly supportive of the operation and its very visible results.

In May 1986, a task force at ORCA reviewed actions taken so far and recommendations for future renovation. Members recommended that the restoration program continue in phases, with the eventual goal of removing all cave rubble and restoring the natural stream course. Cyclic treatment of exotic plant growth will continue and air locks will be installed to restore the natural airflow. All projects planned will incorporate the visitor use operation as well as seasonal use of the cave by local bat populations. Much of the program's success is due to the expert guidance provided by Tom Aley, director of the Ozark Underground Laboratory at Protem, MO, and Cave Geologist Ron Kirbo from Carlsbad Caverns NP.

Results have been impressive. Features previously obscured now are visible, alcoves are reopened, and discolored features have been returned to a more natural appearance. From the main entrance to the 110-foot exit, the removal of 270 cubic yards of material has created a less confined tour route. Control of unnatural air flows has prevented ice damage to the features and restored the cave's climatic equilibrium.

Much work remains; an estimated 500 cubic yards of rubble are still in the cave. Once the rubble is

removed, a new trail and new lighting system will be sensitively installed to protect and highlight the cave features. This continuing project stands as an example of how a scientifically applied resource management program can restore a significantly altered cave environment to a "near natural" condition.

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