

# SANTA BARBARA NEWS-PRESS



## Mission and Rattlesnake creeks, enchanted forests

**Ed Keller**

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Entering Mission Canyon above Rocky Nook Park you encounter an enchanted forest. Giant oaks hundreds of years old greet visitors, hanging over the road, providing shade on hot days. Sounds of wild birds ranging from quail to turkey and songbirds, mixed with the sounds of wind and running water, create a canyon environment that is a quiet retreat from city life below.

Mission Creek and its major tributary, Rattlesnake Creek, both flow over bedrock that varies from soft shale to hard sandstone. Pools are eroded by water flowing around and between large boulders, delivered to the channel in the past from debris flows and floods. Other pools are at the base of rock ledges that create waterfalls.

One pool in Rattlesnake Creek above Skofield Park in the Rattlesnake Canyon Wilderness Area is what I call Ojo Frio or Cold Eye. The round, deep pool at the base of a small waterfall is excavated in the bed of the channel and surrounded by boulders of Matilija and Coldwater sandstone. The Coldwater lives up to its name, delivering cool water from springs and seeps that maintain habitat for the endangered southern steelhead trout in Rattlesnake Creek. Where the stream flows through the Coldwater sandstone, the valley is relatively narrow with steep sandstone cliffs or slopes.

Sandstone forms narrows that I call steelhead narrows, where water persists even in dry years when most of the stream channel has little or no summer water. You won't easily find the pools in steelhead narrows because they are not visible from the trail that winds its way up the canyon. Do a bit of rock hopping above the second trail crossing and you will find the pools. Be very careful walking on rocks near the stream as they can be slippery. I wear sneakers or river sandals and wade up the channel (in the water) using my hands and sometimes crawling over rocks to increase safety. Take a swim on a summer day or meditate on the silence of the canyon, but don't go fishing! The trout are endangered and protected.

The name Rattlesnake Canyon, according to Karen Telleen-Lawton, (who wrote the wonderful book Canyon Voices) is derived from the sinuous pattern of the canyon as it winds its way south, looking like a rattlesnake lying along a trail. In all my hikes in the canyon I have not seen a rattlesnake, although others have.

The canyon looks ancient and eternal, but geologically it is very young. Deposits of past debris flows are common and if you look closely you can find debris flow levees a few feet above and parallel to the channel. The levees consist of open framework boulders (linear piles of boulders with large open spaces (a few inches to a foot or more) between them). The levees form as a debris flow pushes the boulders to the side and top of the flow. The fine (gravel, sand, silt and clay) sediment in the flow drained away from the levees during the depositional process.

Along the eastern crest of the canyon, above Skofield Park, there is a remnant of a 125,000-year-old alluvial fan that is similar to the fan that the City of Santa Barbara is located upon today. We know the age of the fan because we have several numerical dates on boulders at the top of the fan above Skofield Park. These boulders were delivered from debris flows from the Santa Ynez Mountains to the north during the last major

warm interval about 125,000 years ago (known as the Emian). At that time sparse vegetation and intense winter precipitation produced voluminous amounts of sediment to construct alluvial fans in many locations in California.

Boulder deposits and fans extended south from an ancient mountain front and over what is now Mission Ridge. This explains the many boulders found on Mission Ridge today, and provides a minimum age for the ridge. During the past 125,000 years, the fan has been uplifted and folded, forming Mission Ridge. Farther north, the alluvial fan was incised (stream channels eroded), forming, with slope processes that widened canyons, south flowing steep canyons including Mission and Rattlesnake Canyons. If you hike to the top of the fan above the east side of the canyon above and a bit north of Skofield Park, you can see the Santa Ynez Mountains and the Santa Barbara landscape all the way to the Channel Islands. This is where the Tea Fire recently claimed the beloved Mt. Calvary Monastery.

What a different place it must have been 125,000 years ago when the alluvial fans merged to the south with the Pacific Ocean. Another period of fan building occurred about 60 thousand years ago, transporting the gravel and boulders to parts of the alluvial fan that the City of Santa Barbara is built on. Remnants of the upper parts of the fan form the flat surface above Mission Canyon at the Santa Barbara Botanical Garden. The 60,000-year-old fans haven't been dated. The ages are inferred from their connection with marine terraces at Shoreline Park, which have been dated. Also, it is thought that a time of major deposition of sediment occurred in southern California about 60,000 years ago, during a minor warm period.

When you visit the Botanic Garden, you can partake of the mountain views of the crest of the Santa Ynez Mountains to the north that includes Cathedral Peak (elevation 3,323 feet) to the left and La Cumbre Peak (elevation 3,985 feet) to the right. The white sandstone cliffs that hold up the two peaks are the Coldwater and Matilija sandstones respectively. These hard sandstones are the main sources of large boulders (3 feet to more than 20 feet in diameter) found in the canyons below. As you descend into Mission Creek from the entrance of the Botanical Garden, you will drop through the alluvial fan with its debris flow deposits to the site of the Mission Dam constructed 200 years ago. That it has survived to this day is a testimony to the skills of the people who constructed it.

Mission Canyon is different from Rattlesnake Canyon in a major way. Rattlesnake Creek has summer low flow that supports fish, while Mission Creek above the confluence with Rattlesnake Creek generally does not. Mission Canyon is eroded through the same Coldwater Sandstone as Rattlesnake Canyon, so why doesn't it have springs and seeps that provide summer low flow and fish habitat? The reason may be that Mission Tunnel, which was constructed from 1904 to 1912 to provide water to the city of Santa Barbara from Gibraltar Dam on the Santa Ynez River, takes water that otherwise would seep into Mission Creek. In other words, the four-mile-long tunnel through the mountains, which is directly over Mission Creek, is a drain that collects water that would otherwise seep into Mission Creek.

A study by UCSB Geologist Dr. Laura Radmacher and Professors Jordan Clark and James Boles (UCSB) on the hydrology of the tunnel found that water that seeps into the tunnel is a mixture of water that is older than 50 years, along with modern water. Water younger than 50 years is recognized due to the presence of tritium from radioactive fallout from testing nuclear weapons. When it rains, water seeps into the rocks, moves downward along fractures, and enters the tunnel. A lot of groundwater enters the tunnel. Water that flows into the tunnel from the rocks averages about 1,300 acre-feet per year. This is about 20 percent of the total water delivered from the reservoir.

If the tunnel were not present, more groundwater would seep into Mission Creek to help provide summer low flow that might support trout as in Rattlesnake Creek. Water is occasionally released by the city into lower Mission Creek to maintain steelhead trout in the creek. Near the Santa Barbara Museum of Natural History, the stream flows parallel to the Mission Ridge fault through Rocky Nook and behind the museum. Take a

walk behind the museum and ponder the steep hill that is the fold (fault) scarp. There is almost always perennial flow here, and the area is one of the refuges for the endangered southern steelhead trout.

The future of Mission Canyon and Mission Creek, from the trees along the banks, the fish in the pools and other wildlife, and the land is in our hands. Happy New Year.

Dr. Ed Keller is a professor in the Department of Earth Science, Environmental Studies Program and Geography Department at UCSB. The opinions in the column are Dr. Keller's. Contact him at [keller@geol.ucsb.edu](mailto:keller@geol.ucsb.edu).

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