



South Yuba River State Park



Local Gold Mining History

The Yuba River area became famous during the Gold Rush as being exceptionally rich in gold. The nearby Grass Valley gold district was the richest and most famous gold district in California. Gold was found within quartz veins that cut across various metamorphic and granitic rocks such as are revealed in the park. The gold deposits that were eroded by the river became a second type of deposit, placer deposits in the river channel—like those found near Coloma in Marshall Gold Discovery State Historic Park. The ancestral course of the Yuba River was quite different than today. It also contained placer deposits. Starting about 34 million years ago, huge volcanic flows of ash, mud, and rock from the east filled the canyons, buried those placers, and caused the river to change course. Gradually, a new canyon formed through the volcanic cap rock, into the ancient gravels, and deeper into the bedrock. The gold-bearing gravels of the ancestral river were discovered up the canyon walls and along ridges, making them a third type of deposit. Those deposits were mined in two basic ways. First, miners excavated the gold bearing gravels directly out of the

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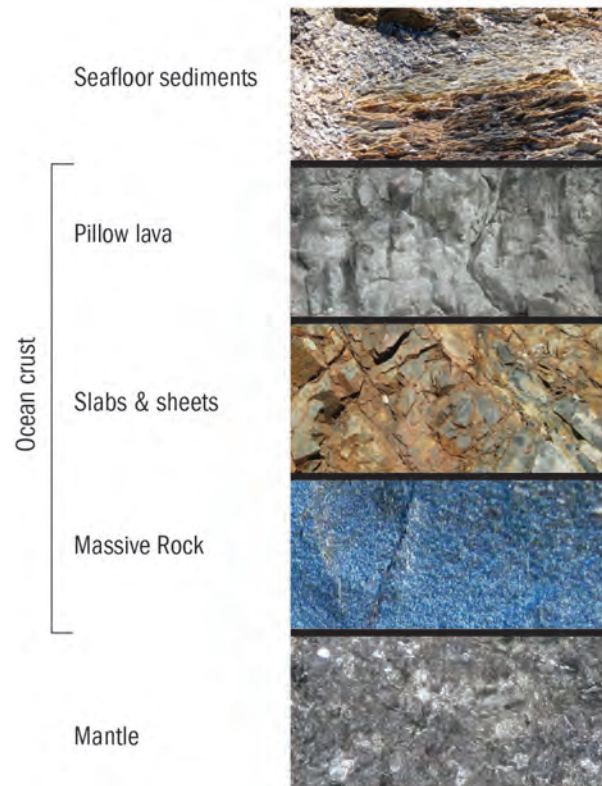
Exotic terranes along an ancient plate boundary in the Sierra

slopes, and when necessary, they cut tunnels (drifts) into the hillside following the ancient river course. Next, they dug pits, big pits. With the development of hydraulic mining, enormous pits were excavated. Nearby Malakoff Diggins State Historic Park is an excellent example. Of course, such large-scale mining (in the days before environmental damage was considered) had enormous consequences that spawned some of California’s first environmental rules. With three types of gold deposits, it is no wonder the Yuba River area and the Grass Valley district were such a treasure trove.

Sea Floor, then Sierra Nevada Foothills

The South Yuba River cuts through three different major rock types: ophiolite, granitic plutons, and metamorphosed volcanic sedimentary rocks. Within the park, the scenic river canyon provides a deep, 20-mile-long cross-section of the ancient oceanic-continental tectonic plate boundary, which reveals the “roots” of the modern Sierra Nevada. Each major rock type is completely bounded by ancient faults. The majority of the faults run generally north-south dividing the rocks into parallel strips or “belts.” The rocks are part of the Foothill metamorphic belt, which extends over a hundred miles along the foothills of the Sierra Nevada and includes the famous Mother Lode Gold Belt and the West Gold Belt. This amalgamation of different rocks is collectively called the Foothill Terrane, a term that refers to the oceanic origin and subsequent accretion of these rocks to the edge of the North American tectonic plate.

Rocks of the Smartville ophiolite (~152 to 164 million years old) crop out near Bridgeport in the western portion of the park and represent oceanic crust. They are bounded by the Grass Valley Fault on the east where they abut the granitic rocks. The ophiolite within the park consists mostly of gabbro (a dark igneous rock similar to granite in texture), and metavolcanics. The landscape underlain by gabbro consists of rolling hills with dark red soils covered by oak woodland and grasslands. Rice’s Crossing downstream of Bridgeport is a good location to view the rocks of the ophiolite.



Ophiolite: A layered assemblage of rocks that formed as a section of oceanic crust. The crust forms at rifts in the oceanic crust producing a characteristic sequence of layers. The rate of cooling of molten rock is controlled by the depth below the ocean floor where water quenches the rock. The deeper layers are cooled more slowly while the uppermost layers cool rapidly. Pillow basalts typify the upper layers, while intermediate layers develop as vertical slabs and lowermost layers develop as massive rock.



Why it's important: Once the South Yuba River watershed was the focal point of the California Gold Rush. Today, it is recognized by the California State legislature as a Wild and Scenic River with scenery of “Outstandingly Remarkable Value.” This park which follows the river for twenty miles provides a very scenic geologic cross-section of a part of the state that played prominent roles both geologically and economically in California’s history.

Green serpentinite, the State rock marks the boundary (Grass Valley Fault) between the ophiolite and the granitic rocks. Serpentinite produces a soil toxic to most plants, including oaks; as a result, vegetation overlying the serpentinite is sparse and soils are thin. The Highway 49 bridge provides a good access point to view this boundary area.

The granitic rocks comprise the Yuba Rivers pluton—a mass of rock that crystallized deep in the earth about 154 to 160 million years ago. These rocks produce distinctive landforms and soils. The soils are generally tan to whitish color, but can be reddish in some places. The canyon cut through the pluton and is characterized by steep slopes and an incised bedrock channel. Many giant boulders line the channel. Purdon Crossing is a good vantage point to see the rocks of the Yuba Rivers pluton, one of many plutons that intruded the accreted metamorphic rocks to build the bulk of what is the Sierra Nevada.

What you can see: A steep canyon traversing the ancient oceanic-continental tectonic plate boundary, which reveals the “roots” of the modern Sierra Nevada.



On the east side of the park, these rocks abut metamorphic rocks of seafloor origins. The metamorphic rocks extend another six miles east of the park boundary to the Melones Fault and the serpentinite rock that marks the fault zone. This fault crosses through the area at the town of Washington, and marks the northern projection of what was referred to as the Mother Lode during the Gold Rush.

Between the Yuba Rivers pluton and the Melones Fault, the metamorphic rocks (called greenstone) are dark colored, sometimes almost black. The bridge at Edwards Crossing is a good access point to see these metamorphic rocks. Depending on the degree of metamorphism, some rocks retain relict textures that allow recognition of the original rock type. Metamorphism included the re-crystallization of elongate minerals along parallel planes, giving the rock a “foliation” and a tabular appearance in outcrop. The foliation is generally aligned north-south and gives the landscape a distinctive “grain.” The river course through these rocks zigzags as it follows the foliation for a distance, then is forced to cut across it. The canyon walls are steeper in this section than in the granitic section. The river bed is primarily bedrock with occasional deposits of cobbles and boulders. At the Ramshorn Fault at the east end of the park near Missouri Bar, the rocks change to thin or platy yellowish slates of the much older Calaveras Complex.

Final Thoughts

Like a surgeon, the South Yuba River cut an incision across the earth’s surface to expose the inner anatomy of the Sierra Nevada.

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