

**Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.**

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**Bowling Balls on the Beach**



*Bowling Ball Beach*  
*Photos by Deepika Shrestha Ross*

We just returned from a road trip up the coast of northern California, Oregon, Washington and then took the ferry across the Straits of Juan de Fuca from Port Angeles to Victoria on Vancouver Island. The weather was great and there was a lot of unique coastline and beaches, all of them considerably less populated than Main Beach in Santa Cruz on most summer days.

One of California's strangest beaches lies thirty miles south of the picturesque town of Mendocino and just three miles south of Point Arena along Highway One. At low tide, Bowling Ball Beach is covered with hundreds of three to four foot diameter, round sandstone concretions that look like massive bowling balls that have collected on the beach.

Concretions are hard, often spherical or rounded masses of sedimentary rock formed when a mineral cement, often silica or calcium carbonate, fills the spaces between individual grains. The structures typically form around some hard object, a shell, pebble, or even a bone or tooth, after the sediment has been deposited but before it has completely hardened to rock. Because of the cement, concretions are nearly always harder than the surrounding sedimentary rock.

The cliffs backing Bowling Ball Beach consists of sandstones and shales that have been uplifted and now tilt at very steep angles down towards the shoreline. The sandstones tend to be more resistant to erosion than the shales, such that the harder sandstones extend across the intertidal zone as ridges, giving the very wide wave-cut platform a corduroy appearance at low tide.

As waves, rain and runoff weaken and erode the bedrock and cliff materials, the large concretions are dislodged or fall or roll to the beach below where they collect in the corrugated intertidal zone between the more resistant intertidal ridges, which acting like bowling lanes.

The beach is accessible from State Highway 1 and is part of the Schooner Gulch State Beach. A trail leads north from a parking area down to the beach. But you need to make sure you plan your visit at low tide to best observe the bowling balls. It's a little hike, but well worth the effort.

The steeply dipping cliffs are nearly as interesting as the bowling balls themselves and create what have been called flatirons. Similar rocks are exposed at the base of the Santa Ynez Mountains along the northern Santa Barbara County coast near Gaviota Pass, and also in the mountains above Boulder, Colorado, which are actually referred to as the Flatirons.

Identical large spherical concretions, called the Moeraki Boulders, occur in the cliffs and along the beach on the South Island of New Zealand, as well as several other locations along the coast of the North and South Islands, where they have weathered out of mudstone bedrock.

But you don't have to go all the way to New Zealand, England or Mendocino; we have some large concretions of our own exposed along West Cliff Drive. Near the western end of Lighthouse Field, a narrow finger of bedrock undercut by an arch extends out from the cliff and has several large rounded concretions exposed on its surface, also looking like very large bowling balls.