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

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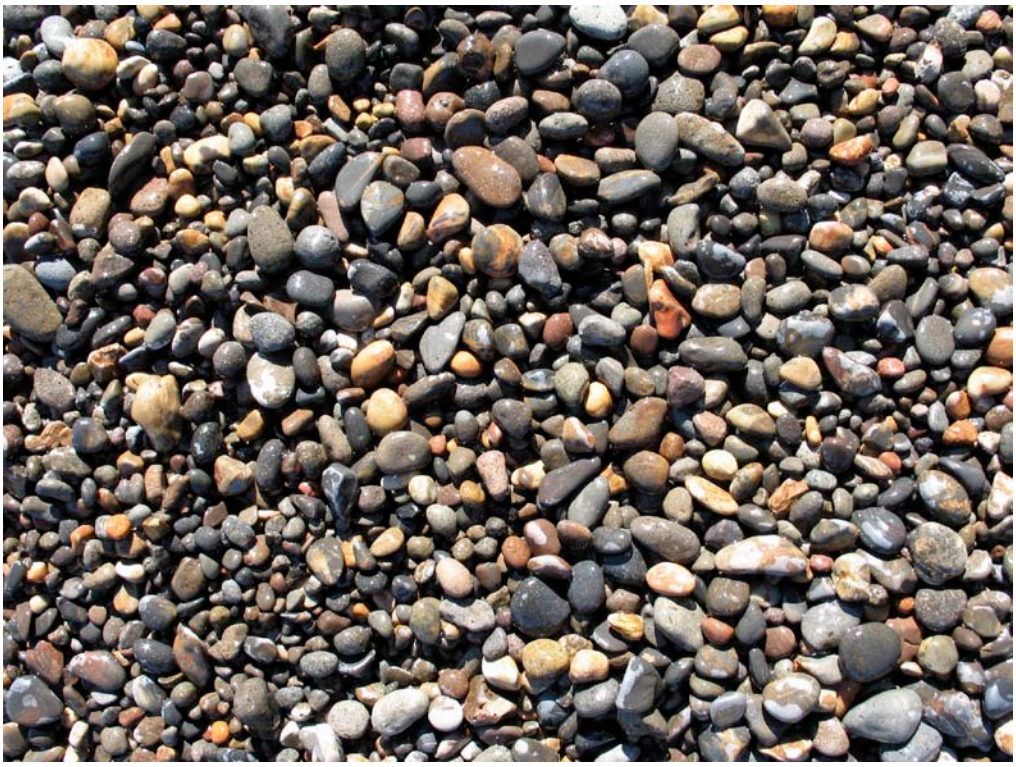
**Why are our beaches so fine?**



*The material on beaches can vary widely depending upon the source of the material and the wave energy.*

To many of us who live along the coast, beaches define California. It's our image of the Golden State. Whether the wide, palm tree-lined beaches of Santa Monica, Main Beach in Santa Cruz, or the rugged, rocky beaches of Mendocino, there is a beach for almost everyone. If we divided up California's 1100 miles of coastline by the state's 38 million residents, however, we would each have less than two inches of shoreline apiece. Being more realistic, only about 300 miles of our state's coast actually consists of accessible beaches, so we each really have about a half an inch of oceanfront to enjoy. To stress the shoreline a little more, our share is reduced further because we have to share this with some of the state's 32 million annual visitors. While California's population has doubled over the past 40 years, our beaches haven't gotten any larger, and in some places the've gotten smaller.

Have you ever stopped to ask yourself why we have sandy beaches at all? Why not just steep rocky cliffs? Or instead of soft white sand, what if beaches consisted of round cobbles the size of golf balls or softballs? While we do have some beaches like this, can you imagine jogging or playing volleyball on golf balls? It would be painful, and I think its fair to say that most people would probably be doing something else on warm summer days besides going to the beach.

Beaches are sort of a geological coincidence. Most sand on California's beaches comes from our rivers and streams. Weathering of the rocks in a watershed or drainage basin through heating and cooling, wetting and drying, and freezing and thawing, gradually breaks down the bedrock into smaller fragments. These are carried down slope by gravity, rainfall, and runoff, until they reach a stream. High winter flows in creeks and rivers gradually move the rocks downstream, breaking them up, sorting them out, and rounding and smoothing them along the way. The large boulders are left way upstream in places like Boulder Creek; the pebbles are carried farther downstream to places like Felton, and it's often only the sand and finer silt and clay that make it to the shoreline. The sand is deposited on the shoreline, but waves along most coasts are energetic enough to keep the silt and clay in suspension. Ultimately they carried offshore, often tens or hundreds of miles before finally settling out onto the seafloor.

Breaking waves along many coasts are most effective at transporting and sorting sand. Gravel and cobbles are usually too heavy for most waves to move very far, and silt and clay are so light that they are transported off the beach. Streams tend to deliver sand sized material to the shoreline and waves prefer to sort and move sand. So we end up with this ribbon of soft sand along most shorelines, which the waves have sorted, smoothed and rounded for our pleasure. Soft sandy beaches are something we often take for granted. Santa Cruz would be a very different place if the shoreline from Cowell's to the harbor were covered with rocks instead of sand. More to come…