

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

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Gold in beach sand



In the mid-1890's a few optimistic prospectors searched the sand of Seabright Beach for gold.

Walking along most Santa Cruz County beaches in the summer months you'll find that the sand looks pretty typical, white or a light tan in color, due to the dominant minerals, quartz and feldspar. Both minerals are durable and persist in sediments for eons. As well as being light in color, both are also fairly low-density minerals. In the winter months, however, a walk on some of the area's beaches will reveal concentrations of black or dark green sand. At the mouth of the Big Sur River you can even find pink sand, colored by the mineral garnet, which is a very hard mineral used for making sand paper.

The black or dark minerals, such as magnetite, ilmenite, and chromite, can be separated from the lighter colored sand by a hand magnet, like you used to do in

the sand box as a child- well some of us who played in sand boxes did. These dark minerals contain heavy elements such as iron, titanium, and magnesium, and these denser grains are left behind by the large winter waves as they remove the lighter quartz and feldspar grains. The black sand will often be concentrated in small rills, channels, or in the troughs of the ripples on the beach surface.

The processes that concentrate these heavier minerals on beaches or just offshore are similar to those that left gold behind in the streams of the Sierra foothills. Currents, whether in rivers or driven by waves or tidal fluctuations along the shoreline, will tend to sort out or separate the lighter from the heavier minerals. These concentrations of minerals are known as placer deposits and led to California's Gold Rush. The beaches and shallow offshore waters of Australia are the source for about 95% of the world's rutile, an important titanium mineral, as well as gold, zirconium, tin and chromium bearing minerals. Much of the world's tin comes from similar sand deposits along the coasts of Malaysia, Indonesia and Thailand.

For a short while in the 1920s, the Triumph Steel Company owned nearly 2 miles of beach along the northern Monterey Bay shoreline and was mining the black sand, which contained 500 to 1,100 pounds of magnetite per ton of sand. They used a magnetic separator to remove the magnetite and then used a furnace to produce a red iron oxide that was used in the manufacture of paint. While this could have happened in the 1920s, mining beach sand and setting up a furnace on the beach would probably not be viewed very favorably today.

The shoreline south of Año Nuevo, and the beaches between Aptos Creek and the Pajaro River are also characterized by seasonal concentrations of black sand. In addition to iron bearing minerals, black sand may contain small amounts of gold, platinum and other rare but heavy metals. A black sand gold rush started in the summer of 1860, and by August, miles of beach had been staked off and more than 25 mining claims filed. The digging continued up until the 1880's when one family drilled a tunnel 300 feet into the bluff and for a time were extracting \$5 of gold for each ton of sand.