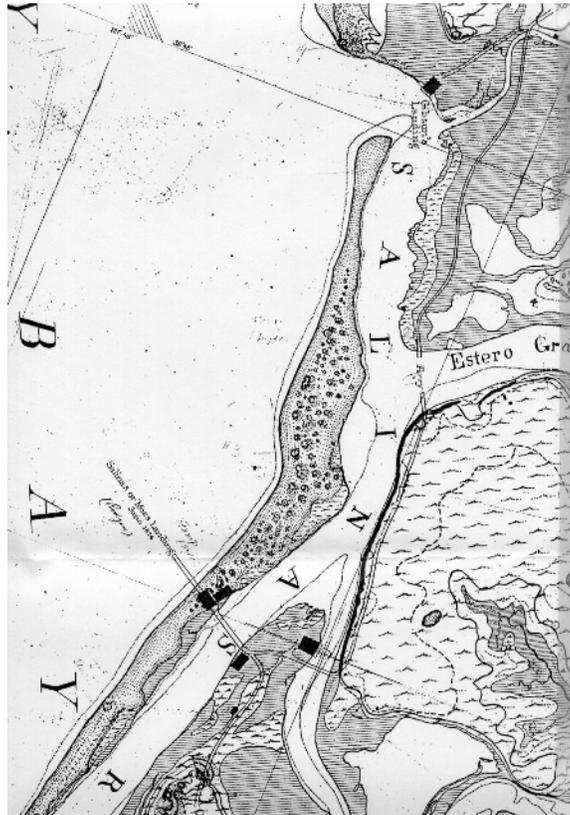


Our Ocean Backyard — *Santa Cruz Sentinel* columns by Gary Griggs, Director, Institute of Marine Sciences, UC Santa Cruz.

**#100 February 25, 2012
Meandering River Mouths**



Map of mouth of Salinas River and Moss Landing in 1854

Littoral drift, driven by the dominant waves from the northwest, pushes the sand south along much of the California coast and tends to divert the mouths of our coastal streams southward as well. This isn't the case all year long, however, nor does this happen along the state's entire coastline.

Littoral transport along portions of the coast north of Cape Mendocino, in southern Monterey Bay, and between the Mexican border and San Diego tends to move beach sand northward for much of each year.

Part of the explanation for this difference is the direction of wave approach in some areas, but more important is what happens to the direction of wave motion as the waves advance towards the coast. Waves are refracted or bent as they enter

shallow water, and the degree and direction of this bending is related to the changes in water depth or the bottom contours.

Swells with parallel wave fronts typically approach Steamer Lane from the northwest. As the underwater portion of the wave begins to feel the bottom, that section of the wave starts to slow down. The entire wave front will progressively bend or wrap around Lighthouse Point and then break as each section enters shallower water. Waves will gradually break eastward from the point, making for the well-known surf break that can extend all the way to Cowells during large swells.

Wave refraction along the northern portion of Monterey Bay drives sand southward towards Moss Landing. This south flowing littoral drift would eventually fill the entrance to the Santa Cruz Small Craft Harbor if we didn't dredge out the nearly 250,000 cubic yards of sand that the waves transport into the entrance channel each year.

The harbor at Monterey is rarely dredged, however. Between Moss Landing and Monterey, instead of sand being transported south and into that harbor, it more often moves northward, carried by waves refracted into the southern end of the bay.

As a result, instead of being diverted southward like the other streams entering the ocean along the central coast, the Salinas River was diverted north for perhaps hundreds of years. One of the oldest maps around, drawn in 1854, shows the Salinas River flowing north for about six miles from its present entrance. It was separated from the ocean behind a narrow dune covered sand spit to a discharge point about a mile north of the present entrance to Moss Landing Harbor.

During the 1800's, the spit and dunes separating the Salinas River from the bay were breached on occasion, not only by the river, but also by ocean waves: "*A natural dam has been formed across the Salinas River near Moss Landing by cutting of the surf through the sand hills separating the river from the ocean*" (from the Salinas City Index, March 7, 1878).

This northerly path of the river was maintained until about 1910, when through either natural breaching, or perhaps assisted by excavation by local farmers to reduce flooding along the lower course of the river, the present mouth was created with a straight shot across the sand spit to the ocean. A map from 1910 depicts the Salinas River still heading north to its ancient mouth north of present day Moss

Landing, although the river flow may well have been already diverted. Today, at the entrance to the old river channel there is a floodgate, which can be opened to let river water flow into an irrigation ditch. This is all that exists of the river's former course.

While writings up until about 1850 give the name Valle de Monterey, Rio de Monterey, Monterey River and a few others to the present day Salinas River, the 1854 map labels it as the Salinas River for the first time. There have been salt flats near the entrance to Elkhorn Slough for years, and they are actually designated on the 1910 map. The Salinas River name was derived from the Spanish word for salt marsh or pond, *salina*. During the Mexican and Spanish eras, the two local sources of salt were either Point Lobos or the ponds at Moss Landing near the old Salinas River mouth.

Humans intervened here in 1946 when the US Army Corps of Engineers constructed a stable channel by dredging the present entrance to Moss Landing Harbor through the sand spit directly opposite the mouth of Elkhorn Slough. The entrance channel was stabilized with two massive rock jetties and the old Salinas River exit to the north was abandoned.

This article is a landmark of sorts as it marks my 100th column. When I began almost four years ago, I thought they might last six months and then I would run out of ideas to write about. Well, there still seem to be interesting things about our ocean backyard to explore. I appreciate all the input and emails I've received over the past four years, and if you have topics or questions you would like to read about, please send an email and I'll do my best to respond.