Reading the Landscape

A FIELD GUIDE FOR IN & AROUND THE SAN FRANCISCO BAY

PRODUCED BY THE OAKLAND MUSEUM OF CALIFORNIA IN PARTNERSHIP WITH THE SAN FRANCISCO ESTUARY INSTITUTE
If you’re curious about what is here and how it became this way, this Field Guide can help you peel back the layers of time. By looking carefully for clues in the landscape, you’ll understand how human activity has long intertwined with nature to create a hybrid landscape around San Francisco Bay.

To get you started, we’ve told the stories of a few areas around the bay, poking under the roadways and parking lots of modern development to reveal what’s beneath the surface. We’ve also assembled a set of features to look for, and a list of online sites that can give you more information.
What to Look For
As you survey the shores in and around the Bay Area...

Follow the water.

Observe the shape of the land.

Take an inventory of the plants.

Study the built environment.
Follow the water.

Observe where water flows and how it travels. This can tell you a lot about how we’ve shaped the landscape.

Water naturally flows in creeks down from the hills, across the flatter plains and into the Bay. We’ve modified how water flows so that we can collect it for drinking and irrigation, and to lessen the effects of flooding. Some creeks have been covered over and channeled into pipes to provide flood protection. Some of these are now being “daylighted,” or uncovered and restored.
If you’re walking along a creek, look for signs that the structure and path of the waterway has been shaped by humans. Do you see large rocks lining the edge of a creek? Is the water flowing in a gutter, ditch, or gully and into a storm drain? Keep an eye out for dams and mounds of earth constraining the course of a creek.

If you’re at the shoreline, look for the effect of tides. High tide—which can raise the Bay’s water level as much as six feet—pushes salty water up into the creeks and sometimes floods the land.
Observe the shape of the land.

Both natural processes and human activity change the shape of the land, sometimes quite rapidly but also more slowly, over longer time periods.

Natural forces of rain, flowing water, wind, plants, and animals cause changes like erosion, landslides, earth flows, and sediment deposition. Humans pave the landscape with roads, sidewalks, and parking lots. People also fill in the Bay to create new land; contain the wetlands with dikes; mine rock, salt, clay, and gravel; and level the land for farming or infrastructure.
Observe the shape of the land.

As you look at the landscape, consider that its surface may have changed over time. That flat field may have formerly been a hill. And the dry ground you’re standing on may have once been washed by the tides.
Take an inventory of the plants.

Over time, humans have changed the plant species that grow here. Learning about which plant species are native and which are introduced can give you a deeper appreciation for the area you live in. Look around—do any plants seem out of place?

For thousands of years, the lowlands were composed mostly of native grasses and wildflowers, dense patches of chaparral, and valley oak savannas. Rushes, cattails, and sedges grew along rivers, freshwater marshes, and wet meadows.
Salt tolerant plants, like pickleweed, cordgrass, and saltgrass thrived in tidal marshes.

Indigenous people actively managed the vegetation of the Bay Area through selective burning and other practices that encouraged some plants over others.

Later, European and American settlers introduced many new plant species, like wild mustard, desert cactus, and palm and eucalyptus trees.

Together, these new plants and people transformed the landscape much more quickly.
Humans have imposed a wide variety of structures on the landscape. You can learn about how people live in an environment by looking at what is built on it, and how it all connects.

One way to understand infrastructure is to think about how we use the things we build. We want to move easily through the landscape, so we build roads, highways, bridges, mass transit systems, airports, railroad tracks, trails, walkways, and bicycle paths. We’ve constructed houses, apartments, and condos to live in.
We work and shop in factories, office buildings, and retail stores. We’ve laid natural gas and petroleum pipes and electrical power lines to carry energy across and around the Bay.

Another way to see the built environment is to look for geometric shapes on the landscape. For example, straight lines and right angles are not often found in nature—they are usually created by humans.

People pave straight roadways and streets, divide property lines in squares and rectangles, and plant trees in a row. If the creek you’re looking at runs in a straight line, people have probably channeled its flow. If a straight earthen wall separates water from land, it’s probably a human-made levee.

You can see the shapes and lines from above—while traveling by plane, studying satellite images and maps, or standing on a hill looking at the landscape below.
Gold Rush Legacy at China Camp
There was never any gold at China Camp. But gold mining up in the Sierra foothills changed the landscape here. Beginning in the 1850s, miners in the Sierra Nevada Mountains used a process known as “hydraulic mining” to blast mountainsides with jets of water to unearth gold. The soil from those mountainsides washed down rivers and creeks to the Bay. By 1885, 1.6 billion cubic yards of sediment (enough to fill 500,000 Olympic-sized swimming pools or to cover the entire city of San Francisco with a pile of dirt three stories tall) had washed down to the Bay.

While this new sediment had many negative impacts, it also created new tidal marshes around the Bay, including a “centennial” marsh at China Camp. These new marshes, a legacy of the Gold Rush, now provide critical habitat for wildlife like the endangered California Clapper Rail.
What you’ll see.

Look for two different marshes: an ancient tidal marsh and a newer one created from Gold Rush sediment. At China Camp you can tell where the ancient marsh ends and the young marsh begins by looking at how straight or curvy the channels are.

The original marsh at China Camp is one of the largest ancient tidal marshes remaining in San Francisco Bay. It started to form about 4,500 years ago when the rate of sea-level rise slowed enough for marsh plants to take hold. You can identify the ancient marsh by its sinuous (or curvy) channels.

Channels in the younger marsh—formed from the rapid deposit of Gold Rush sediment—are much straighter than those in the ancient marsh. A newer section of marsh, formed from Gold Rush sediment, is known as a “Centennial” marsh. Centennial marshes are generally less complex than ancient marshes.
BACKGROUND: Detail of the channels curving through the marsh.
Landfill of Albany Bulb
Albany Bulb is a local park that juts into the Bay, providing excellent access to the water and spectacular views of San Francisco. The land is not original, but fabricated from discarded construction material and other fill.

When the Golden Gate Fields racetrack—just to the south of the Bulb—was created in 1939, part of the nearby shallow bay was filled in to create parking lots. In the 1960s, building debris such as concrete, rebar, and clay was dumped beyond this first fill, creating the shape of Albany Bulb as we find it today. Dumping was halted in the 1980s.

Today the park provides for a wide array of activities, including dog-walking, bird-watching, and viewing the scattered and ever-changing art installations made from remnant concrete and driftwood. A homeless population built shelters on one part of the space. Future plans for the park include turning the Bulb into part of the Eastshore State Park.
Though it’s hard to believe that the entire park is made of fill, evidence of landfill is everywhere. Look for broken concrete and construction debris that lines the edge where land meets water.

Known as riprap, this structure stabilizes the land and protects it from waves and tides. You can see slabs of concrete poking out from under a thin layer of clay; spikes of rebar jutting into the air; and walkways made from bricks and mortar. Native saltgrass and invasive pampas grasses grow side by side.

Landfill has created solid ground in many places along the edge of the Bay. On this map, the dark blue is the historical marsh, mudflat and open water, and the orange shows islands of land in the mudflats. Black lines indicate the original extent of the Bay.
BACKGROUND: Riprap lines Albany’s shoreline from the racetrack to the Bulb.
Piers Reaching Into the Bay
Because the Bay is so shallow, people built long piers and wharves to reach the deep water of the Central Bay where ships could dock.

The Oakland Mole, originally constructed in the mid-1800s, extended more than two miles into the Bay. A mole is different than a pier: it’s made of stone or earth, and water can’t pass beneath it. The Oakland Mole was built of dredged fill and topped with railroad tracks. After taking the train to the end of the Oakland Mole, passengers boarded a ferry for San Francisco.

The Berkeley Pier—at one point 3.4 miles long—extended from the foot of University Avenue. First built by the city of Berkeley in 1909, it had a long life connecting goods and people with freight ships and ferries. The ferries stopped running in 1939 after the Bay Bridge opened, and much of the pier was left to decay.

The Oakland Mole once nearly reached as far as Treasure Island.
Most of the Bay’s historical piers were removed after the construction of the Bay Bridge, but remnants of the structures still exist.

Look for remnants of the Oakland Mole in Middle Harbor Shoreline Park in Oakland. This park sits at the Bay end of the original Mole. Although this small park juts only a short distance into the waters of the Bay today, the site was once over a mile from shore. All the land behind the park was filled after 1915 to create the Port of Oakland.

Old pilings from the Berkeley Pier still extend almost all the way to Treasure Island. You can see them from the end of the modern-day Berkeley Pier. A segment of the original pier has been maintained for pedestrians and fishing.
BACKGROUND: Richmond pier, Richmond Point.
Wetlands Under a Soccer Field
Although it’s now suitable for soccer players of all ages, Raimondi Park in West Oakland is actually a filled-in marsh.

Raimondi Park is a 10-acre park in West Oakland, providing much-needed open space for barbecues, baseball, soccer, and other recreation. It is also situated within a broad triangular wedge of what was once a tidal marsh. This triangle remained stubbornly undeveloped until the 1880s. Early maps show the marsh’s channels and sloughs remained as the surrounding area filled with houses and businesses. Eventually the marsh was filled and the site became Bayview Park.

The current park was dedicated in 1947, and named in honor of Ernie Raimondi, a minor league baseball player who grew up in Oakland.

On this map the original shoreline is indicated by a black line, and the extent of the original marsh is indicated in green.
What you’ll see.

Stand in the park facing the Bay—150 years ago, you would have been standing in a tidal marsh. Mudflats and the open bay would stretch in front of you. If the tide were at its highest, your feet would be wet. Just 800 feet ahead—about where the Ikea loading dock is—were small sandy beaches. The Emeryville shellmound—a sacred site to the local Ohlone people—would be visible a mile to the north.

For many years after the park was developed, you might have seen water collecting and ponding on the fields during the winter rainy season, a clue that this was once a wetland. In 2007, the Oakland Tribune reported that the park’s “drainage problems are so severe that the fields are closed three months of the year except to geese.”

In 2008, substantial refurbishment included new drainage systems for the playing fields.

Look at other low-lying areas around the edge of the Bay. Tidal and seasonal flooding on yards, fields, and roads is often an indication that these are former wetlands.
BACKGROUND: The original marsh may have looked like this one near Antioch before Bay Fill created a space for Raimondi Park.
Suburbs on Top of Tidal Marsh
Foster City, a suburban neighborhood east of San Mateo, is one of the last places around the Bay where housing was constructed on marsh fill.

In 1898, rancher Frank Brewer built dikes and dried out the marsh to grow hay for dairy cattle. In the 1940s, Leslie Salt Company built evaporation ponds on part of the island. Real estate tycoon T. Jack Foster dredged parts of the land in 1958 to create an artificial lagoon with connecting waterways, pumping in 14 million cubic yards of sand. Foster City is now home to 30,000 people.

Much of the Bay’s edge has been filled for agriculture and to provide places to live and work. Two of the first places filled were Yerba Buena Cove and Mission Bay, made into new city lots for booming San Francisco in the mid-1800s. Some other places around the Bay where housing has been built on bay fill include the Marina District in San Francisco, Bay Farm Island in Alameda, and Santa Venetia in Marin County.
What you’ll see.

Compare the wiggly shape of Seal Slough to the Central Lagoon of Foster City, which makes a symmetrical arc through town. Waterways engineered by humans curve and twist much less than those that are natural.

Notice how close the land lies to the water. Foster City was built just above sea level. During floods, the city has to pump excess water from the lagoon into the Bay.

Natural and human-made waterways have very different shapes. On the west side of Foster City is Seal Slough, a curvy and meandering channel, which separates the suburb from neighboring San Mateo. Seal Slough is a large remnant channel of the former marshes now beneath Foster City.

Seal Slough snakes its way through San Mateo before emptying into the Bay.
BACKGROUND: The man-made lagoons create symmetrical arches through Foster City
### Historical Ecology

San Francisco Estuary Institute  
[sfei.org/he](http://sfei.org/he)

### Historical Maps and Images

US Geological Survey  

David Rumsey Map Collection  
[davidrumsey.com](http://davidrumsey.com)

Library of Congress  
[loc.gov/index.html](http://loc.gov/index.html)

Online Archive of California  
[oac.cdlib.org](http://oac.cdlib.org)

Calisphere, University of California  
[calisphere.universityofcalifornia.edu](http://calisphere.universityofcalifornia.edu)

### Newspaper Archives

California Digital Newspaper Collection  
[cdnc.ucr.edu/cgi-bin/cdnc](http://cdnc.ucr.edu/cgi-bin/cdnc)

### California Historical Collections

California Historical Society  
[californiahistoricalsociety.org](http://californiahistoricalsociety.org)

Society of California Pioneers  
[californiapioneers.org](http://californiapioneers.org)

The Bancroft Library, UC Berkeley  
[bancroft.berkeley.edu](http://bancroft.berkeley.edu)

### Museums

Oakland Museum of California  
[museumca.org](http://museumca.org)
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The Story of California. The Story of You.
Oakland Museum of California
museumca.org
This guide invites you to see San Francisco Bay in a new way. Layers of urban history here rest on an older landscape of grasslands, woodlands, marshes, and tidal flats. Given the challenges of climate change and sea level rise, it’s a good time to discover how the past shapes the future.