



Association of Environmental & Engineering Geologists San Francisco Section

ANNOUNCING THE AEG SAN FRANCISCO SECTION
JUNE 2013 JOINT MEETING WITH CCGO & GRA

The Natural and Unnatural History of The San Francisco Bay

by
Kenneth R. Lajoie

MEETING DETAILS

Restaurant

Spenger's Fresh Fish Grotto
1919 Fourth Street
Berkeley, CA 94710

[Map](#)

Date and Time

Wednesday, June 12, 2013
5:30 pm—Social Hour and Sign-in
6:30 pm—Dinner
7:45 pm—Presentation

Cost: \$55 Members; \$55 Non-Members, \$15 for Students

Menu

- 🍴 Grilled Atlantic Salmon with Northwest Berry Sauce
- 🍴 Grilled Chicken Breast Marsala
- 🍴 Pasta Primavera with fresh Seasonal Vegetables

Reservations*: To RSVP, please fill out the online form at <http://www.grac.org/reservation> by **12 PM, Friday, June 7th, 2013**

Cancellation Policy: GRA will accept cancellations with no charge until 12:00 PM (Noon) on Friday, June 7, 2013. At that time, we must submit a final headcount to Spengers and we will be charged accordingly. If you cancel after that time, or are a no-show, we will ask you to pay the cost of your meal(s). Thank you for your cooperation.

Driving Directions:

From San Francisco and points south: Take I-880 to I-80 east towards Berkeley/Sacramento. Take University Avenue off-ramp and stay in your right lane. Follow the Fourth Street/Frontage Road signs. Turn right on Hearst Street and go 3 blocks to Fourth Street and turn right. Spenger's will be on the left and guest parking is to the right.

From points north: Take I-80 towards Berkeley and exit at University Avenue and keep right. You will pass over the highway and at the first stoplight, Sixth Street, turn left. Take the first left at Hearst Street. Go 2 blocks and turn left again on Fourth Street. Spenger's will be on the left and guest parking is to the right.

From points east: Take Highway I-680 to Highway 24 and Highway 24 to Highway I-580. Head west on I580 West following the signs to Berkeley/Sacramento. Take the University Avenue off-ramp and stay in your right lane. Follow the Fourth Street/Frontage Road signs. Turn right on Hearst Street and go 3 blocks to Fourth Street and turn right. Spenger's will be on the left and guest parking is to the right.

See next page for abstract and speaker biographies.

The Natural and Unnatural History of the San Francisco Bay

Dr. Kenneth R. Lajoie

Kenneth R. Lajoie enjoyed a 30 year-long career as a Geologist at the United States Geological Survey in Menlo Park before retiring in 2000. His areas of expertise included identifying Earthquake Hazards and Coastal Hazards of the San Francisco Bay Area region. Dr. Lajoie also studied the climatic impacts of the El Nino events of 1982-83 and 1997-98 and mapped landslides in San Mateo County resulting from such events. Dr. Lajoie has given numerous public presentations, school lectures, and led field trips on seismic and coastal hazards, the history of Mono Lake, the seismic hazards of Los Angeles basin, and the natural and unnatural history of San Francisco Bay. He has also shared his expertise with local, regional, state and federal agencies on seismic and coastal hazards, and environmental issues. Dr. Lajoie received his BS and PhD in Geology from UC Berkeley.

Abstract –

At the height of the last ice age, roughly twenty-thousand years ago, sea level was about 120 m (390 ft) lower than it is today. As a consequence, there was no San Francisco Bay and the beach lay out beyond the Farallon Islands, about 40 km west of San Francisco. At that time giant camels, mammoths, mastodons, ground sloths and bison (the extinct Rancho Labrean fauna) roamed the broad inland valleys now partially flooded by the bay. As the climate warmed at the end of the ice age, the large continental glaciers partially melted, causing sea level to rise rapidly, up to about 1m per century. The rising ocean flooded through the Golden Gate about ten-thousand years ago, giving birth to the bay, which reached its present size only within the last two-thousand years. Deep bridge borings beneath the bay penetrate at least four beds of old bay mud, indicating there were four previous bays, tentatively correlated with four interglacial sea -level highstands dating back to about 430,000 years.

The San Francisco Bay basin consists of several broad, interconnected valleys bounded by linear ridges uplifted along seismically active faults, all parts of the wide, complex boundary between the North American and Pacific tectonic plates referred to as the San Andreas Fault system. Owing to crustal compression across and within this boundary, the Berkeley Hills and the Santa Cruz Mountains rise as the bay block between them subsides to form the long basin partially flooded by the south bay. The south bay would be much larger but for the sediments eroded from the surrounding hills that partially fill the subsiding basin.

The Great Central Valley of California has drained through the bay basin for only the past 560,000 years. Prior to that time, a large, freshwater lake, Corcoran Lake, occupied the Central Valley and spilled through a narrow pass into the Salinas Valley, then ultimately into Monterey Bay. As crustal movements tilted the Coast Ranges northward, that spillway was defeated, forcing Corcoran Lake to spill over a lower divide to the north. The resulting catastrophic flood quickly cut the deep gorge referred to as Carquinez Strait.

The oldest archeological sites around the margins of the bay, mostly large shell mounds, date to about five-thousand years ago. However, it is quite likely that humans entered North American and the future Bay Area at least fifteen-thousand years ago. If so, the oldest shell mounds in the region lie on the ocean floor out beyond the Farallon Islands at ocean depths of about 100 m. Sea level rose so rapidly between fifteen- and five-thousand years ago that no large shell mounds could accumulate along the transgressing shoreline. However, small camp sites probably lie out on the continental shelf and beneath the muds of the present bay. Prior to the arrival of Europeans in 1769 there had been minimal human impact on the bay. However, by the early 1800's the rapidly

expanding European population, besides decimating the local native-American population, had hunted the harbor seals and sea otters of the bay to near extinction. And by 1900 it had severely reduced salmon and sturgeon populations in the bay. The still-expanding European population has severely polluted the waters of the bay, killed most of its natural fauna, and has converted most of its bounding salt marshes to evaporation ponds, agricultural land, garbage dumps, ship yards, harbors, airports, industrial sites and housing tracts. As population pressures mount, the challenge of the immediate future is to preserve what little remains of San Francisco Bay, the defining geologic feature for one of the most unique coastal sites in North America.

Thank you for the RSVP! See you on [Wednesday, June 12th, 2013!](#)