A Sea Change: Consequences of Bay Level Rises

by Ann Thomas
2017

Changes to Marin's bay shore-line that rising sea levels could bring about by century's end are detailed in a recently completed report, pre-viewed in May at several community workshops. BayWAVE (Bay Water-front Adaptation & Vulnerability Evaluation) anticipates extensive physical and fiscal impacts of rising water around the bay, along with high water associated with storms. It was prepared over two years with the participation of staff and elected officials from all of Marin's jurisdictions fronting the bay.

Although there is a wide range of forecasts regarding when, and how sea-level rise will occur, the report bases findings on estimates of impacts possible under six specific scenarios: sea level increases of 10, 20, and 60 inches, and in addition, these same three elevation changes in combination with a 100-year storm event. The report studied buildings, utilities, roadways, environmental resources, recreational resources, and other services along the bay shoreline. The report does not anticipate specific timing for any one scenario.

Residential Parcels are Most Affected Under a 10-inch rise, tidal flooding could reach 5,000 acres, 1,300 parcels, and 700 buildings in Marin County. The areas in this watershed most immediately impacted would be bayfront Corte Madera including Mariner Cove and Marina Village homes and commercial areas on Paradise Drive, the Greenbrae Boardwalk, and low-lying roads and Highway 101 in Corte Madera and Larkspur. Water supply, sewage treatment, transportation, and electricity networks could be damaged, causing impacts to extend far upstream.

With regard to utilities, for example, sanitary, stormwater, water supply, and natural gas pipelines under roadways could be squeezed between rising groundwater and overhead pavement, which could cause pipes to buckle or break. Laterals on private property could also suffer.

In the decades to come, low-lying neighborhoods such as Mariner Cove in Corte Madera, will frequently be awash with rising bay waters. Photo by Ann Thomas

Longer Term Changes Extend Inland As longer-term projections materialize, flooding and storm effects would reach further inland and affect thousands more acres. There could be regular flooding of areas also including: Madera Gardens in Corte Madera; Kentfield Gardens, Bacich and Kent schools, and the College of Marin in Kentfield; Larkspur Marina, Hillview, Larkspur Plaza, and Heather Gardens neighborhoods; and schools on Doherty Drive in Larkspur; and Larkspur and Corte Madera retail centers.

Under the most extreme scenario studied, about 30 percent of Corte Madera could experience tidal flooding. Greenbrae Boardwalk tops the list of communities that would be most compromised by sea-level rise.

Marsh and Creek Impacts All likely scenarios would result in extensive changes to marshes along the bay shoreline where these marshlands change from high marsh to low marsh to mud flat, and eelgrass beds shrink under deepening waters. The report lists Madera Gardens lagoons, Corte Madera Ecological Reserve, and Triangle Marsh as locations where tidal wetland and marsh habitats could be vulnerable to increased storms and higher bay waters.

Storms analyzed in this report include only bay storm surge, and the report does not try to predict flooding that could be triggered upstream along the freshwater creeks that flow through Fairfax, San

Anselmo, Ross, and Kentfield. However, under the most extreme scenario, a 60-inch rise in sea level along with a 100-year storm, salt water could reach eight miles inland up the creek channel, well into San Anselmo.

Marsh and freshwater creek changes due to rising bay waters would affect plant, fish, and animal species. Species that could be threatened by habitat changes include the harbor seal, otter, salt marsh harvest mouse, Ridgway's rail, Chinook salmon, steelhead, and many more.

Conclusions Despite uncertainty about when changes could occur, tidal gauges at the Golden Gate documented a rise in sea level of about eight inches in the 20th century, and this appears to be accelerating. Even if carbon emissions stabilized or declined, the report acknowledges, sea levels will likely continue to rise for decades due to past activities, and it could be hundreds of years before levels begin to drop again.

As an informational document BayWAVE does not require any action to prepare for changes. However, it cites sources which indicate that the cost of doing nothing is four to ten times the cost of adapting to sea level rise, and suggests that information in BayWAVE could be useful as jurisdictions update relevant land use and hazard mitigation planning documents. BayWAVE is available online at www.marinco unty.org/main/baywave/vulnerability-assessment.