

M A R I N C O U N T Y

Squeezed by Geography

NATE SELTENRICH, REPORTER

In most respects, Marin County is a privileged place. It ranks first in the Bay Area for income per capita, and includes many of the region's priciest zip codes. But its miles of Bay and ocean shoreline and many low-lying towns, positioned to afford easy coastal access and world-class scenery, represent a major liability in the era of sea-level rise.

Marin is considered one of the Bay Area's most vulnerable counties. That's largely because the vast majority of its critical infrastructure, including roadways and utilities, exists within a slim strip of land along the Bay shore at low elevation. Much of the county's housing stock and commercial and industrial activity is also concentrated along the country's eastern edge, from the Golden Gate Bridge to Highway 37.

"Marin is the canary in the coal mine in some ways, because almost everything is in that narrow strip along the Bay," says Roger Leventhal, a senior engineer with Marin County Public Works.

Smack in the middle of this span is San Rafael, population 59,000. The county's economic and transportation hub — and home to many of its lowest-income, most vulnerable residents — faces the greatest risk of all. Its downtown and adjacent Canal District — a waterfront neighborhood where immigrant Latino and Vietnamese residents live in aging, high-density apartments — were considered among the region's most threatened sites during the 2018 Resilient by Design (RBD) challenge.

The canal, also known as San Rafael Creek, is about 1.5 miles long and drains a significant portion of the city. Projections indicate that much of the area along its south bank could see major flooding with just ten inches of sea-level rise.

Solutions developed during the RBD process range from the relatively straightforward — like restoring 20-acre Tiscornia Marsh at the creek's mouth, which is already in progress, or raising a nearby levee — to the life-changing and intractable, like retreating from parts of the shoreline that cannot be saved.

San Rafael is now in the midst of updating its general plan to help it respond to rising seas more systematically over the next two decades through a mix of zoning, building codes, and other policies, says Paul Jensen, community development director for the city. The plan is likely to recommend new city government requirements for considering future sea-level when reviewing capital projects; code amendments that establish minimum elevations for building floors; and a formal framework for evaluating physical adaptation projects, from upgraded pump stations and restored wetlands to brand-new levees.

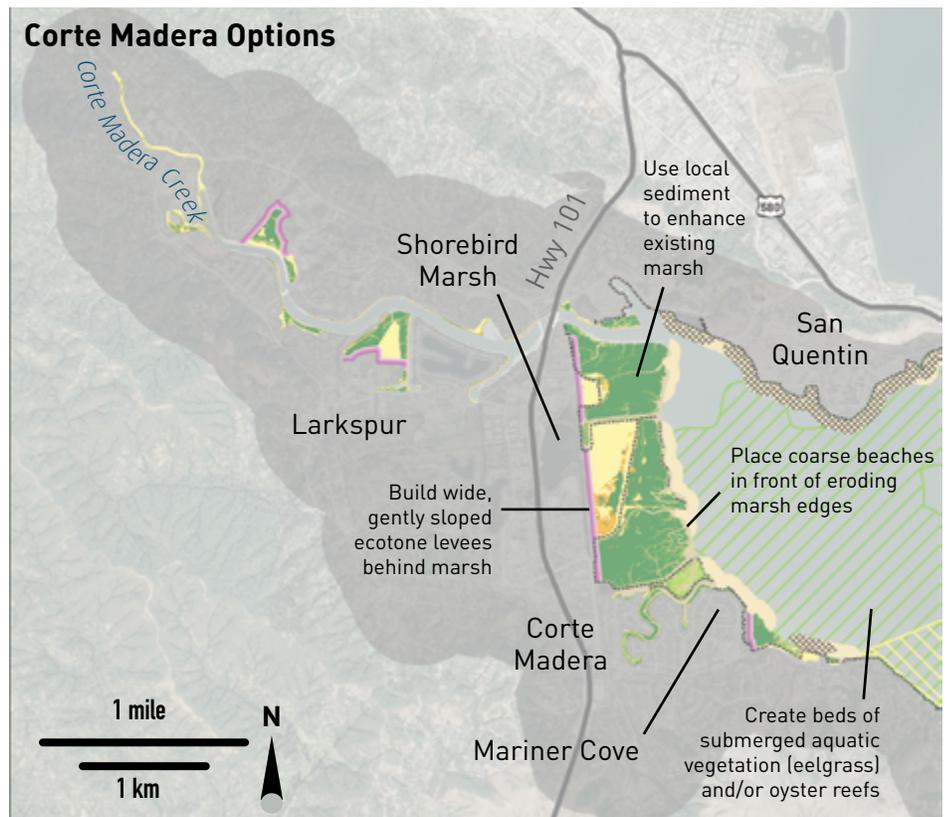
The updated general plan will also suggest a sea-level-rise overlay, a zoning tool that imposes additional requirements and restrictions on properties located within a defined waterfront strip, Jensen says. Its

precise boundaries have yet to be defined, but are likely to follow 2050 projections included in the 2019 Marin BayWAVE report, which outlines waterfront vulnerability and sea-level-rise impacts across the county.

"What's fortunate for San Rafael is that there's been a lot of attention [to] this topic here," says Jensen. "The timing is right for us to do what we can, and put what we can in our general plan."

Marco Berger, community resilience coordinator for the Canal District nonprofit Multicultural Center of Marin, says it's also important for at-risk residents to have a say in how their neighborhood responds to the crisis. To that end, he leads the Canal Community Resilience Committee, a group of about 40 local residents that began meeting in November 2019 to discuss issues including sea-level rise. He also coordinates community outreach for a broader climate change response program called Drawdown Marin.

"The idea is to bring in people who usually would not have contact with



In 2019, SFEI, Point Blue, and Marin County planners used Corte Madera as a case study to draw up hypothetical adaptation options over time, with an emphasis on nature-based solutions. This forward-thinking planning process is based on prior work identifying "operational landscape units" around the Bay, natural habitats and open spaces that, if taken into consideration while planning for infrastructure and urban adaptation, would add up to better multi-jurisdiction, multi-benefit solutions all around. Corte Madera is currently moving these ideas forward, incorporating community input, and also considering adaptation to wildfire, and other climate hazards.

or access to resources or may not normally be at the table, to create real equity, where those people are getting heard and having opinions and sharing input that officials might hear and take back into their plans," Berger says.

A few miles south along the shore is Corte Madera, home to 10,000 people. As in San Rafael, development is concentrated in low-lying areas along the waterfront, including on Bay fill. Roughly a quarter of its properties fall within the FEMA floodplain, according to director of public works and town engineer R.J. Suokko. "A big chunk of our community is at risk for sea-level rise," he says.

More urgently, one crucial roadway already floods and another may not be far behind. Sections of Lucky Drive, which crosses Corte Madera Creek just west of Highway 101, and Paradise Drive, which hugs the Bayshore, have both been targeted for raising within the next five years.

"[Lucky Drive] is one of three key arteries into Central Marin," Suokko says. "It already floods annually, and in December it was a couple feet [under water], to where I wouldn't advise sedans passing." The city has not secured funding for either project, but is currently looking for grant opportunities, he says.

One potential source is a county-wide half-cent sales tax benefiting transportation projects and roads, approved by voters in 2018 for 30 years, with 1% of revenues earmarked specifically for addressing sea-level-rise impacts. This may be the only dedicated source of new local funding for transportation adaptation in the Bay Area to date.

In 2019 total revenues were \$27 million, providing about \$270,000 to the sea-level-rise program, none of which has yet been spent, says Derek McGill, planning manager for the county transportation authority. "It's not a substantial sum in terms of infrastructure redevelopment budgets, but we hope it can at least be a seed that attracts federal and state funding."

Another coordinated, countywide effort revolves around the 2019 publication of a land-use planning guide that recommends baseline policies and an approach to adaptation planning for sea-level rise. County leaders are using it to build consensus among planning directors in nine shoreline cities, including San Rafael and Corte Madera.

FIREWATCH

Backdoor Threat

San Rafael rises toward heavily forested China Camp State Park, while Corte Madera reaches into the county's mountainous interior: wildfire territory. Leaders in both towns recognize that climate change will come roaring at their back door just as surely as it will lap at their front steps.

Voters countywide seem aware of the risk, too. In February, they approved Measure C, a new parcel tax to fund efforts to protect residents from wildfire through early warning systems, defensible space inspections, shaded fuel breaks, and cleared evacuation routes.

Vast swaths of undeveloped and forested lands fill central Marin, from Mount Tamalpais to lesser known ridgelines and peaks in the north. These county, state, national, and water district properties are bordered by, and in some cases interspersed with, remote residences and small communities. As weather patterns shift and the next drought looms, the wildfire threat to interior Marin appears to be growing by the year.

The Measure C ballot language doesn't explicitly refer to climate change, but the official argument in favor led with a clear message: "So far, Marin has escaped a major fire. However with longer, hotter, drier

fire seasons combined with abundant natural vegetation, the need for coordinated fire prevention is crucial."

The Central Marin Fire Department, which serves Corte Madera and neighboring Larkspur, is on heightened alert after recent fire seasons, says fire marshal Ruben Martin. This year it has worked "aggressively" to improve evacuation routes and remove hazardous vegetation along roadways. "Due to climate change, we have been experiencing longer fire seasons," Martin says. "Historically, Marin's fire season began in May and ended in October. We are now experiencing vegetation fires as late as December."

Sarah Minnick, a vegetation and fire ecologist with Marin County Parks, says a landscape and vegetation mapping effort now underway will help the county prepare for and fight future wildfires. "This can provide us insight into some opportunities to address tree mortality or fuel buildup," she says. The new maps can also be compared against older, less-detailed "landform" maps to see how vegetation types have shifted over time — from grassland to shrubland, for instance. "This is impacted by climate change and has implications for fire and how it moves on the landscape," Minnick says. **NS**

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Also in 2019, Point Blue and the San Francisco Estuary Institute, in partnership with the county, developed a separate framework designed to help planners Bay Area-wide include nature-based strategies alongside or in place of hard infrastructure like seawalls and bulkheads as they prepare their shorelines for rising tides. Using four Marin cities located at creek mouths as case studies, the report evaluates the landscapes and shorelines for nature-based adaptation opportunities and constraints, and includes colorful maps detailing outcomes (see diagram).

Beaches, tidal marshes, oyster reefs, ecotone levees, and other sorts of living shorelines that provide wildlife habitat as well as flood protection already figure prominently in adaptation

efforts in every corner of the county, from Tomales Bay to Richardson Bay to diked Baylands in Novato.

Leventhal, who's helping lead a number of these projects, says natural shorelines can buy planners a couple decades by providing wind and wave protection and reducing erosion, but ultimately won't be enough.

"If sea-level is really going up on the order of feet, [these projects won't] necessarily stop that," he said. "The scale of the problem is so big that I don't know of anything [currently] being implemented that's going to make a significant difference."

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