

STUDY

Losses of marshes would be jolt to coast

Rising sea level might lead to increased floods

By Mark Prado

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Marshes that afford flood protection and support an array of wildlife along Marin's bay coast could drown as the sea level rises over the next 50 to 100 years, according to a study released Wednesday.

As the muddy, vegetation-laden life-supporting marshes diminish and are replaced by free-flowing sea water, species such as the California clapper rail, the salt marsh harvest mouse and rare plants could struggle for survival, according to the study, led by PRBO Conservation Science, a Petaluma-based organization with offices in Marin.

Flooding in coastal areas could also increase because the sponge-like marshes would be overrun. The fishing industry could also suffer: 70 percent of commercial fish depend on marshes for all or part of their lives.

"Tidal marshes are incredibly resilient to changes in

See MARSHEs , page8

Article Continued Below

[See MARSHEs on Page A08](#)

MARSHEs

From page 1

sea level, depending on how fast seas rise and how much sediment is available," said Diana Stralberg, the study's lead author. "Unfortunately, marshes cannot keep up with the high-end sea-level rise predictions on their own. They will need our help."

PRBO joined with other researchers and found that 93 percent of San Francisco Bay's tidal marsh could be lost in the next century with 5.4 feet of sea-level rise, combined with low sediment levels.

The first-of-its-kind study assesses impacts of sea-level rise, suspended sediment availability, salinity and other factors on the bay's tidal marshes. The study was published this week in the scientific journal PLoS ONE.

"This will allow planners to make decisions that can help the marshes," said coauthor and PRBO biologist Julian Wood. "We can also help by kick-starting the restoration process by using dredge material to build up marshes."

That process could help areas like Richardson Bay, which could have its marshes hit hard by sea level rise, he said. Such an effort is occurring at the former Hamilton Air Force base where dredged material from the Port of Oakland and other locales has been used to bring a marsh area back to life. When sea levels rose during pre-modern times, tidal marshes gradually migrated onto land and into upland areas. Today levees, development, roads, parking lots and other barriers prevent that movement, threatening the future of tidal marsh habitat and dependent wildlife, according to the report.

"Our results indicate that we must start thinking now about where tidal marshes could move up to — the future potential wetlands," Stralberg said. "If we can't slow down sea-level rise, we will need to identify and protect areas where marshes can migrate to."

That may mean protecting areas from development or moving roads or buildings, researchers said.

Of the 190,000 acres of tidal marshes that existed in the bay before the Gold Rush, only 16,000 acres remain. Another 24,000 acres have been restored or are in the process of being restored — giving the bay only about one-fifth of the tidal marsh area it once had.

As people settled nearby the area was diked and drained and claimed for agriculture and housing. About 82 percent of San Pablo Bay's marshes and wetlands along Marin's shores were diked by the time of the Great Depression. These degraded baylands, many of which have been used for agriculture or salt production, should be restored by re-connecting them to the tidal flow, the report says.

Scientists believe rates of sea-level rise will accelerate in the second half of this century, giving a window of opportunity to adjust.

"The real hope for San Francisco Bay's tidal marshes, for the birds and fish that depend upon them, and for the many benefits tidal marshes provide to our

communities, is working together now to restore existing priority marshes and create new ones where feasible," said Ellie Cohen, PR-BO's president and CEO.

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