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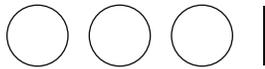
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\$63 million wetland restoration could be a blueprint for how California adapts to climate change. But it's taking forever



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UC Berkeley researcher Ariane Arias wipes down equipment to measure carbon dioxide and methane at Dutch Slough in Oakley. The 1,200 acres of delta wetlands is undergoing a state-funded project to restore its habitat and diverse ecosystems.

Brontë Wittpenn/The Chronicle

An ambitious project to restore tidal wetlands on almost 1,200 acres of delta farmland has just completed its first phase, and the hoped-for transformation already is flourishing: River otters, rare seabirds and a single black bear have all returned to once-drained-out pastureland called Dutch Slough — results that hold promise for similar efforts toward many California environmental goals, including storage of greenhouse gases.

In the Contra Costa County town of Oakley, the restored Dutch Slough wetlands are bordered by housing developments and dairy farms, with Mount Diablo towering in the distance. When completed, the \$63 million restoration will be

The state Department of Water Resources, which leads the Dutch Slough Tidal Marsh Restoration Project, hopes it will be a model for many other restorations, with a goal to restore 30,000 acres of the Sacramento-San Joaquin River Delta's original 360,000 acres of wetlands long lost to farms and housing.

At a time when worldwide greenhouse emission-reduction targets aren't being met, scientists are looking at ways to adapt to global warming; wetland restoration in San Francisco Bay and the sprawling delta holds a key strategy. Wetlands lessen destruction from flooding caused by storms and sea level rise, and also can recharge drought-starved aquifers, since they hold and release water gradually.

They also perform a key role in absorbing carbon from the atmosphere and storing it long term.

"You can put carbon in forests, where it can get burned," said Dennis Baldocchi, professor at UC Berkeley's Department of Environmental Science, Policy and Management. "But if you put it in wetlands, it can stay a very long time. The limitation is we have a limited amount of land area we can convert."





Wetlands can be seen at Dutch Sough with Mt. Diablo in the background near Oakley where wetlands are undergoing a state-funded project to restore its habitat and diverse ecosystems.

Brontë Wittpenn/The Chronicle

Baldocchi is one of several scientists now using Dutch Slough to study carbon sequestration in freshwater tidal marshes. Last week, he was joined in the field by U.S. Geological Survey ecologist Scott Jones, who is doing similar research.

Jones tottered through the wetlands in hip waders, holding high a cuboid plastic container tall enough to enclose the towering tule plants. He demonstrated how the container can be used to trap gases and then be attached to a greenhouse gas analyzer that measures how much methane and carbon dioxide that specific square foot of marsh is emitting or sequestering.

“Finding these ecosystems that can store carbon over the long term helps meet our goals for greenhouse gas reduction,” said research ecologist Karen Thorne of the U.S. Geological Survey.

Restoration began in 2018, when excavators tore into the silty soil to create channels that mimic natural tidal zones. Conservation groups planted an assortment of native plants and trees and allowed them time to establish roots before levees were breached this fall. Now over half of the former grazing land has been converted into a maze of curving waterways under a wide expanse of

Especially with wetlands' role as a natural barrier to sea level rise, it's important that the state move quickly, said Dylan Chapple, senior environmental scientist at the Delta Stewardship Council, which administers grants for Baldocchi's research.

"Every year matters," said Chapple. "Wetlands are a really critical nature-based infrastructure. The sooner they can get in the ground, the more they can persist." Without intervention, the delta is expected to see large-scale inundation by 2100, he said.