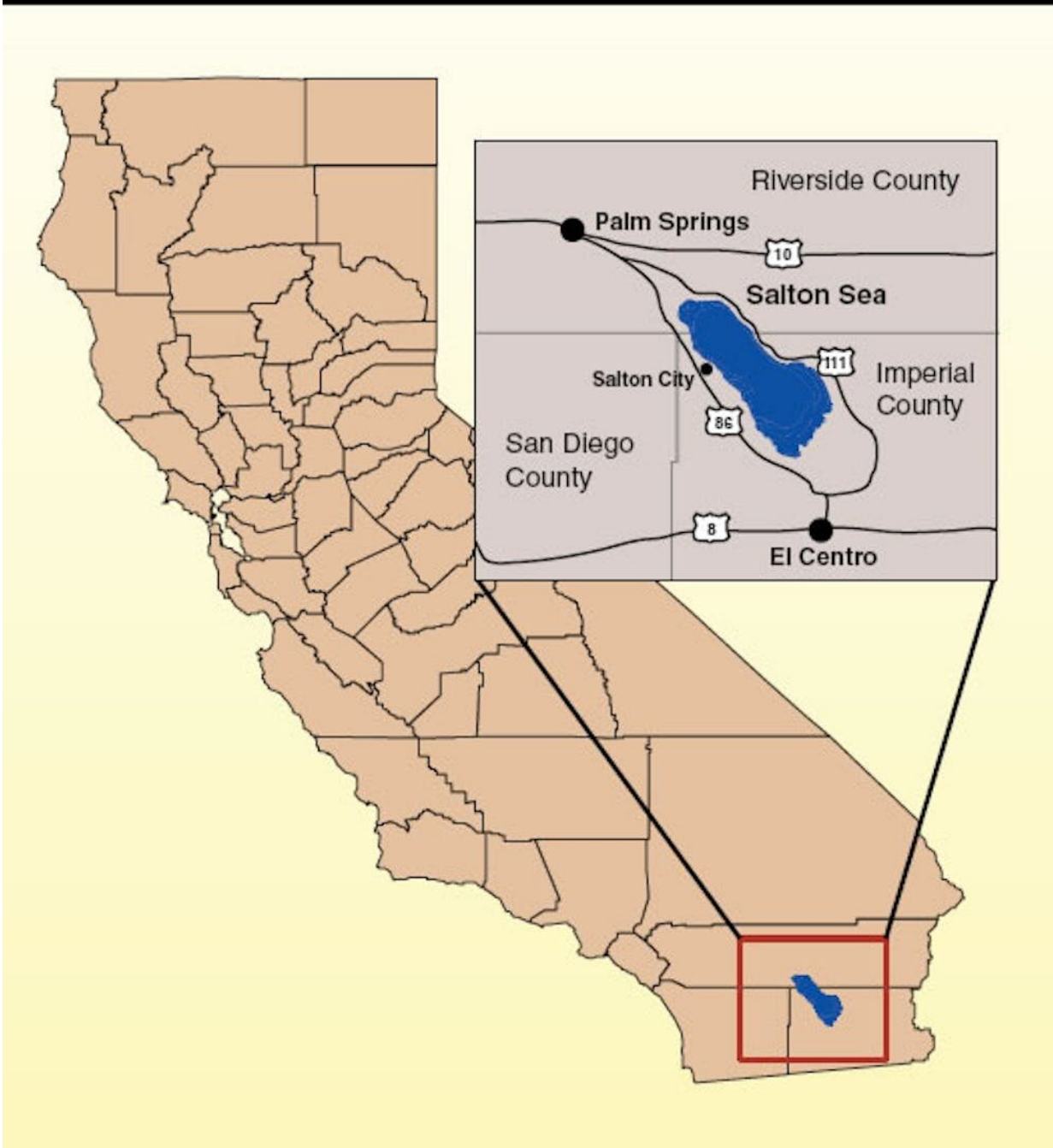


Human actions created the Salton Sea, California's largest lake. Here's how to save its ecosystem

January 11 2023, by Robert Glennon and Brent Haddad

Figure 1

The Salton Sea and Vicinity



The Salton Sea is a large inland lake in southeastern California fed by Colorado River irrigation water from farms in the Imperial Valley. Credit: [Legislative Analysts's Office, state of California](#), [CC BY-ND](#)

The Salton Sea spreads across a remote valley in California's lower Colorado Desert, 40 miles (65 kilometers) from the Mexican border. For birds migrating along the Pacific coast, it's an avian Grand Central Station. In midwinter tens of thousands of [snow geese, ducks, pelicans, gulls](#) and other species forage on and around the lake. [Hundreds of other species](#) nest there year-round or use it as a rest stop during spring and fall migration.

At the dawn of the 20th century, this massive oasis didn't even exist. It was created in 1905 when Colorado River floodwaters [breached an irrigation canal](#) under construction in Southern California and flowed into a basin that had flooded in the past. In earlier years, the sea covered roughly 40 square miles more than its current size of 343 square miles (890 square kilometers).

Since then, [agricultural runoff](#) from newly formed nearby irrigation districts has [sustained it](#). By midcentury, the sea was considered a [regional amenity](#) and [stocked with popular sport fish](#).

Now, however, this resource is in trouble. Wasteful irrigation practices that maintained the sea have been reduced, and excess water is now being transferred to thirsty coastal cities instead. The sea's volume has declined to roughly 4.6 million acre-feet, losing nearly 3 million acre-feet since the mid-2000s. (An acre-foot is about 326,000 gallons—the amount of water required to cover an acre of land to a depth of one foot).

As water evaporates from its surface, its salinity has spiked: The sea is now [almost twice as salty as the Pacific Ocean](#).

In November 2022, the [federal government pledged US\\$250 million](#) for

environmental restoration and dust suppression at the Salton Sea. It's a historic contribution, but experts agree that other critical steps are needed.

We just completed more than a year of service to the California Salton Sea Management Program's [Independent Review Panel](#), which was charged with evaluating proposals to import water to the sea. In our view, the panel's recommendations represent the best path forward. They also reflect the complexity of managing water in the increasingly dry U.S. Southwest, where other [water bodies](#), such as Utah's [Great Salt Lake](#), share the same general challenges of net water loss.

An ecosystem on the brink

There's no question that the Salton Sea desperately needs a fix. Rising salinity threatens worms, crustaceans and other organisms that make up the base of the sea's food web and has [killed off many of its fish species](#). Without intervention, the sea's entire ecosystem [could collapse](#).

The sea's declining water levels also threaten human health. Nearby residents, who are mostly [low-income people of color](#), already experience high rates of [respiratory illness](#). A recent study found that dust mobilized by wind blowing across the playa [triggers lung inflammation](#).

Without [government intervention](#), the sea would reach a lower equilibrium size by 2045 that matches smaller inflows with evaporation losses. Even greater areas of playa would be exposed, potentially generating even more airborne dust.

Many bad options

The state review panel analyzed strategies for adding water to the Salton Sea as a [long-term restoration strategy](#). Most of the proposals envisioned [pulling water from Mexico's Sea of Cortez](#), 125 miles to the south, desalinating it and moving it north by canal.

These schemes called for building immense desalination plants along the Sea of Cortez, up to 10 times bigger than California's [Claude "Bud" Lewis plant](#) in Carlsbad—the largest such facility in the United States.

The proposals could not overcome three significant problems. First, they were projected to cost many tens of billions of dollars and take more than 20 years to complete. Second, they threatened to inflict nasty environmental consequences on the Sea of Cortez, dumping huge quantities of brine into sensitive and protected marine ecosystems and turning pristine beaches into industrial zones. Third, Mexico would derive little benefit from building a huge desalination plant in a remote area, other than some jobs from building and running the plant.

Focus on salinity, not size

Ultimately, the panel concluded that expanding the Salton Sea to its former size was less important than controlling its salinity. The panel made [four recommendations](#) that center on building a desalination plant at the Salton Sea to treat water that's already there.

This plant would remove 200 million gallons of high-salinity water daily from the Salton Sea and produce 100 million gallons per day of desalinated water, which would be returned to the Salton Sea. In short order, this exchange would begin to significantly lower its overall salinity.

A desalination plant using [reverse osmosis](#) generates a brine stream equal to approximately half the volume of the treated seawater. Accordingly,

the panel called for California to negotiate a voluntary paid transfer program in which the state would pay farmers to transfer enough water to the Salton Sea to replace the volume of brine removed at the desalination plant. The net effect would keep the sea from becoming even smaller and hasten the process of lowering salinity.

The [desalination plant](#) would generate an immense quantity of salt, which would require careful disposal. The panel recommended drying out the brine in evaporation ponds and transferring dried salts from the ponds to landfills or industrial uses.

Finally, the panel called for California to step up support for an aggressive program to stabilize the exposed playa. Techniques could include planting vegetation on the playa and plowing long rows of furrows to reduce dust mobilization during wind storms. The estimated total cost for this plan is \$63 billion, compared with \$95 billion-\$148 billion for various proposals to desalinate and import water from the Sea of Cortez.

Since 2020, the state has conducted [pilot projects](#) to reduce dust blowing off the playa, with promising early results. The federal government's \$250 million pledge will enable this work to move more quickly.

Stabilizing the playa is essential to address significant public health concerns associated with windborne dust, although more must be done regionally to fully address [air quality problems](#).

Looking forward, not backward

This approach will not satisfy critics who want to restore the Salton Sea to its maximum volume. These advocates recall the mid-20th century when the sea was [a tourism draw](#) and would like to reconnect the few small towns that once bordered the sea, which are now separated by

extensive playa. Expanding the sea to its original size also would address concerns about playa-sourced air pollution.

In our view, however, the panel's recommendations offer a genuine opportunity to solve the main problems: blowing dust and increasing salinity. This solution is more likely to actually be implemented than an enormous binational desalination project. It would happen more quickly, at about half the cost of the binational importation options.

We believe that the sooner California officials accept the reality of a smaller Salton Sea, the sooner the state can move ahead, focusing on air quality improvement and ecological restoration.

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