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1. WATER: No perfect solution for Salton Sea restoration, but many options presented

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The Salton Sea, California's largest lake and long a desert refuge for vacationers and hundreds of species of migrating birds, will inevitably shrink in volume and lose surface area over the next two decades, as about half of current inflows are diverted to help quench Southern California's unflagging thirst for water.

Exactly how to prevent or mitigate the worst problems associated with this situation -- increased salinity, worsening air quality, continued threats to the local economy and the virtual elimination of fish and wildlife -- has become a top priority for government officials, agricultural groups, Indian tribes and environmentalists. But it is also a conundrum, as starkly differing visions of how to preserve and restore this inland sea have made it difficult to reach consensus on a workable, affordable strategy.

The only things parties seem to agree on is the importance of the task and that every possible solution will end up costing billions of dollars.

Now, after a nearly three-year planning effort that is expected to cost nearly \$20 million, the California Resources Agency has presented a draft plan for Salton Sea ecosystem restoration that described eight alternative scenarios meant to balance competing requirements for environmental protections, recreational uses, farming needs and local developmental impacts. And while the programmatic environmental impact report (PEIR) issued this month also includes a "no action" alternative, it is clear that "letting nature take its course" is not an option.



The Salton Sea offers a mix of recreation and wildlife habitat but its future is uncertain. Photo courtesy of the Salton Sea Coalition.

During an all-day meeting this week of the Salton Sea advisory committee -- made up of nearly 30 representatives of state, federal and local agencies, environmental groups, tribes and other stakeholders -- state officials worked their way through the massive PEIR document to lay out their analysis of the various alternatives while admitting to still-gaping holes in critical information necessary to present state lawmakers with a preferred alternative by next April.

"There are a lot of questions for which we don't have answers," Resources Agency Secretary Mike Chrisman told *Land Letter*. "This is a huge, huge project. We've been trying to make sure that we do as much information gathering as we can. Our goal is to keep the process open, keep the dialog going. How this will ultimately play out, I cannot say."

Dale Hoffman-Floerke, chief of the Colorado and Salton Sea office of the state's Department of Water Resources, is project manager for the PEIR process. She explained to the group that each of the offered alternatives employs a basic set of components to represent a wide range of options. "We explored over 200 alternatives that we broke into eight programmatic alternatives," she said. "This is just to pick the overall concept."

Among common features of each scenario are ways to deal with air-quality issues, maintenance of a saline habitat for wildlife, a brine sink to capture excess salinity, and preservation of a large lake--whether a moderately deep (less than 10 foot) marine sea, or a much deeper (55 foot deep) waterway. Several include construction of a dam that would be 75 feet high and up to 12 miles long.

One alternative considered but immediately rejected was the "whole sea" concept of trying to maintain Salton Sea essentially as the deep-water lake is now because it would require new sources of inflow from the Colorado River, from the Pacific Ocean or from Mexico. "We cannot acquire land or facilities for the whole sea concept," she said.

Another major uncertainty is the amount of water that will be available beginning in 2017. As a result of the Quantification Settlement Agreement (QSA) signed in 2003 by Western states with allocations of Colorado River flows, and the terms of a water transfer deal between the Imperial Irrigation District and the San Diego County Water Agency, IID must convey a certain amount of water into the sea until 2017.

But even if the QSA were not a factor, state planners say that surface elevations in the Salton Sea will drop by several feet, increasing a salinity problem and hydrogen sulfide concentrations that are already causing large-scale die-offs of fish and birds. After 2018, according to the PEIR, water elevations will decline rapidly, worsening the problems for decades to come. "The surface water area would decline from the existing 230,000 acres to 213,000 acres in 2018, and 140,000 acres by 2078," the report says. As a result salinity will increase more than six-fold.

For the purposes of developing alternative scenarios, Hoffman-Floerke said, DWR is using a "very conservative" in-flow figure of 650,000 acre-feet per year, based on an 80 percent probability averaged over 60 years. A moderately conservative figure would be about 715,000 a/f-year, but she admitted, "some years the number will be higher and some years much lower."

Given those major assumptions, the eight alternatives for sea restoration are:

- Saline Habitat I: Featuring a 38,000-acre saline habitat in the south part of the lake bed, with large brine sink and 77,000 acres of exposed playa. The habitat would support tilapia, invertebrates, and variety of birds. There would also be protections for desert pupfish. Capital cost is expected at \$2.3 billion, with an operations and maintenance budget averaging \$91 million annually through 2078.
- Saline Habitat II: This variation doubles the size of the saline habitat to 75,000 acres, spreading it around the south, west and north portions of the lake. Cost: \$3.3 billion, plus \$107 million annual O&M.
- Concentric Rings: Creates two concentric bodies of water, a brackish water body and a marine lake, using rock-filled dikes and establishing a shoreline around the entire Sea. Cost: \$4.9 billion and \$138 million/year.
- Concentric Lakes: 88,000 acres of multiple lakes and waterways created by using geotube berms, or tubes filled with material dredged from the lakebed. Unlike prior alternatives, this would support irrigation water and motorized recreational boating. Cost: \$2.3 billion, plus \$20 million annually.
- North Sea: A 62,000-acre deep-water Marine sea on the north end of the bed, separated from a 45,000-acre saline habitat by a dam constructed from large rocks and gravel. Cost: \$4.5 billion, plus \$134 million/year.
- North Sea Combined: Featuring a somewhat larger marine sea of varying depths and a smaller habitat with more exposed playa. Cost: \$5.9 billion, plus \$149 million per year.
- Combined North and South Lakes: A deep waterway would extend along the western edge of the lake shore to the Alamo River, with a saline habitat in the south, a storage reservoir and upstream wetlands. Cost: \$5.2 billion, plus \$82 million per year.
- South Sea Combined: In this alternative the deep lake is in the south portion of the seabed, combined with a moderately deep lake in the north, connected by a western waterway. Cost: \$5.8 billion, plus \$145 million per year.



One option for restoring the Salton Sea would split the lake in two. Map from Salton Sea Authority. Click on map for a larger version.

While DWR has identified Concentric Rings as having the "least adverse" environmental impacts, planners have not specified a preferred alternative. A "report card" issued by the Salton Sea Coalition of 13 environmental groups found all of them lacking in major respects, with the highest grade being a "B-" for the Saline Habitat variations.

And yet another idea

Separately from the state PEIR process, the local Salton Sea Authority has been developing its own plan that it would like to see chosen as the preferred alternative. Similar to the state's Combined North and South Lakes option, but with some recent modifications, the Authority's goal is to preserve as much of the deep-water lake as possible to enhance recreation by building a rock dam, and enhancing water quality through construction of treatment plants to remove phosphorous and hydrogen sulfide. Among changes to the plan include moving the dam further north to increase a southern habitat and accommodate expected lower inflows.

Rick Daniels, executive director of the Authority, said that the project would cost about \$5 billion but could result in economic benefits several times the cost. The Authority is working with University of California at Riverside, on a benefits study. "Nobody is really focused on the benefits of recreation and wildlife protection," he said. Past studies have focused on business, he said, but there is a value to habitat restoration and a value to threatened and endangered species that has not been quantified. "When you look at it, the benefits to the national economy could be tens of billions of dollars."

The Authority has been gathering support for its plan with local meetings every day and will begin a television campaign in November to get the public involved. It has already gotten 30 communities and groups to pass resolutions of support, Daniels reported.

Uncertainties Abound

The feasibility of many of these alternatives for Salton Sea restoration rests on still-unknown factors, such as the availability of large rocks and gravel to build dam and dikes, or whether the presence of concentrations of hydrogen sulfide will rule out any deep-water lakes as too risky for fish or humans.

Also, some potentially major costs, such as land-rights acquisition, continued air-quality monitoring, and sources of funding remain unknown at this stage.

The federal Bureau of Reclamation is in charge of conducting several studies into these matters. Mike Walker, Reclamation's Salton Sea restoration project manager, cautioned that some studies may not be completed in time for their results to be reflected in the state's PIER process for taking public comments through mid-January. He expects a draft report to be out in mid-December, with a final version completed in March or April. He also admitted that "We don't have a source of rock identified at this point," though he said that was not a fatal flaw—even though an alternative dam design could be much more expensive and pose increased seismic risks in an area prone to earthquakes.

This lack of resolution on key matters proved troubling, especially to members of the advisory group representing environmental concerns. "This is a critical piece we've been waiting on," said Julia Levin, state policy director for California Audubon. She and others expressed a concern that there would be insufficient time for public comment under the California Environmental Quality Act (CEQA) rules or adaptation of plans if the Reclamation studies turn big problems.

"All I can do is assure you that we're working very hard to get through the legal requirements," Walker responded.

As the day wore on, the environmental groups became more concerned about the large uncertainties involved in restoration planning and the legislative timeline. "Are we trying to squeak through the CEQA process or are we trying to get the best information?" asked an exasperated Kim Delfino, California program director for Defenders of Wildlife. "We're suspending our disbelief on land acquisition, on funding and other big issues. When are we entering the realm of Fantasyland?"

Though some group members pressed the issue of whether there should be an extension of the PEIR public comment period, that does not seem to be in the cards. Mike Chrisman, head of the Resources Agency told *Land Letter*, "I'm not convinced yet we need to extend it. I think a 90-day comment period will be enough. We'll miss the Legislature's deadline and that's troubling to me." But, he concluded, "Our goal is to get this right."

[Click here](#) to view the Salton Sea PEIR.