Restoring the Salton Sea, Part 2: Ecological Collapse or Restoration? Problems and Potential Solutions

Warning Signs

Although most of the attention has been focussed on the salinity problem, another significant factor is characteristic of closed basin lakes: eutrophication. Fueled by nitrates from fertilizers and warm temperatures, algae blooms create a boom-and-bust cycle, flourishing and then dying off, depleting the water of oxygen as they decompose. Fish are killed by the hundreds of thousands, creating more biomass for decomposition and so on. Beginning in the 1980s, the Salton Sea began to experience large-scale die-offs of fish and waterfowl: 150,000 eared grebes in 1992; a severe botulism outbreak killing over 15,000 birds in 1996, including 1,500 brown pelicans; the appearance of Newcastle's disease in 1997, wiping out an entire nesting colony of double-crested cormorants, and numerous other incidents over the past 20 years.

Potential Solutions

The Salton Sea Authority—a joint-powers agency comprised of the Coachella Valley Water District, the Imperial Irrigation District, Riverside and Imperial Counties—produced an Engineering Alternatives study that examined the feasibility of 54 different solutions to the problems facing the Salton Sea, ranging from biofiltration and desalting options to No Action. Of these, two or three major suites of alternatives were identified for further evaluation: diked impoundments; pump-in/pump-out alternatives; and water quality treatment plants.

The diked impoundment concept would construct dikes or levees within the Salton Sea basin. Controllable weirs would let water into the impoundments and allow evaporation to concentrate the salts. More water is allowed to flow in and salt concentration continues over the years, thereby freshening the remaining water in the lake. This is a tried-and-true technology since humankind has been controlling saltworks in the Middle East thousands of years ago. Several problems are inherent in the diked impoundment alternative, however. The area set aside for impoundments will become biologically dead and, depending upon one's calculations, as much as one third of the lake surface area would have to be set aside as diked impoundments in order to provide a "sink" for the annual salt load. The impoundments would have to be constructed of materials capable of withstanding seismic activity and would have to be imported; one could not simply use the lake bottom sediments because of the potential remobilization of contaminants, and they would not meet geotechnical construction standards in any case. Ultimately, the brine solutions must be disposed of "off-site", either in another nearby closed basin (Ford or other nearby dry lake beds) or the Laguna Salada basin in Mexico. Also, the diked impoundment alternative assumes that there is a steady water supply to the Salton Sea—not necessarily so, what with potential water exports to the L.A. Metropolitan Water District or to San Diego, and with the Colorado River being 10% over-allocated already, in which case one might find dikes high and dry, or under water during potential flood conditions.

The pump-in/pump-out alternative would involve pumping out hypersaline water through pipes and/or existing drainage canals to another closed basin, or pumping out to the Gulf of California, essentially converting the Sea from a closed to an open basin. The potential impacts of pump-out on the marine life in the Gulf would have to be evaluated, but preliminary feasibility studies have indicated that dilution would render these contributions to the Gulf insignificant. And if one can pump out, one can also pump in: pumping ocean water from the Gulf into the Salton Sea, thereby lowering the salinity to levels approaching those of the ocean and capable of supporting a viable ecosystem. This alternative would effectively stabilize lake elevations as well.

Finally, there are potential water treatment facilities that could be sited along the three tributary rivers. U.S. Filters has proposed to construct a pilot treatment plant on the Alamo River to scrub influent for agricultural re-use. Another proposal would establish a series of treatment marsh wetlands along the New River from Mexico to the Sea, creating additional wetlands, but also increasing evaporative surface area. Such a system can remove fertilizer and pesticide residues, but would exacerbate the salinity problem somewhat.

Pending legislation before Congress would allocate $370 million toward evaluating these alternatives, conducting feasibility and preliminary design engineering studies, selecting a restoration project, preparing an environmental impact study (Federal EIS) and environmental impact report (State EIR), and finally constructing and implementing the project.

The problems appear daunting and complex, but I am confident that we can save the Salton Sea. Toward this end, the University of Redlands' Salton Sea Database Program is collecting data and developing a geographic information system (GIS) pertaining to the Salton Sea restoration efforts. Through our web site, we will be able to analyze the data and serve this information back out to the decision-makers, stakeholders and general public.

For more information, visit the SSDP site at: *http://cem.uor.edu*

— Tim Krantz