

A Summary of Environmental Issues Which Effect the Restoration of the Salton Sea

By

James C. Kelley, PhD.

The Salton Sea is an ephemeral feature of the environment. It is not an old growth forest. Old growth temperate forests, tropical rain forests, deserts, tundra and coral reefs are examples of ecosystems in equilibrium attained over thousands of years in relatively stable climatic regimes. The Salton Sea, by contrast, has come and gone repeatedly at least since the Pleistocene and would have continued to come and go, were it not for damming the Colorado River. Originally the Gulf of California extended north to the Salton Sea and they were one body of water. As the Colorado River delta built seaward, the Sea was cut off and dried up. Periodically (every few hundred years), the Colorado flooded the delta and refilled the Sea, only to have it dry up again.

Today the Colorado delta is migrating northward due to the loss of Colorado River sediment to maintain it. The Gulf of California is expanding to the north. At the same time, the marine ecosystem in the northern Gulf of California has changed from an estuarine environment to a largely marine environment because fresh water which naturally flowed into the Sea has been diverted upstream for agriculture and residential uses.

Altogether, therefore, the entire Salton Sea-Colorado Delta system is one which was naturally variable, but whose variability has been reduced due to human activity on the River and which is currently rather static. One aspect which is not, is the Cienega de Santa Clara, a wetland which has developed in the Delta fed by the discharge of brackish water from the Wellton-Mohawk Irrigation District canal, a drain from the saline Yuma aquifer. The Cienega attracts a variety of neotropical migrant birds traversing the Pacific Flyway on their way to and from wintering feeding areas in northern Mexico.

The Salton Sea itself is a hypersaline lake (salinity $\approx 40\text{‰}$). It supports one native fish, the desert pupfish. Other fish species such as talapia have been introduced but are being lost because of the increasingly the hypersaline condition of the Sea. Most of the freshwater flow into the Sea is from agricultural runoff and the inflow of the New River which carries untreated sewage across the international border from Mexicali. This wastewater is treated in a model treatment wetland before it enters the Sea. In the shoreline areas where this freshwater enters the Sea there are large concentrations of shorebirds. The central part of the Sea, however, is largely devoid of life, including human recreational activity.

The population of the Mexicali region across the international border to the south is supported by a large agricultural enterprise that depends upon groundwater which leaks out of the All American Canal just over the border to the north.

We should like to address three primary proposals under consideration for the future of the Salton Sea to reveal some of the environmental costs and benefits of each.

1. The ***No-Action Alternative***, which proposes to let the Sea continue to shrink and become more saline. This alternative is natural, cheap and will eliminate the ephemeral wetlands in the shoreline areas with a concomitant loss of avian stopovers. The Sea area will revert to a salt pan and increase air pollution in the Imperial Valley. The alternative will be aesthetically unattractive and eliminate the already very limited recreational value of the area.
2. The ***North Lake Alternative***, favored by the Salton Sea Authority proposes to construct a large dam across the center of the Sea and sequester the remaining hypersaline water in the north end of the current Sea, allowing the southern portion of the Sea to dry up creating a large salt pan. This alternative is expensive and risky in the highly seismically active Imperial Valley area which is subject to earthquakes of magnitude 6 or greater approximately every decade. The North Lake alternative maintains the current shoreline in the northern part of the Sea, but completely abandons the southern portion. It essentially produces a smaller version of the current Sea, a uniform hypersaline environment which will be no more attractive to birds and other wildlife, nor more supportive of aquatic life, than the current Sea. It likely will produce a Sea with no more recreational value than the current situation and will certainly be less attractive aesthetically.
3. The ***Cascade Alternative***, advanced by the Salton Sea Restoration Consortium, would construct low dikes concentrically around the interior of the current Sea, producing a series of concentric lakes and intervening islands. In this alternative, the concentric lakes form a series of cascades and which will have salinities which vary from that of the inflow water ($\sim 2\%$ — one can taste salt at 4%, so the water will be quite fresh) to that of ocean water ($\sim 35\%$). The lakes will drain finally into a pair of brine ponds in the center of the current Sea area which will be small hypersaline lakes surrounded by an area of relatively dry land, but land which can support halophytic vegetation. This alternative is environmentally attractive because it produces a diversity of aquatic habitats in the range of salinities which exist in the Gulf of California and the mangrove areas on both sides of the Baja California peninsula. These lakes will be attractive to birds using the flyway and will support a variety of introduced fish species. The Cascade Alternative will reduce air pollution considerably below that produced by alternatives 1 and 2 because there will be no large areas of salt crust over which the wind can work to suspend particulates into the atmosphere. The Cascade Alternative is seismically much less risky than the North Lake alternative because the dikes are low and are built using the well established technology of geotubes which stabilize the dike material so that it will not fail catastrophically as would the large dam envisioned in the North Lake Alternative. It will also be much less expensive to construct and much less environmentally intrusive during the construction phase as it can be built underwater, with no long distance transport of material or atmospheric pollution. The Cascade Alternative will produce a Sea which is not only environmentally rich and attractive to wildfowl and other

wildlife, but which is aesthetically attractive and which greatly enhances the recreational potential of the area.

The Colorado River delta was once a biologically rich and diverse ecosystem, characterized by a wide range of salinities and other environmental variables. This rich environment has been lost with the restriction of fresh water from the Colorado River. The Cienega de Santa Clara was formed accidentally from the release of brackish water from the Welton-Mohawk MODE canal and demonstrates that new wetlands will attract abundant wildlife. At the same time, the Cienega could disappear at any time. The Cascade Alternative for the Restoration of the Salton Sea will provide the rich and diverse environment which once existed in the Delta and which today exists in the Cienega, and will do so on a permanent basis. It will, in turn, provide 350 miles of new littoral environment and an aesthetically attractive resource to the present and future human populations of the Imperial Valley and beyond.

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“Dawn on the Delta was whistled in by Gambel quail, which roosted in the mesquites overhanging camp. When the sun peeped over the Sierra Madres, it slanted across a hundred miles of lovely desolation, a vast bowl of wilderness rimmed by jagged peaks. On the map the Delta was bisected by the river, but the river was nowhere and everywhere, for he could not decide which of a hundred green lagoons offered the most pleasant and least speedy path to the Gulf. So he traveled them all, and so did we. He divided and rejoined, he twisted and turned, he meandered in awesome jungles, he all but ran in circles, he dallied with lovely groves, he got lost and was glad of it, and so were we....A verdant smell of mesquite and willow separated the channel from the thorny desert beyond. At each bend we saw egrets standing in the pools ahead, each white statue matched by its white reflection. Fleets of cormorants drove their black prows in quest of skittering mullets; avocets, willets, and yellow-legs dozed one-legged on the bars; mallards, widgeons, and teal sprang skyward in alarm. As the birds took the air, they accumulated in a small cloud ahead, there to settle, or to break back to our rear. When a group of egrets settled on a far green willow, they looked like a premature snowstorm....What matters is that we were sharing our wilderness with the wildest of living fowl. We and they had found a common home in the remote vastness of space and time; we were both back in the Pleistocene.” Aldo Leopold, Sand County Almanac, 1949.