



Salt and the Central Valley: Crisis or Opportunity?

(Intro 1)

Water is the livelihood and lifeline of the Central Valley.

It quenches the fertile valleys that feed our nation and much of the world. It supports growing populations of families and the commerce, manufacturing and industry that come with them.

But look along some irrigation fields, vacant lots, even in the yards of some homes and you will witness patches of crystalline deposits, “white death” as it is called in this region, more commonly known as salt.

(Intro 2)

Salt is an essential mineral for life.

But in excess, it can poison drinking water, ruin farmland, and at its worst: leave entire regions unable to support human habitation.

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For decades, salts and nitrates have leached and become concentrated in the soil and groundwater of this basin, with no way to get out. The deposits come from fertilizers used on crops; the residue from the processing of the Valley’s bountiful yield, the growing and processing dairy products; beef, dairy, swine, poultry and other livestock operations; detergents, soft water conditioners and wastewater from homes, industries and businesses; and storm runoff from streets, yards, and fields.

More than 1.5 million tons of salt are deposited in the Central Valley each year at an estimated annual cost of \$544 million to residents and industry, according to a 2009 study by U.C. Davis, “Economic Impacts of Central Valley Salinity.” If nothing is done to address the situation, the study forecasts direct costs associated with salinity tripling to \$1.5 billion a year statewide by 2030.

This is collective problem that needs a collaborative solution. Our focus is on planning, for effective and practical regulation.

There are many ways to address the problem. CV-SALTS and the Central Valley Salinity Coalition are evaluating three options:

OPTION ONE: Status Quo

What would happen if we did nothing additional to address the problems of salinity in the Central Valley?

Already, the increased salinity is having an impact on environmental, social and economic factors in the valley.

Environmental: Elevated concentrations of salt and nitrates contaminate the soil and groundwater, often acting as a poison to certain plants and the animal species that depend on them. In extreme cases, increased salinity can create a moonscape appearance similar to that of the Dead Sea, the most saline water body on Earth with concentrations of salt reaching 10 times that of the ocean in its depths. There are no animals living in the waters, only a few species of bacteria and algae survive there.

Photo here of an example of the problem or solutions outlined on this page.

In the Central Valley, concentrations of salt have posed problems for certain crops. Salinity also contaminates the groundwater, requiring water districts to seek alternate, more expensive sources or to charge higher rates in order to take on more expensive treatment processes that sometimes still leave the liquid coming out of the tap unfit to drink.

Photo here of an example of the problem or solutions outlined on this page.

Social: Increased salinity can require lifestyle changes for the people who live or do business in the Central Valley. Restrictions on certain water softeners, certain detergents, and even the amount of food waste you put through your garbage disposal have been proposed. Industries such as food processors are being watched to determine the impacts of their wastewater discharges. In order to meet the growing demand for food in our world, agriculture is

being forced to seek out new and innovative irrigation techniques and cropping strategies to address the problem and still meet the growing demand for food in our world.

Economic: All this adds up to a cumulative effect that stretches beyond the borders of the Valley. “Failure to control salinity will result in the continued decline of Central Valley water quality and an increase in costs to all water users, eventually creating even greater hardship for the environment, agriculture, industry, municipal utilities, and the economy of the Valley and the State,” the U.C. Davis report stated.

The research team put the direct annual costs of these problems at as much as \$1.5 billion a year by 2030. Residual impacts to the Central Valley could reach \$2.2 billion annually, with loss-of-income impacts on the entire State of California hitting as much as \$3 billion a year, the university found.

That’s not the end of it. Projected impacts to the Central Valley, coupled with the loss-of-income effect on the state would lead to a reduction in the manufacture of goods and services: as high as \$8.7 billion a year for the state. Doing nothing is an option that regulatory agencies will ultimately not allow, due to the catastrophic impacts projected..

Ripple Effect:
California’s manufacturing sector could lose up to \$8.7 billion annually

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OPTION TWO: Manage salinity at its source

What if Central Valley residents, businesses and industry adopted practices that reduced the amount of salts and nitrates going into the basin?

The more water consumed in the Central Valley, the higher the concentrations of salt and nitrates generally become. This formula becomes especially problematic as the region grows in population and industry and agriculture work harder to boost productivity to meet a growing international demand for food.

Current and developing technology and practices offer solutions to keep the salt and nitrates out of the soil and groundwater.

Some of these even present opportunities to generate revenue for the region through the sale of highly concentrated salt water, called brine, for industrial and other uses.

Photo or graphic describing problem or solution on this page

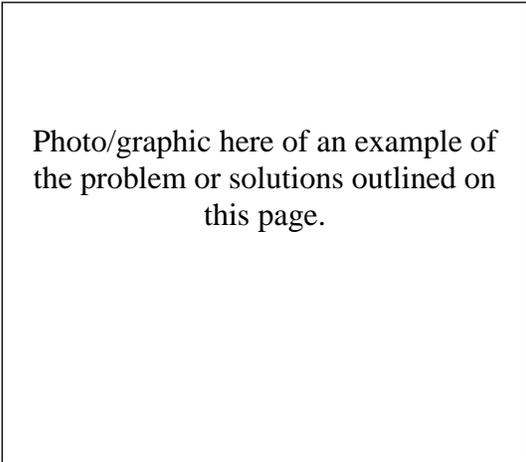
Some of these approaches include:

Lifestyle Shifts: Simple steps taken at home, such as using drier sheets instead of fabric softener, using water softeners with replacement filter cartridges, or limiting your use of the garbage disposal can have a collective impact on the reduction of salts in the water. Very important for a very significant reduction of salinity, particularly nitrate, is limiting the use of pesticides and fertilizers at home and in agricultural, and the use of organic practices where possible.

Salinity Management: There are a number of techniques available to managing salinity through collection and evaporation. Many of these approaches create barriers that block nitrates and salts from entering the soil and groundwater below. The water is collected and can either be allowed to evaporate, or be used for beneficial purposes such as irrigation for salt-tolerant crops like those grown for biofuels or aquaculture.

Effluent Treatment: Wastewater and runoff, called effluent, contributes to the region's high salinity levels by washing detergents, pesticides, and other high-salt contents into the water supply. When the salt and nitrate levels become high, water agencies can either treat the water or allow it to evaporate in detention basins, leaving concentrated deposits behind.

Brine Storage and Recovery: Concentrated brine could be a marketable commodity in the future, and storage may be a desirable medium-term option. Brine could be stored in deep oil well zones and in areas where the groundwater is already highly saline, such as in the Tulare Lake Basin. Storing the brine would preserve a potentially valuable commodity for the region as new technologies increase demand for the product.



Explore developing technology: Innovation is producing new and effective ways to treat effluent, including membrane processes that allow for the conversion of brine into marketable products that are extracted from the brine, and leaving fresh water in its place.

Commercial-grade zinc and other minerals can be mined from brine, and the water itself can be used as a cooling liquid for energy generation projects. In California's Imperial Valley, a mineral recovery project creates jobs and increases revenue for eight geothermal power plants operating along the Salton Sea.

Separating salts, nitrates and other minerals from brine could spark new industry for the Central Valley region. Many consider salinity management, as outlined above, a critical step to protecting the future of the valley, and to addressing California's dire water needs.

By beginning the long journey today towards effective salinity management, the Central Valley will begin to address the problem, and establish opportunities for innovative approaches that can be carried into the future.

Marketing elements from brine creates new industry and enhances the fresh water supply.

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OPTION THREE: Manage salinity at its source, collect and export brine

What if brine effluent and its byproducts were collected, separated and transported for sale or disposal as far off as the ocean?

A third option takes the concepts of managing salinity and seeks beneficial solutions that can either generate revenue or lead to the successful export of salts and nitrates from the Valley.

Because of the collective nature of the problem, a collaborative approach involving communities, industry and agriculture would achieve solutions through regional systems that reduce the economic impacts to any single user. Government, nonprofits and businesses would work together in partnership to develop and implement these programs that manage, reclaim and may ultimately dispose of brine to the ocean.

Discharge Stations: One or several discharge stations could be set up throughout the Central Valley to treat the brine and separate marketable materials from it.

Transport: Treated effluent could be sold for irrigation of salt-tolerant crops, for industrial purposes, or it could be processed even further for ocean discharge cleaner than wastewater currently piped to the same ocean outfalls.

- The transport of brine or saltwater can be cheaper than the conveyance of wastewater because it can be moved using less energy through smaller pumps, pipes and infrastructure.
- Existing pipelines and rights-of-way may reduce the cost of this option significantly. Use of existing underutilized wastewater outfalls (ocean disposal pipelines) can further reduce costs and even improve the ocean discharge outfall itself through better cleaning flows and lower concentrations of marine contaminants.

Materials Recovery: Salts, minerals and brine recovered from the separation process at discharge stations could result in a marketable commodity for the Central Valley Region.

In other regions of California, these programs have had the effect of bringing together communities, businesses and industry stakeholders together in developing together

regions uses for the byproducts expands on the concepts of managing salinity, and includes the idea of shipping effluent to discharge stations for disposal, treatment or export out of the region. For example, fresh water could be extracted from brine, leaving behind mineral and liquid concentrations that are anticipated to become marketable commodities for the future.

Discharge stations set up throughout the Central Valley would create new economic opportunity for the region.

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What can you do to help?

We need your help in providing a voice for your community, your business or industry.

Membership in the Central Valley Salinity Coalition (CVSC) is open to public or private entities that use waters of the Central Valley or are engaged in the management of salinity in the region. Primary membership is from water and wastewater agencies and associations, irrigation and water districts, and business associations that use water or are sources of salts.

Members of the public not wishing to join the coalition can participate in ongoing workshops and help keep others informed in order to assure participation from the people who live and work in the Valley.

Input and participation from a variety of stakeholders is essential to developing solutions that will provide the greatest benefit at the least cost to those impacted by the problem. Contributions for membership are based on the size of the entity, and fees are negotiable subject to Board approval.

Contributions generally range from \$10,000 to \$100,000. Contributions of \$25,000 or more qualify donors for one of the 18 Board of Directors positions.

Future year costs are not expected to rise due to membership growth and grants.

Benefits of Membership: Members work directly to develop the regulation, policy and implementation plans for salinity management for the Central Valley. They decide on future management programs and develop relationships with other critical water and resource management entities in the region.

- Members will oversee the allocation of \$5 million in grant funds from the State Water Resources Control Board for the project. CVSC Members and CV-SALTS participants will provide data, in-kind services and local information that will enable planning to address scientific and sociological aspects and needs of any given project.
- All partners will be expected to contribute funding for implementation projects.

- A dedicated source of matching funds is needed to secure State funding from grants, bonds and loans for salt management projects, anticipated to exceed \$100 million. Interim funding and a new funding initiative from the federal government will be required for planning and implementation.

We invite you to become a part of the solution. For more information, visit www.xxxxxx.com or call NAME HERE at XXX-XXX-XXXX.

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About CV-SALTS

Central Valley-Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a collaborative, stakeholder-led initiative resulting from a comprehensive effort by state and regional water boards. Its mission is to identify developing scientific and policy approaches in order to set reasonable yet effective water quality regulations and solutions for salts and nitrates within the Central Valley.

A project of the Central Valley Salinity Coalition, CV-SALTS began in 2006 as vehicle for identifying a collaborative approach to address the growing problem.