

**Downstream impacts...** The reduction of drainage discharge to the San Joaquin River has lowered selenium concentrations to very low levels, well below water quality objectives. In 2009 the State Water Resources Control Board removed selenium from the 303(d) list of impaired water bodies from the Merced River to the Delta.

## WHERE WE ARE HEADED

Farmers and water districts within the Grassland Drainage Area are committed to eliminating agricultural subsurface drainage discharges to the San Joaquin River through:

- Improvement of irrigation distribution systems in all of the districts;
- Full development of up to 10,000 acres of reuse area;
- Installation of high-efficiency irrigation systems throughout the farming area;
- A system of strategically placed wells to help lower the perched water table; and
- A treatment system to process the remaining drainage water to allow for beneficial reuse.



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## SAN JOAQUIN RIVER SALINITY MANAGEMENT PROGRAM



*Produced in  
cooperation  
with*

**PANOCHÉ DRAINAGE DISTRICT and  
FIREBAUGH CANAL WATER DISTRICT**

## THE CHALLENGE

Maintaining agricultural production in a 100,000-acre region faced with naturally occurring salts and minerals is a challenge undertaken in part by funding from the San Joaquin River Salinity Management Program (SJRSMP).

In 1998 the Grassland Bypass Project was initiated as an innovative effort designed to improve water quality in the channels used to deliver water to wetland areas and, in particular, to avoid the delivery of drainage containing selenium for habitat purposes.

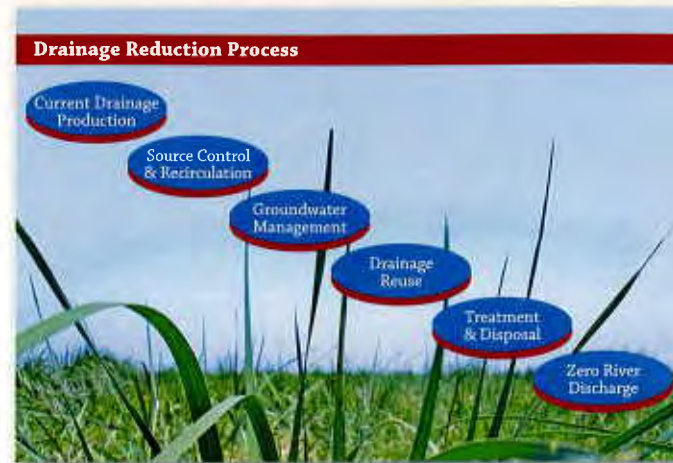


## WHERE WE HAVE BEEN

Over time, the application of irrigation water and other factors have raised these minerals toward the soil's surface and into the root zone, jeopardizing crops. Since the 1950s farmers have installed subsurface drains to lower this water table to a point below the root zone.

Naturally occurring minerals, such as selenium, are also found in the subsurface water and picked up in the tile drains. Historically some of this drainage water ended up in the San Joaquin River. In 1985, drainage water containing selenium needed to be removed from channels used to deliver water to wetland areas between the project area and the San Joaquin River.

## WHERE WE ARE NOW



Reducing drainage to the San Joaquin River is a multi-step process that involves innovative technology and adaptive management. These steps include:

**Source Control and Recirculation...** Farmers and water districts are curtailing the amount of drainage water by reducing the amount of water that is applied. One of the ways this has been accomplished is by installing drip irrigation systems on approximately 60,000 acres and converting more than 10 miles of conveyance canals with concrete or underground pipelines.



**Groundwater management...** Much of the land in the Grassland Drainage Area has a layer of Corcoran Clay approximately 400 feet below the soil's surface that creates a perched water table. Strategically located wells have been drilled above the Corcoran Clay to lower the perched water table and reduce the amount of water collected in subsurface drains that flow into discharge channels.

**Drainage reuse...** The Panoche Drainage District began applying drainage water to wheatgrass fields in 1998 to divert and reduce the drainage from flowing into the San Joaquin River. This effort has expanded to include 6,000 acres under the SJRSMP. Most of the land is planted to commercial wheatgrass and alfalfa hay. Applying drainage water for reuse requires careful management. Tile systems have been installed beneath the surface on more than 1,700 acres to maintain a salt balance in the fields.



**Project impacts...** Nearly 100,000 acres of farmland within the project area continues to be productive thanks to the efforts to reduce drainage water to the San Joaquin River, resulting in:

- A value of more than \$400 million in annual crop harvests;
- Employment of hundreds of workers on a year-round basis and thousands more on a seasonal basis; and
- An additional \$250 million in economic activity generated by neighboring farms that supports rural communities.