

## Case Studies – Water Quality

### Stockton Ship Channel Dissolved Oxygen

In January 1998, the State Water Resources Control Board (SWRCB) placed the San Joaquin River Deep Water Ship Channel (DWSC), located downstream from the city of Stockton, on its list of impaired water bodies. The DWSC regularly experiences periods of low dissolved oxygen (DO) concentrations, which often violate water quality objectives. In addition to its potentially harmful effects on fish inhabiting this part of the Delta, low dissolved oxygen is thought to act as a barrier to upstream migration of adult salmon in the fall months.

Investigations into the causes of DO depletion in the ship channel have identified multiple contributing causes, including discharge of oxygen demanding substances, including ammonia, into the San



Joaquin River from the City of Stockton wastewater plant; loads from upstream; reduced flows through the ship channel; and changes to channel geometry caused by dredging to accommodate ship traffic. There are still some important information gaps related to this problem. Sources of algae and other oxygen demanding substances from upstream are not completely understood and the potential for source control and remedial measures, such as aeration, to resolve the DO require further study.

The Costa-Machado Water Act of 2000 (Proposition 13), allocated \$40 million to address the dissolved oxygen problem in the Stockton Ship Channel. Funding ,primarily administered through the CALFED Ecosystem Restoration Program, has gone to projects to investigate the causes of the DO problem and to identify and implement solutions. One such project was construction of a pilot aeration system at the Port of Stockton. Completed in 2008, the pilot aeration system was designed to deliver as much as 11,000 pounds of oxygen per day to the ship channel. This amount of oxygen could theoretically prevent oxygen concentrations from dropping below the applicable standard under most circumstances. Initial testing has been conducted, but funding constraints have prevented full implementation of this project.

Upgrades to the Stockton wastewater plant that were implemented to address other water quality concerns, have reduced loads of ammonia which appears to have improved recent dissolved oxygen levels. The most recent monitoring data indicates that dissolved oxygen concentrations are higher than would have been expected under similar conditions in the past.

More information on Stockton Ship Channel dissolved oxygen can be found on the following web sites:

[Department of Water Resources - Stockton DWSC Demonstration Dissolved Oxygen Project](#)

[San Joaquin River Dissolved Oxygen TMDL Technical Working Group](#)

[Central Valley Regional Water Quality Control Board Dissolved Oxygen TMDL](#)