

Water Quality and Salinity

EC values in the southern Delta are affected primarily by the salinity of water flowing into the southern Delta from the SJR at Vernalis, salt discharged back into southern Delta channels that was previously diverted for irrigation, the combined CVP and SWP pumping influencing salinity in the southern Delta, and tidal mixing of inflow from the Pacific Ocean. Municipal treated wastewater discharges have some effect on the southern Delta salinity. The SJR flow at Vernalis has a large effect on the SJR salinity at Vernalis. Higher flows will generally reduce the salinity, following a dilution relationship in which salinity is inversely proportional to the flow. Higher CVP and SWP pumping also has an effect on southern Delta salinity by bringing more low-salinity Sacramento River water across the Delta to the export pumps. However, periods of low Delta outflow (in the fall months) causes increased seawater intrusion and higher EC at the southern Delta export and CCWD intakes.

EC at the three southern Delta compliance stations downstream of Vernalis (SJR at Brandt Bridge, Old River at Middle River [Union Island], and Old River at Tracy Boulevard) are generally higher than the Vernalis EC because of agricultural drainage and municipal discharges. All of the agricultural land in the southern Delta diverts irrigation and salt leaching water (during winter months) from the southern Delta channels. The total amount of diverted water can generally be estimated from the irrigated acreage, with about 3–4 feet per acre applied. The withdrawal of water from channels for use on agricultural fields (i.e., agricultural diversions) does not change the salinity of the channel water. But because agricultural drainage (i.e., runoff from agricultural fields) eventually returns the diverted salt that is applied to the soils back to the channels (often during rainfall runoff and salt leaching periods in the winter), there is an indirect and/or delayed increase in southern Delta salinity. In some channel locations (e.g., Old River at Tracy Boulevard) there can be an increase in the channel salinity during the irrigation season as a result of the agricultural drainage returning to the channels (Appendix F.2, *Evaluation of Historical Flow and Salinity Measurements of the Lower San Joaquin River and Southern Delta*).

There are several treated wastewater discharges in the southern Delta. Figure 2-10 identifies their locations. The effects of the wastewater discharges depend on the difference between the discharge EC and the river EC. All of the salt from agricultural drainage and wastewater discharges, as well as from the SJR at Vernalis, is generally exported at the CVP and SWP export pumping plants. Because CVP and SWP export pumping draws a majority of the exported water from the Sacramento River, thereby reducing the salinity in the channels near the pumping plants, it is difficult to detect the effects of agricultural drainage or treated municipal wastewater discharged in the southern Delta. Table 5-14 below lists the major wastewater dischargers (greater than 1 million gallons per day) and their effect on existing EC concentrations in the southern Delta.