



National Water Quality Assessment Program

San Joaquin - Tulare Basins Study Unit

Surface Water Abstracts

An Assessment of the Increasing Nitrate Trend in the Lower San Joaquin River, California

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Abstract: A highly significant, flow-adjusted, statistical trend ($p < 0.01$) of increasing nitrate concentration in the lower San Joaquin River since 1950 can be attributed to several sources, including tile drainage, runoff from fertilizer application, wastewater treatment plant effluent, and runoff from dairies. Nitrate in the tile drainage is primarily native. The relative contributions of these sources were evaluated by limited estimates of nitrate load in sources and trends in phosphorus and ammonia concentrations in the lower San Joaquin River. Tile drainage and runoff affected by fertilizer application are relatively high in nitrate, whereas wastewater treatment plant effluent and runoff from dairies are relatively high in nitrate, phosphorus, and ammonia.

The source of the nitrate increase during the 1950s is indeterminate, although all potential sources, except tile drainage, increased substantially. During the 1960s, phosphorus concentrations in the lower San Joaquin river decreased, and the nitrate increase in the river was due to increases in runoff affected by fertilizer application and tile drainage. Since 1970, phosphorus and ammonia concentrations in the river have remained relatively low and stable. Nitrate in runoff affected by fertilizer applications decreased during the early 1970s, then stabilized at mid-1960s levels. Nitrate loads to the river from tile drainage increased steadily and were the primary cause of the increase in concentrations in the river since 1970.

Kratzer, C.R., 1994, An assessment of the increasing nitrate trend in the lower San Joaquin River, California, in Sorenson, S.K., ed., Proceedings abstracts of the American Water Resources Association's symposium on the National Water Quality Assessment (NAWQA) Program -- November 7-9, 1994, Chicago, Illinois: U.S. Geological Survey Open- File Report 94-397, p. 5.

Back to:

[Surface-Water Publications](#)

[USGS San Joaquin - Tulare Basins NAWQA](#)

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