

DIATOMS “EAST OF EDEN”: ARE STREAM AND RIVER DIATOM ASSEMBLAGES BEING AFFECTED BY AGRICULTURAL PRACTICES IN THE CENTRAL CALIFORNIA COASTAL REGION?

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Several of John Steinbeck's novels take place along the central California coast, one of the most productive agricultural areas in the world. The area contributes significantly to California's economy (the 10th largest in the world) and has earned the nickname “The World's Salad Bowl.” Several streams and rivers within the region have been listed for violating water quality criteria for nitrate and biostimulatory substances. Periphyton in streams and rivers of the central California coastal region was sampled and characterized, along with chemical, physical, and geographic data in order to determine whether agricultural practices are having a significant effect on algal abundance and diatom species composition. Data suggest that while nutrient concentrations are exceptionally high in some areas downstream of intense agriculture, diatom species composition was only weakly related to differences in nitrogen and phosphorus. Diatom assemblages were robust to seasonal changes, showing significantly greater differences between-sites than within-site differences. Water column chlorophyll concentrations, however, did show positive correlations with seasonal increases in nutrients. Factors such as canopy cover, substratum size, specific conductivity, and pH explained more variation in diatom species composition than nutrients among stream reaches. This suggests that alternative states may exist in diatom assemblages once major environmental thresholds are surpassed. Contemporary agricultural conditions may constrain assemblages and limit successful recruitment of other species. Our current survey of reference sites throughout the region should allow us to more effectively evaluate whether diatom assemblages in geologically similar streams have similar diatom assemblages or whether agricultural land use practices have facilitated changes in diatom assemblages.

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