



A multi-parameter assessment of restored managed wetlands in California Central Valley, USA

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Abstract: This study provides a preliminary assessment of hydrology and water quality on restored and subsequently managed wetlands in California's Central Valley. We explored their relationship to adjacent land uses to understand how these may influence ecological functions such as nutrient reduction. Managed restored wetlands depend on agricultural irrigation canals as their primary source of surface water. Water samples from the inflows and outflows of three restored wetland sites in the San Joaquin sub-basin (SJ14, SJ15 and SJ19) were collected using automated samplers and nutrients analyzed using standard methods. Water depth was recorded every four hours at each wetland using data loggers from July 2019 until December 2020. We also measured flow line length. Pooled water quality and depth data were analyzed using multivariate analysis techniques. The results showed that total nitrogen and nitrates were greater at the inflows, while ammonium and phosphate were greater at out flows. SJ19 retained water for longer durations of time due to deeper depth than SJ14, and SJ15 sites resulting in high PO₄-P concentrations at SJ19. Excess NH₄-N concentrations were recorded in outflows which require greater detention time to removal of ammonia by macrophyte. Analysis of drainage canal length indicated that human development may result in nutrient rich agricultural and urban runoff discharge to restored wetlands. Walnuts and almonds croplands synchronously intersect with flow lines that may drain nutrients and pesticides into the wetlands. The information gained from this research may help wetland resource managers in determining site-specific courses of action to protect and enhance wetland functions.

Keywords: Central Valley, Cropland data, Land use, Managed wetlands, Water quality