



Drivers of Dissolved Oxygen in Rangeland Streams within the Upper Feather River Watershed

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Dissolved oxygen (DO) is an important habitat variable for aquatic species, and is a regulatory parameter in streams designated as cold water fisheries habitat. In grazed watersheds, elevated nitrogen (N) and phosphorus (P) loading from livestock can stimulate increased aquatic vegetation growth and diurnal stream O fluctuations. Particularly if in conjunction with increased stream temperature and reduced streamflows. All streams in the Upper Feather River Watershed (northeastern California) have been classified as cold water fisheries habitat, with the regulatory expectation that dissolved oxygen levels will not fall below 7mg/L. Cattle grazing and associated meadow irrigation are the dominant agricultural land uses within the watershed. Monitoring during 2006-07 documented mid to late summer DO levels below 7mg/L, despite relatively low nitrogen and phosphorous levels. In 2008, an intensive study was undertaken on three streams within the watershed to identify the factors driving DO fluctuations. On a monthly basis from May through September, three stream monitoring locations were intensively monitored over a 24 hour period. Field measurements included: flow, dissolved oxygen (mg/l and percent saturation), electrical conductivity, pH, water and air temperatures and photographs plus an assessment of aquatic vegetative cover by species. Water samples were collected and analyzed for all species of N and P, as well as for carbon. A multivariate statistical analysis approach was employed to determine relative significance of each potential driving factor (temperature, flow, N, P, C) as a predictor of DO. The results of these analyses will be presented and relevance to management discussed.

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