Phosphorus and Nitrogen Legacy in a Restoration Wetland, Upper Klamath Lake, Oregon

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The effects of sediment, groundwater, and surface-water processes on the timing, quantity, and mechanisms of N and P fluxes were investigated in the Wood River Wetland 5–7 years after agricultural practices ceased and seasonal and permanent wetland hydrologies were restored. Nutrient concentrations in standing water largely reflected groundwater in winter, the largest annual water source in the closed-basin wetland. High concentrations of total P (22 mg L^{-1}) and total N (30 mg L^{-1}) accumulated in summer when water temperature, air temperature, and evapotranspiration were highest. High positive benthic fluxes of soluble reactive P and ammonium (NH_4^+-N) were measured in two sections of the study area in June and August, averaging 46 and 24 mg m^{-2} d^{-1}, respectively. Nonetheless, a wetland mass balance simultaneously indicated a net loss of P and N by assimilation, denitrification (1.1–10.1 mg N m^{-2} h^{-1}), or solute repartitioning. High nutrient concentrations pose a risk for water quality management. Shifts in the timing and magnitude of water inflows and outflows may improve biogeochemical function and water quality by optimizing seed germination and aquatic plant distribution, which would be especially important if the Wood River Wetland was reconnected with hyper-eutrophic Agency Lake.

Use of Dual Frequency Identification Sonar (DIDSON) to Estimate Low Abundance Salmonid Escapement in California Watersheds

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Steelhead (*Oncorhynchus mykiss*) and coho salmon (*O. kisutch*) are listed as Threatened or Endangered under the Endangered Species Act throughout most of California. Monitoring these fish presents difficult challenges since their abundances are so low that often a complete census of these populations is needed. Dual frequency identification sonar (DIDSON) is a promising new technology that could potentially be used to monitor adult salmonids runs in California streams and rivers under highly variable environmental conditions. We tested the feasibility of using DIDSON to estimate steelhead escapement in two systems with low abundance in central California: the San Lorenzo River and Scott Creek in Santa Cruz County. DIDSON uses sonar to produce high-quality images in turbid water, which allows for detection and enumeration of fish, as well as estimation of fish size and swimming direction. Each deployment yielded insight into equipment durability, the importance of site selection, data management techniques, and how fish behavior affects data processing. These deployments lead to much improvement in operational techniques. Our 2006 experiment in the San Lorenzo River lasted 8 days and was focused on equipment durability. The DIDSON counts from this site yielded 41 upstream migrants compared to 46 passed at an upstream fish trap. There were some differences in operation time between the two methods which may account for the discrepancy. The Scott Creek (2008) deployment will also span the entire steelhead run season and data validation will be possible using results from a weir located 200 m downstream.

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