

## **Spatial and Temporal Patterns of Dissolved Nitrogen and Phosphorus in Surface Waters of a Multi-Land Use Basin**

**Daniel M. Evans, Stephen H. Schoenholtz, Parker J. Wigington Jr., Stephen M. Griffith, William C. Floyd**

Research on relationships between dissolved nutrients and land use at the watershed scale is a high priority for protecting surface water quality. We measured dissolved nitrogen (DN) and ortho-phosphorus (P) along 130 km of the Calapooia River (Oregon, USA) and 44 of its sub-basins for three years to test for associations with land use. Nutrient concentrations were analyzed for spatial and seasonal patterns and for relationships with land-use and stream discharge. Ortho-P and DN were higher in lower-elevation sub-basins dominated by poorly-drained soils and agricultural production compared to higher-elevation sub-basins dominated by well-drained soils and forests. Eight lower basins had at least one sample period with nitrate-N >10 mg L<sup>-1</sup>. The Calapooia River had lower dissolved nutrient concentrations compared to lower sub-basins, often by an order of magnitude. Dissolved organic N represented a greater proportion of DN in the upper forested sub-basins. Seasonal nutrient concentrations had strong positive correlations to the percent of a sub-basin that was managed for agriculture in all seasons (p-values ≤ 0.019) except summer. Results suggest that agricultural lands are contributing to stream nutrient concentrations. However, poorly drained soils in agricultural areas may also contribute to the strong relationships that we found between dissolved nutrients and agriculture.