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Characteristics of Nutrient Transport from Tate's Hell Forest into East Bay Estuary in Northwest Florida

Over a ten year period 1988 to 1998, silvicultural activities impacted annually an average of approximately 3,639 miles of rivers and streams in the southern United States (US). Eighty percent of freshwater resources in the US originate in forests. Internal cycling of nutrients from sediment and the water column in a forest can be an important contribution to the total nutrient load of an associated aquatic ecosystem. Therefore, understanding nutrient transport in forests can aid in our efforts to protect aquatic resources. During June 2003 to May 2005 a field study was conducted in two watersheds of Tate's Hell State Forest in northwest Florida, US, to determine nutrient concentrations in run-off water and sediment and potential impacts on East Bay, a near-by estuary,. Of the two sites one was formerly used in silviculture and had been impacted with ditching, diking and fertilization while the other was not. Water samples collected on a monthly basis and sediment on a seasonal basis were analyzed for nitrate (NO3-N) and ammonium nitrogen (NH4+-N) and dissolved reactive phosphorous (DRP). Physical characteristics of the water column were also monitored throughout the duration of the study. Results showed that NO3-N, NH4+-N and DRP in water and sediment, were higher in concentration at the impacted sites verses the non-impacted site. At the impacted site NO3-N, NH4+-N and DRP in the water column were 25 to 33%, 39 to 47% and 50% to 64% higher, respectively when compared to the non-impacted site. Sediment sample concentrations from the impacted site were significantly ($p < 0.05$) higher and ranged (in mg kg-1 dry weight) from 0.25 ±.01 to 0.44 ±0.03 for NO3-, 1.01±0.02 to 1.50±0.02 DRP and 6.41±0.19 to12.77±0.45 NH4+. Nitrate concentrations in the water column were positively correlated with rainfall while NH4+ and DRP in the water and sediment samples were positively correlated with dissolved oxygen (DO) concentrations. This study also shows that sediment acts as a source of NH4+-N and DRP, and as a sink for NO3-N in this ecosystem.

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