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Silvicultural Impacts on Forest Outflow from Tate's Hell State Forest into East Bay Estuary in Northwest Florida

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Abstract Text:

Internal cycling of nutrients from sediment and water column in a forest can be important contribution to the nutrient load of aquatic ecosystems. During 1988 to 1998, silvicultural activities impacted 3,639 miles of rivers and streams in the southern United States. Therefore, understanding nutrient transport in forests can aid efforts to protect aquatic resources. Two watersheds in Tate's Hell State Forest were selected to conduct a study on silvicultural impacts on surface water quality. Of the two sites one had been impacted with ditching and fertilization while the other was not. During June 2003 to May 2005 a field study determined nutrient [nitrate (NO3-); ammonium (NH4+) and ortho-phosphate] concentrations in run-off water and sediments and potential impacts on the East Bay estuary. Results showed NO3-; NH4+ and ortho-phosphate in water and sediment, were higher in concentration at the impacted verses the non-impacted site. At the impacted site NO3-; NH4+ and ortho-phosphate in the water column were 16 to 33%; 39 to 47% and 66% to 84% higher, respectively. Sediment sample concentrations from the impacted site were significantly ($p< 0.05$) higher and ranged (mg kg-1) from 0.25 ±.01 to 0.44 ± 0.03 for NO3-; 9.34 ± 0.02 to 12.77 ± 0.45 NH4+ and 1.01± 0.02 to 1.50 ± 0.02 ortho-phosphate. In this ecosystem the sediment acted as a source of NH4+ and ortho-phosphate and as a sink for NO3- in this ecosystem. If proper management practices of forests are not carried out they can be potential sources of aquatic systems degradation.

Impact Statement:

This project have provided much needed information for those who wish to use the information in their water quality monitoring that is done in and around the area, such as personnel from the Apalachicola National Estuarine Research Reserve site in Apalachicola Florida. The Apalachicola Bay is of vital seafood and economic importance to the state, and any means of pollution threat can be devastating to the industry. This study give a baseline of the nutrient concentrations that runoff from the forest into streams and eventually into the Apalachicola bay.