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Pollutant Export from Three Coastal NC Watersheds

Fecal coliform bacteria in coastal waters impair the use of these waters for shellfish harvesting and recreation. This study was designed to quantify fecal coliform loading in three coastal watersheds. Continuous monitoring of rainfall and discharge at sites in the Jumping Run Creek (residential land use), Pettiford Creek (forest), and Open Grounds (agricultural) watersheds was conducted during a 2-year period. Nonstorm or baseflow grab and flow-proportional storm-event samples were collected and analyzed for turbidity, conductivity, pH, suspended sediment, nitrogen, phosphorus, and fecal coliform. Mean fecal coliform levels in Jumping Run Creek ranged from 593 to 2096 mpn/100 ml, while the mean levels at the Pettiford Creek and Open Grounds sites were 191 and 1600 mpn/100 ml, respectively. Levels of most other parameters were greater in storm discharge from the Jumping Run Creek sites as compared to Pettiford Creek, indicating increased pollutant levels in watersheds with increased human and, possibly, domestic animal populations and activity. Statistical analysis of the monitoring data suggested that FC levels in stormwater samples consistently increased with storm rainfall, but were not consistently correlated with any other parameter, including TSS. Multivariate analysis of weekly FC load data indicated that the weekly FC load for each of the four sites was lowest during the February-December months of the year. Loads were highest during the spring and summer at the Jumping Run Creek sites, while for the Pettiford Creek site, FC loads were highest during the September-November months. The cause of the seasonal variability was unknown but was thought to be associated with human activity in the watersheds. A total maximum daily load (TMDL) was developed for fecal coliform bacteria in Jumping Run Creek. Various methods for developing the TMDL and quantifying the various sources of the bacteria will be evaluated.

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