Spatial Patterns of Fecal-Indicator Bacteria From Selected Stream Sites in the Municipality of Anchorage, Alaska

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Fecal-indicator bacteria were sampled at 14 stream sites in 5 watersheds in the Municipality of Anchorage, Alaska. Two sites were sampled in the Ship Creek watershed, and three sites were sampled in each of the following watersheds: Chester Creek, Campbell Creek, Rabbit Creek, and Little Rabbit Creek. Sites were selected to represent a gradient of urban development. Population density in the areas between sampling sites ranged from 0 to 1,750 persons per square kilometer. Higher concentrations of fecal-coliform, *Escherichia coli,* and enterococci bacteria were measured at the most urbanized sites. Statistically different fecal-indicator bacteria concentrations were noted in eight of the nine (three bacteria groups by three population-density groups) possible comparisons of the population-density groups. Sites or groups of sites that represent areas of little or no human population had fecal-indicator bacteria concentrations significantly lower than sites with relatively high population densities.

All bacteria groups measured showed a tendency for many samples to have relatively low concentrations and a few relatively high concentrations. Data ranged from 1 bacteria colony per 100 milliliters for each group to 3,900 for fecal-coliform bacteria, 2,900 for *Escherichia coli*, and 2,400 for enterococci. Seasonal differences in bacteria concentrations were not apparent. Fecal-indicator bacteria concentrations were highly variable over a 2-day period of stable streamflow; this variability may have implications for testing of compliance to water-quality standards. Currently, the State of Alaska has water-quality standards for fecal-coliform bacteria but not for *Escherichia coli* or enterococci bacteria.