

Analyzing Watersheds to Determine Sources of Bacteria at Two of Iowa's Beaches

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Biographical Sketch of Author

Janice Boekhoff is a Research Geologist for the Iowa Department of Natural Resources, Iowa Geological Survey. She began work at the IDNR in August 2000 in the Hydrogeology and Environmental Studies Section where she worked on the Source Water Protection Program. Beginning in April 2002, she began working on projects for the Water Monitoring Section. She is involved in bacterial monitoring at the state's beaches, source tracking of bacteria, establishing a groundwater network in Iowa, and coordinating the municipal-well water quality project.

Abstract

Iowa's Ambient Water Monitoring Program has monitored Iowa's state-owned beaches since 2000. Monitoring has shown persistent high levels of bacteria at several beaches. Intensive watershed investigations have been undertaken at these beaches to determine the cause of the elevated bacteria levels. Results have shown numerous causes for bacterial contamination. Bacteria levels at some beaches appear to be correlated to rainfall, indicating sources from within the watershed. Other beaches demonstrate no rainfall influence, and bacteria appear to be coming from a source closer to the beach.

Two beaches with persistent elevated bacteria, Backbone and George Wyth beaches, both located in northeast Iowa, provide a contrast in likely bacteria sources. Both beaches differ in their watershed:lake ratio, watershed size, landuse, and patterns in elevated bacteria. Backbone Beach has a 919:1 watershed:lake ratio, a watershed dominated by agriculture, and is a beach where bacteria levels increase after rainfall events. Bacteria levels are also elevated throughout the lake and at several tributaries entering the lake. Backbone Beach is located on the lower end of a lake created by a dam on the Maquoketa River. In comparison, George Wyth has a watershed:lake ratio of 89:1, is primarily an urban watershed, and elevated bacteria levels occur primarily in the ankle zone at the beach while lake bacteria levels tend to be low, suggesting a bacteria source close to the beach. An understanding of watershed composition, and its effects on bacterial inputs in lakes can be utilized as an important asset when monitoring beaches.

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