

# IOWA'S WATER

## Ambient Monitoring Program

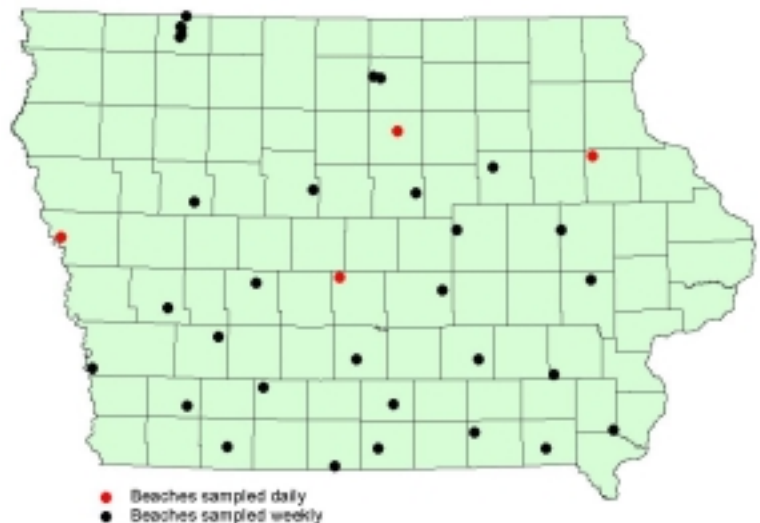
### Monitoring Iowa's Beaches – 2001

The purpose of Iowa's Ambient Water Monitoring Program is to develop and deliver consistent, unbiased information about the condition of Iowa's water resources so that decisions regarding the development, management and protection of these resources may be improved. Monitoring of Iowa's state-owned swimming beaches is one component of this program.

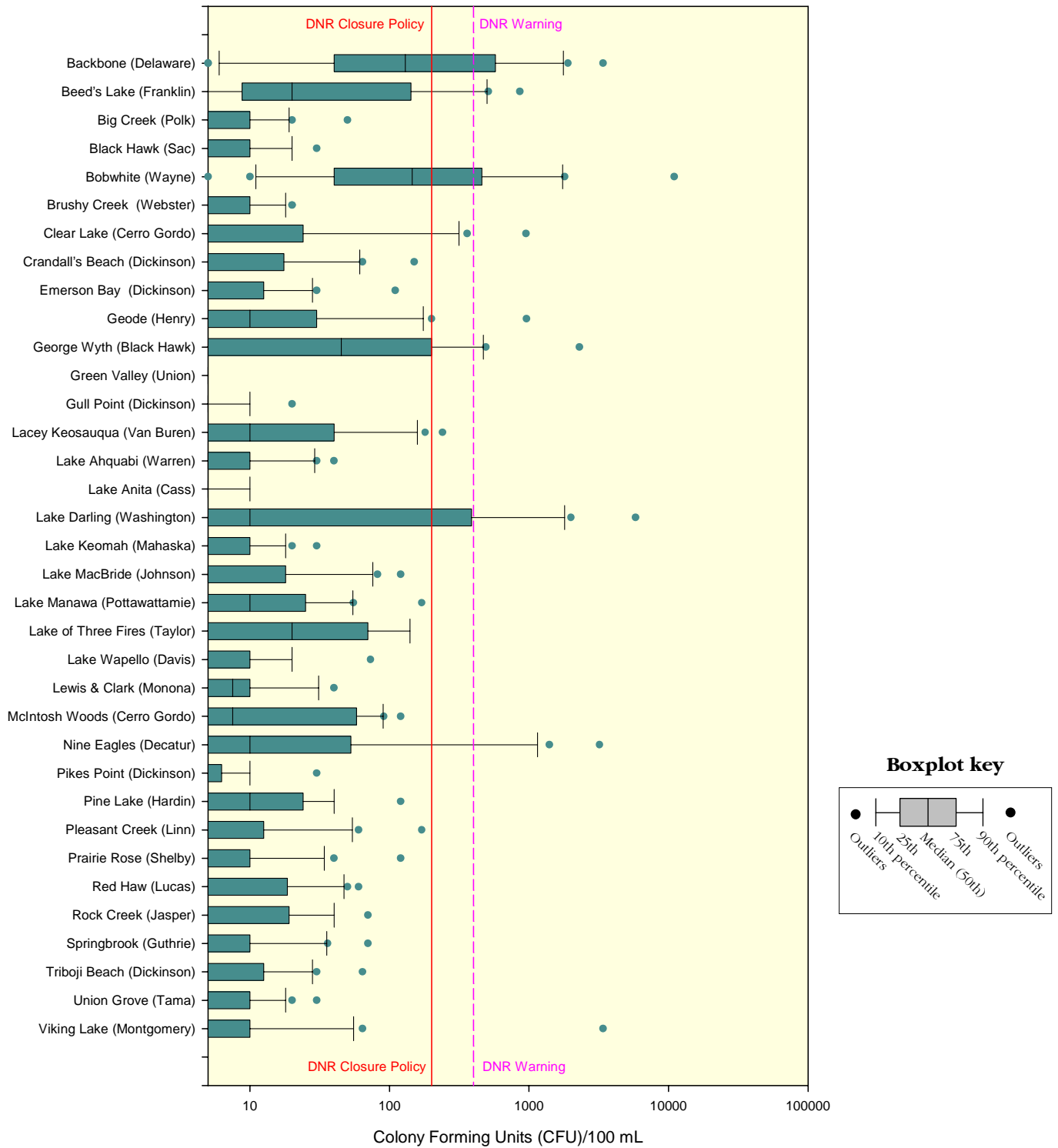
In 2001, the beach-monitoring program was expanded to 35 beaches from the 31 original beaches monitored in 2000. From May 21 through September 10, 2001, the beaches were monitored once a week to obtain bacteria levels at each beach (Figure 1). Four of the beaches were also sampled daily from June 11 through July 12 to determine the daily variability of bacteria levels at these beaches. Other goals of this program were to assess the impact of heavy rains on the bacteria levels, to identify other factors that impact bacteria levels, and to assess the risk of each beach to bacterial contamination.

All beaches were monitored for three bacterial indicators: fecal coliform, enterococci and *E. coli*. These indicator bacteria themselves do not cause illness, but their presence suggests that disease-causing organisms, or pathogens, may be present. As the number of indicator bacteria rises in water, so does the likelihood that pathogens are present. The most frequent sources of pathogens are sewage overflows, malfunctioning septic systems, animal waste, polluted storm-water runoff and boating wastes. Children, the elderly and people with weakened immune systems have a greater chance of becoming ill when ingesting this contaminated water.

The year 2001 marked the first year that the Iowa Department of Natural Resources (IDNR) established bacterial guidelines for



**Figure 1.** Location of 35 beaches monitored in 2001.



**Figure 2.** Boxplots of weekly fecal coliform levels measured at 35 beaches.

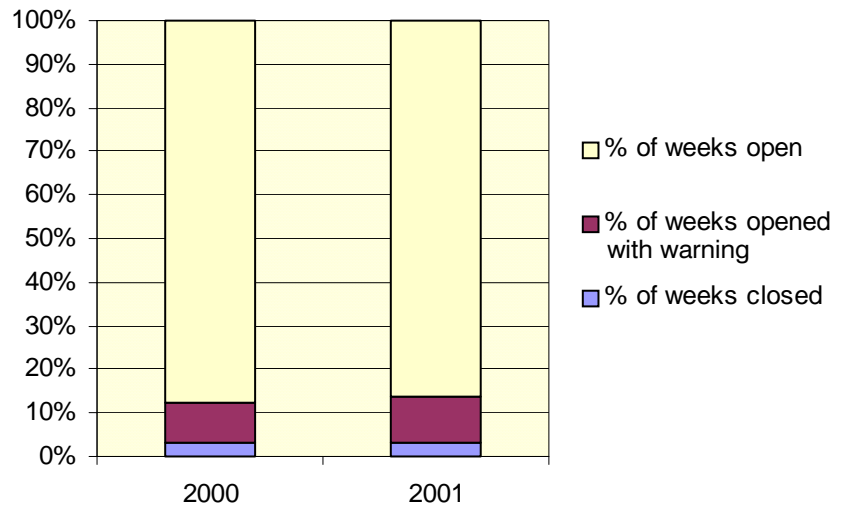
the beaches. Beaches were closed if the “geometric mean” exceeded 200 colonies per 100 milliliters for fecal coliform bacteria or 126 colonies per 100 milliliters for *E. coli*. The “geometric mean” is calculated by using five samples collected at equally-spaced intervals within a 30-day period. A high “geometric mean” indicates that high bacteria levels persist over a period of time.

Beaches were posted with warning signs stating swimming was not recommended if bacterial counts exceeded one-time guidelines of the Environmental Protection Agency. Warning signs were posted when *E. coli* exceeded 235 colonies per 100 mL, enterococci exceeded 60 colonies per 100 mL, or fecal coliform exceeded 400 colonies per 100 mL.

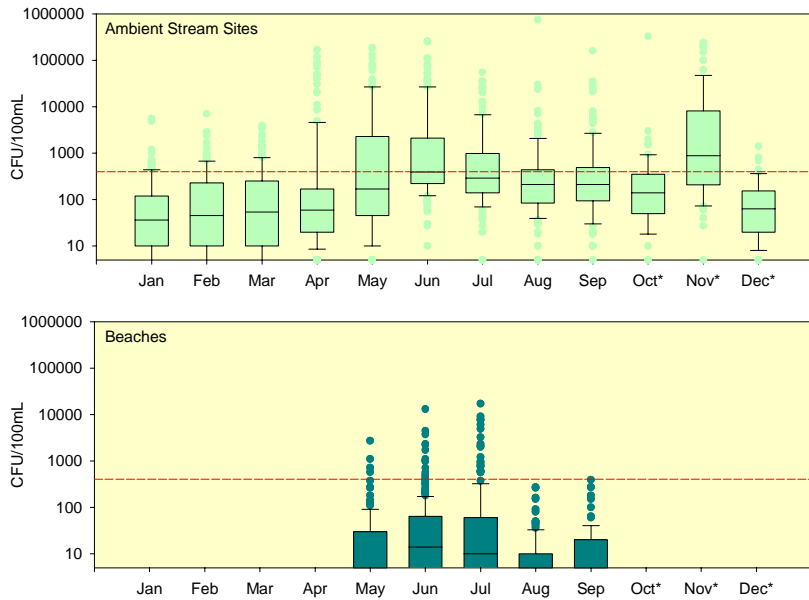
Bacterial levels were below the guidelines for most of the state beaches. Like 2000, weekly sampling in 2001 showed a large range in bacteria levels, not only between beaches, but from week to week at a given beach. Figure 2 shows results of the fecal coliform samples. Weekly results can be accessed at the IDNR Parks, Recreation and Preserves Division internet site at [www.state.ia.us/government/dnr/beach2001.htm](http://www.state.ia.us/government/dnr/beach2001.htm).

Beaches at five parks (Backbone, Beed’s Lake, Bobwhite, George Wyth and Lake Darling) had “geometric means” that exceeded IDNR guidelines and were closed. An additional 22 beaches exceeded the one-time limits and had warning signs posted. Only seven state parks (Green Valley, Gull Point, Lake Ahquabi, Lake Anita, Lake Wapello, McIntosh Woods, Pleasant Creek and Union Grove) had bacterial levels that did not exceed any guidelines.

If the IDNR had applied the 2001 policy in 2000, the results would have been similar (Figure 3). Beaches at three parks (Backbone, Beed’s Lake and Lake Keomah) had “geometric means” that exceeded the guidelines and would have been closed. An additional 23 beaches would have exceeded the one-time limits and have been posted with warning signs. A wetter spring may account for the slight increase in the per



**Figure 3.** Percentage of time all state-owned beaches were open, open with warning signs, and closed in 2000 and 2001. The year 2001 marked the first year that the IDNR adopted an official closure policy.



**Figure 4.** Comparison of fecal coliform levels in Iowa's streams to the 35 beaches monitored. An asterisk (\*) indicates data for 2000 only. Red line illustrates the one-time guideline.

centage of weeks that beaches were open with warning in 2001.

To gain a better understanding of what the bacteria levels at the beaches are while they are not being monitored, compare the beach data to the ambient stream data (Figure 4). The ambient

stream sites show an increase in bacteria levels early in the year until early summer, followed by a decline through October. Bacteria levels at the beaches follow a similar trend, increasing until early summer and then decreasing.

While beach monitoring provides the IDNR with important information on bacteria, the ultimate goal is to create safer recreational conditions for all Iowans by preventing water-borne illnesses. Monitoring is only the first step, but great strides are already being made to meet this goal.

### **Acknowledgements**

Michelle Wilson and Janet Ott of the Iowa DNR-Parks, Recreation and Preserves Division helped coordinate this project. Personnel from each park and Josh Gruber from Upper Iowa University collected and shipped all water samples to the laboratory for analysis. The University Hygienic Laboratory (UHL) in Iowa City performed all analyses and reported all results, and Nancy Hall of UHL provided coordination and expertise in interpretation of the results.

### **Funding**

Water monitoring activities of the Iowa Department of Natural Resources are funded by Iowa Infrastructure and State General Fund appropriations, as well as grants provided by the U.S. Environmental Protection Agency from Sections 106 and 319 of the Clean Water Act.

Water Monitoring Program Web Site – [www.igsb.uiowa.edu/water](http://www.igsb.uiowa.edu/water)



Prepared by  
Iowa Department of Natural Resources, Geological Survey Bureau  
109 Trowbridge Hall, Iowa City, IA 52242-1319