IOWA'S WATER

Ambient Monitoring Program

Iowa's Beach Monitoring 2002

Iowa's Ambient Water Monitoring Program develops and delivers consistent, unbiased information about the condition of Iowa's water resources. One part of this program includes the sampling of Iowa's state park beaches.

History

The Beaches Environmental Assessment and Coastal Health Act of 2000 (BEACH Act) requires states with coastal or Great Lakes beaches to monitor those waters according to U.S. Environmental Protection Agency (EPA) guidelines. Iowa is one of twenty states **not** required through the BEACH Act to monitor beaches. However, the Iowa Department of Natural Resources (DNR) understood the need for a comprehensive beach monitoring program in Iowa. As a result, the DNR-Water Monitoring Section began monitoring 31 state park beaches in 2000. In 2001, the beach monitoring program expanded to include all of the 35 state-owned beaches. During both the 2000 and 2001 monitoring seasons, a grab sample (single bottle submerged in one location) was taken weekly at the beaches by DNR park staff from late May to early September. All of the beaches were tested for three types of indicator bacteria: fecal coliform, enterococci and *E. coli*.

DNR Beach Closure Policy 2002

- Beaches that exceed Iowa's current water quality standard for bacteria (the geometric mean of five samples in a 30-day period exceeds 200 colony forming units of fecal coliform bacteria per 100 ml of water) **will not be closed**. Rather these beaches will be posted with signs that state, "Swimming is Not Recommended."
- All beaches will be posted with signs that provide general information regarding ways to reduce the health risk associated with swimming at public beaches. These signs will also inform the public of current monitoring efforts and ways to obtain the data. Signs will be posted in a variety of locations at the park and beach.
- DNR reserves the right to close a beach in the event of a documented health risk including things such as (but not limited to) wastewater by-pass, spills of hazardous chemicals, or localized outbreaks of an infectious disease.

Beginning in 2001, the DNR adopted a fairly strict beach closure policy using the results from these weekly samples. Beaches were closed if the **geometric mean** (an EPA recommended calculation method) was above the EPA guideline of 200 organisms per 100 mL of water for fecal coliform bacteria or 126 organisms per 100 mL for *E. coli*. In addition, if any weekly result exceeded EPA one-time guidelines in 2001, signs were posted stating that swimming was not recommended.

Program Revisions for 2002

Policy. Several changes were made to the beach monitoring program in 2002. Since the DNR's beach policy potentially affects swimmer health, officials from the Iowa Department of Public Health and the University of Iowa Hygienic Laboratory (UHL) were invited to join the beach policy committee. The committee reviewed existing scientific research and determined that closing beaches was not protective of human health based on monitoring capabilities. Current technology allows bacteria samples to be analyzed within 48 hours. However, bacteria levels can shift dramatically from one day to the next or even within a few hours. This led the beach committee to implement a new beach policy during the 2002 recreational season.

Sample Collection. The monitoring season was lengthened and weekly samples were taken from April 15 until October 31. This period more closely corresponds to the recreational season when the Iowa Water Quality Standards are in effect. Also in 2002, UHL staff took over the weekly monitoring of beaches. UHL staff took nine samples at each beach – at three locations along the beach and at three water depths (ankle-, knee- and chest-deep). The water from these locations was mixed to form one composite sample, which was taken to UHL for bacterial analysis. All of the beach samples were still analyzed for fecal coliform, *E. coli* and enterococci.

Closures and Postings. Beaches with chronically high levels of bacteria (those exceeding Iowa's current water quality standard for bacteria – a geometric mean of five samples in a 30-day period that was more than 200 organisms of fecal coliform bacteria per 100 mL of water), were not closed as they had been in previous years. Instead, advisory signs were posted at these beaches stating "Swimming is Not Recommended."

Results

In 2000, two beaches (Backbone and Beed's Lake) exceeded the state water-quality standard for fecal coliform. Three beaches exceeded this standard in 2001 (Backbone, Bobwhite and Lake Darling). In 2002, eight beaches (Backbone, Beed's Lake, Clear Lake, George Wyth, Lake Darling, Prairie Rose, Rock Creek and Union Grove) exceeded the state water-quality standard. Figure 1 displays the median and range of weekly fecal coliform bacteria values for the beaches in 2002. The rise in the number of beaches with

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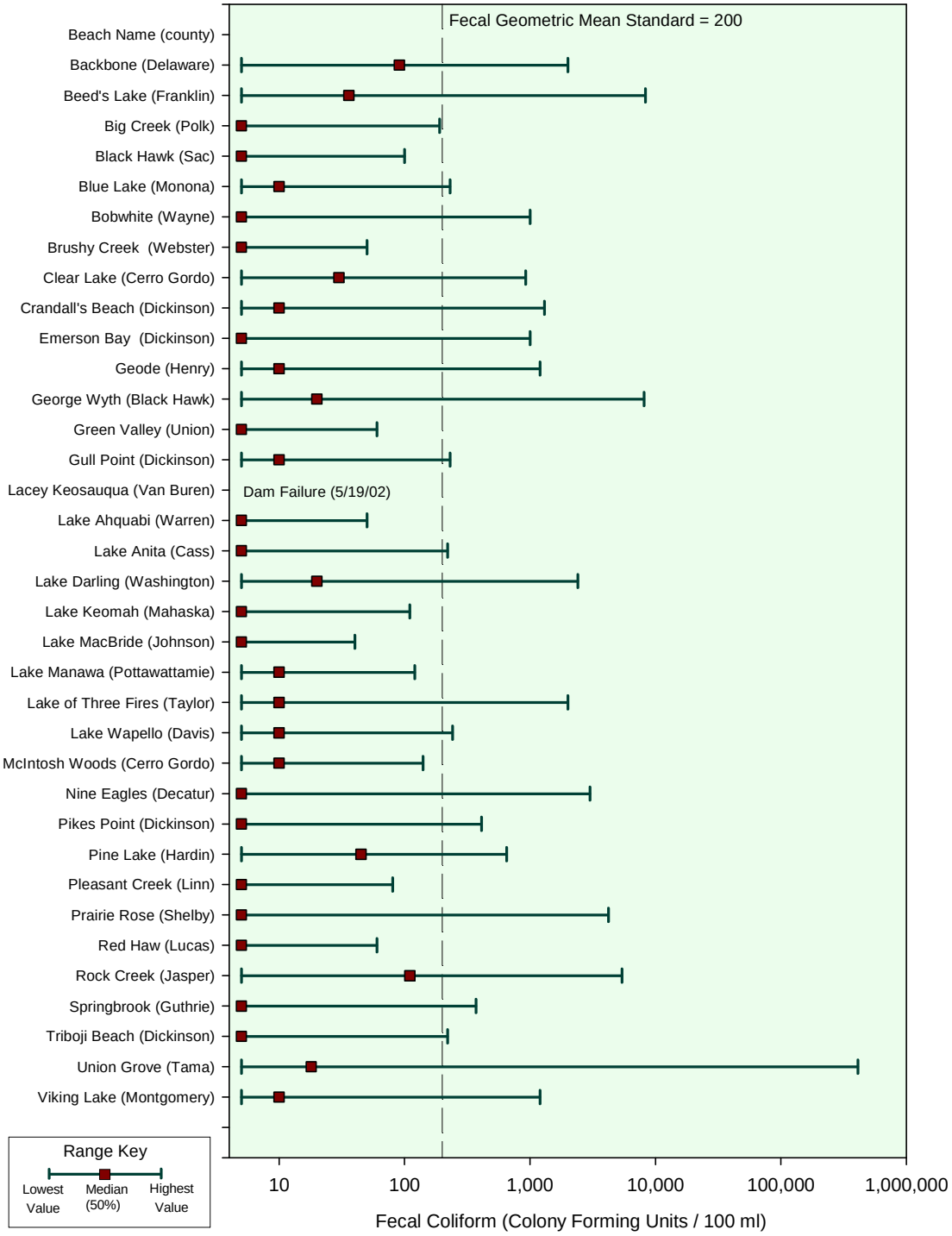

Figure 1. *Median and range of weekly fecal coliform bacteria results in 2002. Median is the value where 50 percent of the results fall above and 50 percent below this value. The geometric mean standard represents five samples over a thirty-day period, but is shown with the weekly results for comparison purposes.*

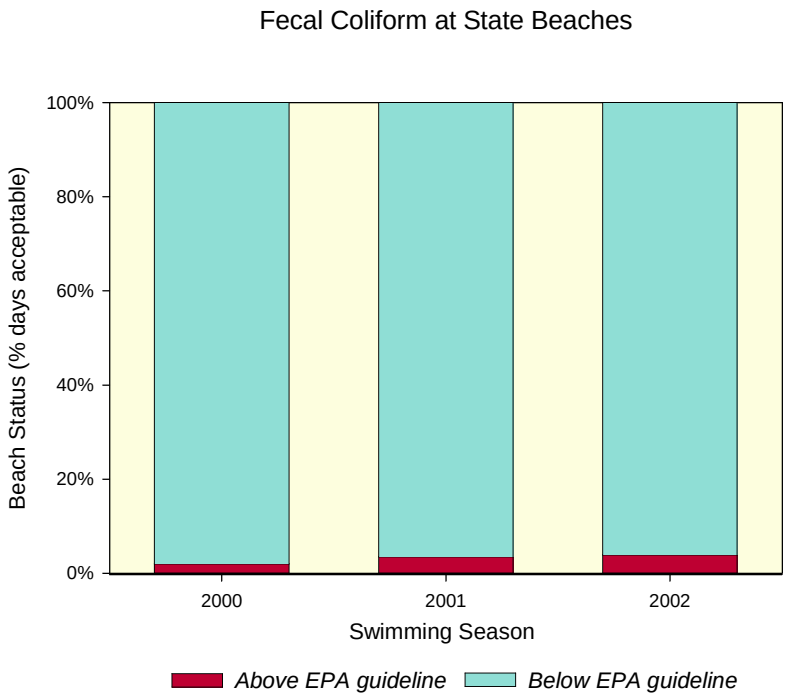

Figure 2. *Iowa State Park beaches met or were below EPA guidelines about 97% of the time for fecal coliform bacteria.*

high bacteria in 2002 could be a result of the extended length of the sampling season. Two of these beaches (Backbone and Union Grove) had high bacteria levels late in the season, after sampling would have been completed in previous years. Intensive investigations were undertaken at those few beaches with chronically high bacteria levels (except for Clear Lake and Union Grove) in an attempt to determine the source (see insert). High bacteria levels at Clear Lake and Union Grove were short-lived, thus intensive sampling was not undertaken.

Over the last three years of sampling (2000-2002), Iowa's state-owned beaches have showed weekly fluctuations in bacteria levels. Overall, the beaches met or were below the EPA recommended guidelines about 97 percent of the time (Figure 2).

As the ambient program continues to grow, it is likely that more changes will be made to the monitoring framework. Ultimately, human safety and the prevention of illness are the driving force in making management decisions regarding Iowa's water resources.

Acknowledgements

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Water Monitoring Program Web Site – www.igsb.uiowa.edu/water

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