

IOWA'S WATER

Ambient Monitoring Program

Iowa's Beach Monitoring 2004

Protecting swimmer health is a primary goal for the state of Iowa. For this reason, Iowa's State Park beaches have been monitored weekly since 2000 for indicator bacteria as part of Iowa's Ambient Water Monitoring Program. To gain further knowledge of Iowa's swimming waters, a monitoring program for county-owned beaches was initiated in 2004.

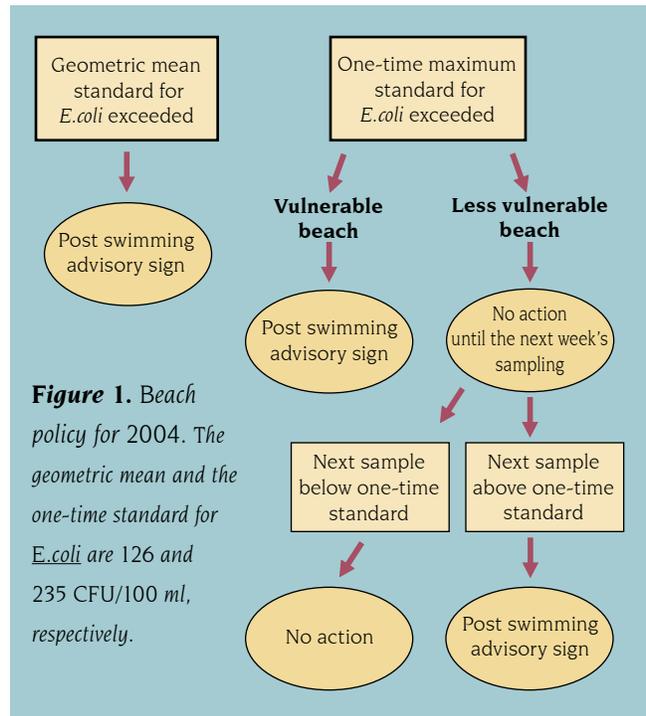
Beach Policy

State-owned beaches. The 2004 policy for beaches on state-owned property had two components: a geometric mean and a one-time sample maximum standard. The geometric mean is based on five samples collected over a 30-day period. Swimming advisory signs, which state that "swimming is not recommended," were posted at any beach exceeding Iowa's geometric mean standard for *E.coli* bacteria (126 organisms per 100 ml of water). See Figure 1 at right.

The one-time sample maximum standard (235 organisms per 100 ml) was used to either post a swimming advisory sign at a beach after one week with a high sample (at "vulnerable" beaches) or after two weeks of high samples (at "less vulnerable" beaches). Based on data from 2000 through 2003, state-owned beaches were classified as either "vulnerable" or "less vulnerable" to experience consistent and high levels of bacteria (Figure 2).



Backbone State Park, Delaware County.



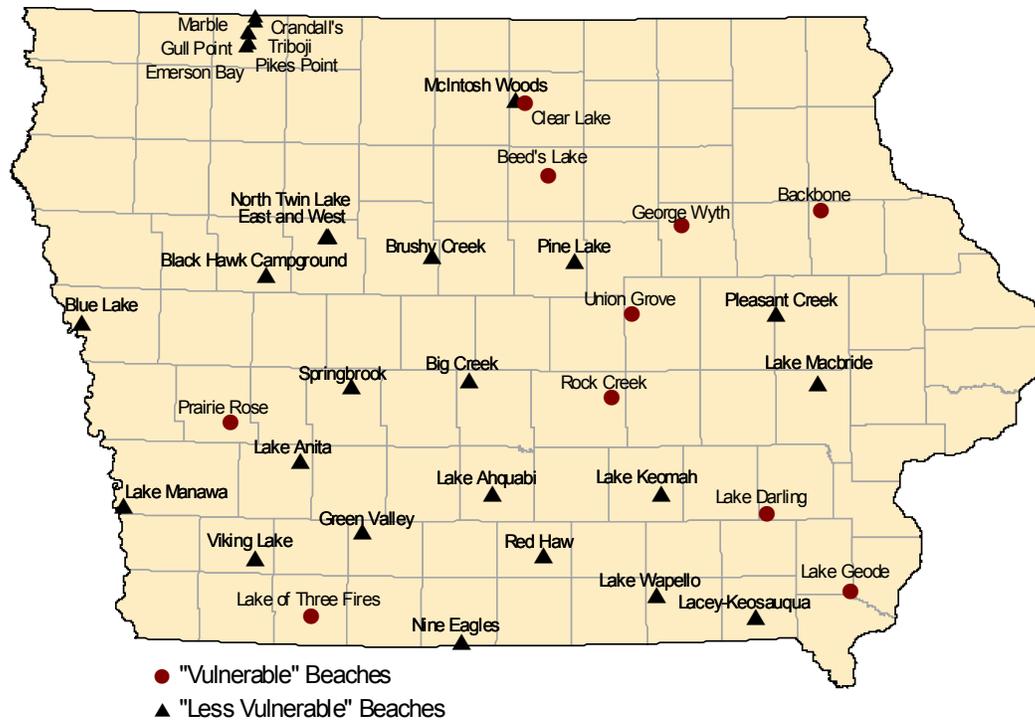


Figure 2. Classification of state-owned beaches.

Those beaches that are classified as “vulnerable” have experienced high geometric means for bacteria in previous years. When elevated readings occur at these “vulnerable” beaches, they are more likely to persist. For this reason, swimming advisory signs are posted at “vulnerable” beaches after a single one-time high bacteria value.

Beaches classified as “less vulnerable” are beaches that have not experienced high geometric means in the past and include all state-owned beaches not classified as “vulnerable.” Their bacteria levels may be more variable, often being high one week and low the next. For this reason, the “less vulnerable” beaches are posted with a swimming advisory sign after exceeding the one-time sample maximum during two consecutive weeks.

County beaches participated in Iowa’s Beach Monitoring Program on a voluntary basis beginning in 2004 (Figure 3). County beaches, with the exception of those located on state-owned property, were given the option of creating their own beach policy or adopting that of the Iowa DNR. Those beaches on state land (Cold Springs, Crystal Lake, Lake Cornelia, Lake Icaria, and Swan Lake) were subject to the same beach policy used at State Park beaches.

Sample Collection

State-owned beaches. In 2004, most of the 37 state-owned beaches were scheduled for monitoring between April 15 and October 31. However, due to budget constraints monitoring did not begin until the week before Memorial Day (May 24th). Fourteen of the state beaches were monitored on a shortened season from the week before Memorial Day through Labor Day because they had one or

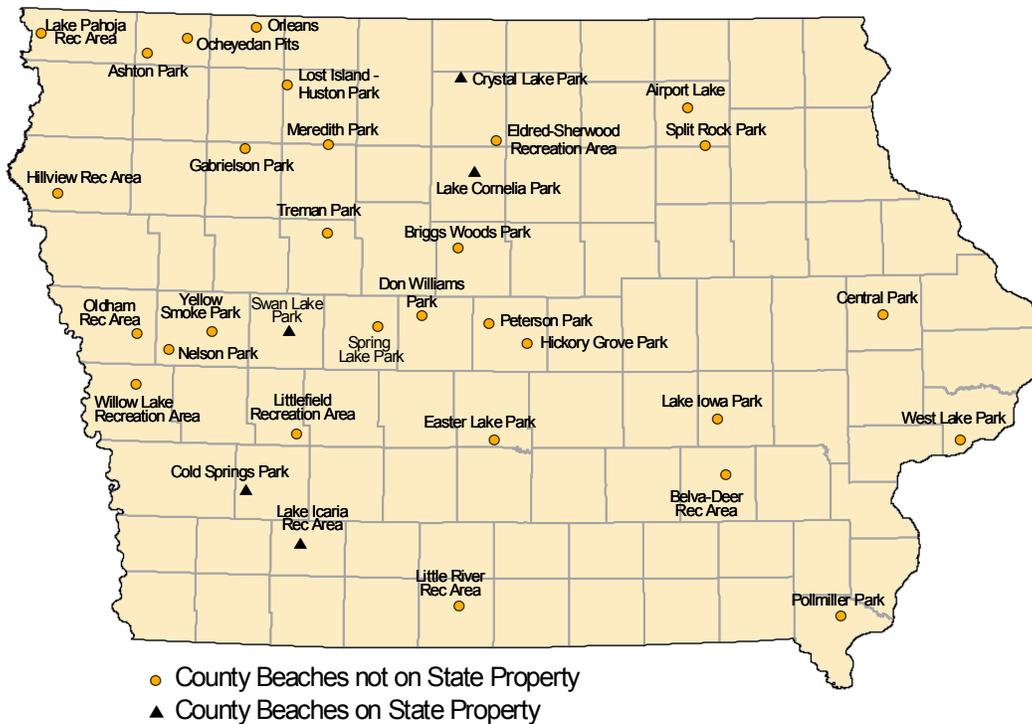


Figure 3. County-owned or -managed beaches monitored weekly from Memorial Day through Labor Day.

fewer high readings from 2000-2003. These fourteen beaches included: Black Hawk, Blue Lake, Brushy Creek, Green Valley, Gull Point, Lacey-Keosauqua, Lake Ahquabi, Lake Anita, Lake Keomah, Lake Manawa, McIntosh Woods, Pleasant Creek, Red Haw, and Triboji. University of Iowa Hygienic Laboratory personnel collected weekly samples at 37 state-owned beaches. Water was taken from nine locations at each beach – at three transects along the beach (the center and two ends of the beach) and at three water depths (ankle-, knee- and chest-deep). The water taken from these locations was mixed to form one composite sample for each beach. All of the beach samples were analyzed for *E.coli* and enterococci bacteria. Previously, the state-owned beach samples were also analyzed for fecal coliform bacteria. However, fecal coliforms were removed from the program in 2004 because four years worth of data determined the general relationship between coliform bacteria and *E.coli* at Iowa's beaches. Additionally, water quality standards for Iowa's recreational waters changed from fecal coliform bacteria to *E.coli* bacteria in 2003.

County beaches. Weekly water samples were taken by county conservation staff at 34 beaches from Memorial Day through Labor Day. County conservation staff were trained by Iowa DNR Water Monitoring staff to use the same sampling protocol employed at state-owned beaches (described above). County beach samples were analyzed for *E.coli* bacteria only.

Results

State-owned beaches. During the 2004 monitoring season, 15 beaches exceeded the geometric mean standard for *E.coli* (126 organisms per 100 ml) and 26 beaches exceeded the one-time maximum standard for *E.coli* (235 organisms per 100 ml). Figure 4 displays the median and range of the weekly

E.coli bacteria values for the state-owned beaches in 2004. Intensive watershed investigations were undertaken at those beaches with chronically high bacteria levels to determine the source(s) of these bacteria. (See Water Fact Sheet 2005-6.)

Over the last four years of sampling, Iowa's state-owned beaches have shown weekly fluctuations in bacteria levels. Overall, beaches met or were below the geometric mean standard for *E.coli* 94 percent of the time and met or were below the one-time standard for *E.coli* 93 percent of the time.

County beaches. During the 2004 monitoring season, 6 beaches exceeded the geometric mean standard for *E.coli* (126 organisms per 100 ml) and 21 beaches exceeded the one-time maximum standard for *E.coli* (235 organisms per 100 ml). Figure 5 displays the median and range of the weekly *E.coli* bacteria values for the county beaches in 2004.

Future Plans

As Iowa's Ambient Water Monitoring Program continues to grow, more changes will likely be made to the monitoring framework. Proposed additions to the monitoring program in 2005 include the monitoring of city beaches and additional county beaches. Ultimately, the goal of the Beach Monitoring Program is to enhance the public's understanding of the environment, protect swimmer health, and increase enjoyment of Iowa's beaches through comprehensive monitoring and research.

Acknowledgements

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Photo on page 1 by Ray Anderson.

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Iowa Water Monitoring Program Web Site – wqm.igsb.uiowa.edu



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