



Predictive models for *Escherichia coli* at Ohio bathing beaches

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IN COOPERATION WITH

- **Northeast Ohio Regional Sewer District**
- **Ohio Water Development Authority**
- **Ohio Lake Erie Office**
- **Cuyahoga County Board of Health**
- **Cuyahoga County Sanitary Engineers**
- **Cuyahoga River Community Planning Organization**
- **Lake County Health Department**

PROJECT GOAL AND OBJECTIVES

**Provide timely, accurate assessments of
beach water quality**

- **Improve and evaluate existing *E. coli* predictive models for two Lake Erie beaches**
- **Develop predictive models for another Lake Erie beach and an inland lake**
- **Take the first steps toward implementing a beach notification program**

BEACH STUDY SITES 2000 and 2001

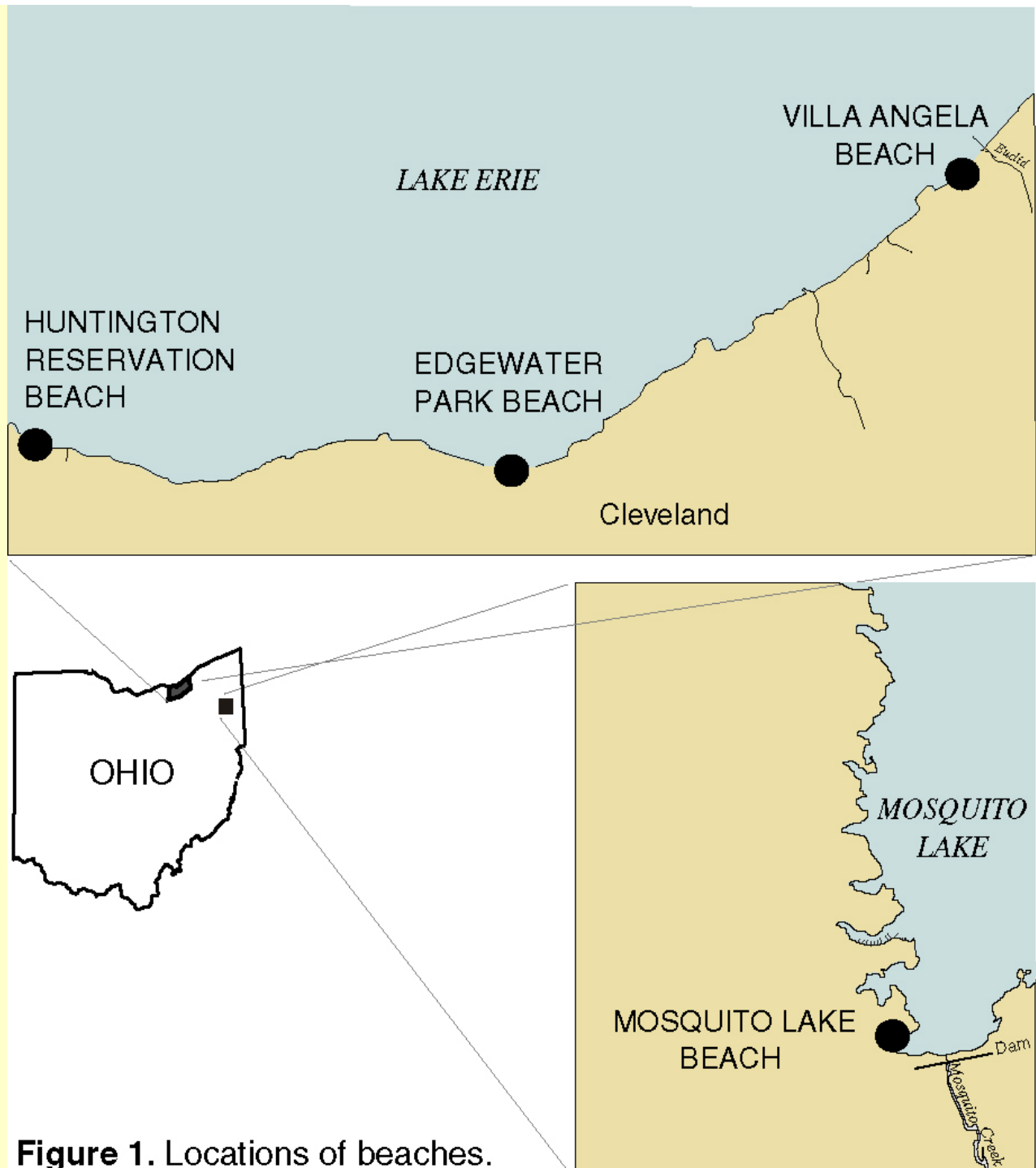


Figure 1. Locations of beaches.

APPROACH

- **Weekday mornings from May - Aug**
- **Determined *E. coli* concentrations**
- **Collected data on explanatory variables for model development**

Antecedent rainfall, wave height, turbidity, number of birds, current direction, stream flow, wind direction and speed, previous day's *E. coli*, water temp, UV intensity, specific conductance, pool elevation

Beach-specific models were developed using multiple linear regression techniques

- **Wave height was used in all Lake Erie models**
- **Variables used in models for the inland lake were different than for L. Erie**
- **R^2 values ranged from 0.32 to 0.41**
- **Models could not accurately estimate *E. coli* concentrations**

**Determined the probability that *E. coli*
concentration is greater than the single-sample
maximum level of 235 col/100 mL**

**wave height
turbidity
rainfall in the previous 24 hours
lake current direction**

Huntington Beach, Bay Village, Ohio



THRESHOLD PROBABILITY

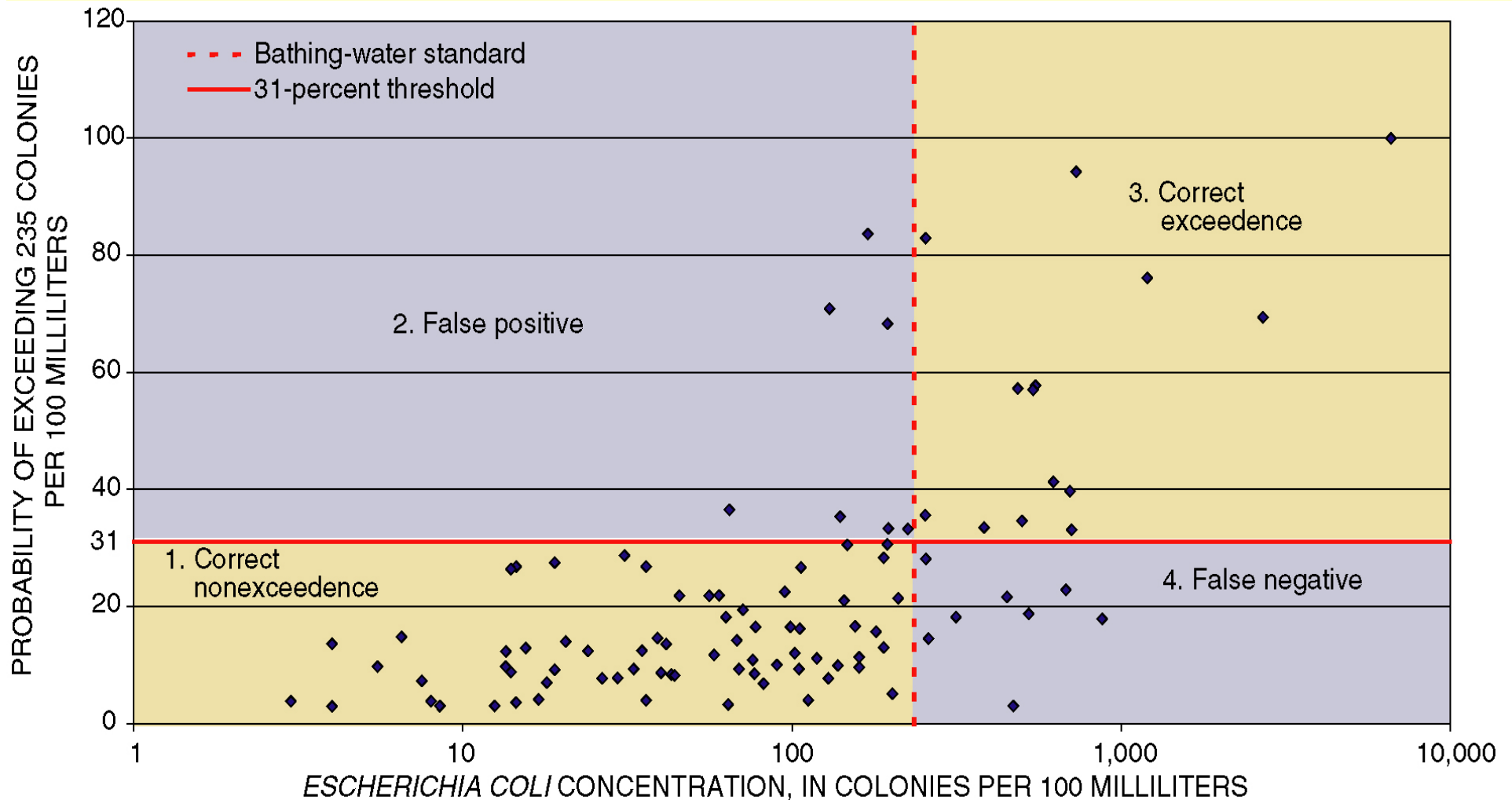


Figure 3. Establishment of the threshold probability based on the single-sample bathing-water standard of 235 colonies per 100 milliliters and the 2000-2001 model for Huntington Reservation, Cleveland, Ohio. (Samples were collected from May through August in 2000 and 2001.)