Beach Water Study
- 2003-2005 -
Tiny Township Beaches

Bernard Mayer, Safe Water Manager
John Barbaro, Research Officer
Simcoe County District Health Unit

Outline of the presentation

- Objectives of the study
- Methodology
- Results
- Discussion
- Questions

Objectives of the Study

Objectives of the study

- Respond to Tiny Township's request to assist in identifying factors that may have an impact on bathing beach water quality.
- Determine if there is a relationship between weather and water conditions and elevated bacteria in the water measured as the geometric means of E. coli counts.

Definition: Elevated Geometric Mean

- Elevated geometric mean of an E. coli count is defined as *the daily geometric mean of E. coli results equal to or exceeding 100 cfu per 100 ml. from a minimum 5 samples from each beach.*

Methodology

Methodology

- 21 beaches were sampled over three years for this study
- June 16 to August 27, 2003,
  June 22 to September 1, 2004 &
  June 14 to September 1, 2005
- Beach water samples were tested for E. coli by Public Health Laboratory.
- Event of an elevated geometric mean is defined as a date the daily g*eometric* mean was calculated to be ≥100 cfu of *E. coli.*

Methodology (cont'd)

- At the time of sampling the following items were recorded:
  - Sampling time
  - Weather conditions
  - Water and environmental factors
- The data was entered and compiled in an Excel spreadsheet.
- The data was analyzed using Statistical Package for the Social Sciences (SPSS).

Results

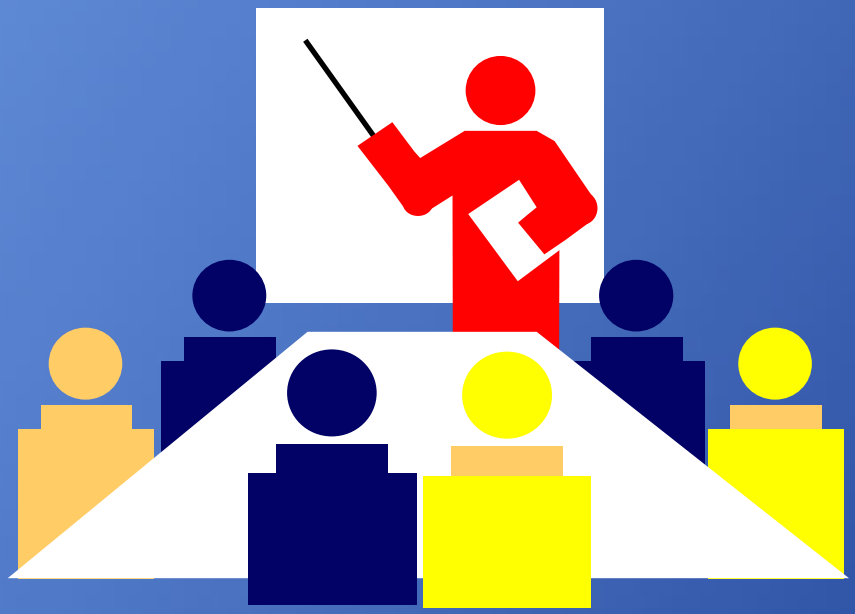
Results - general

- 538 bathing beach water sample sets were collected and submitted to the Public Health Lab in Orillia.
- 105 (19.5%) sets of samples from 18 beaches had a calculated daily geometric mean ≥100 cfu of *E. coli* per 100 ml of water

Results – summary

- The following environmental conditions were *individually* associated with elevated e. coli levels:
  - Summer months (July and August)
  - Rain in the previous 24 hours
  - Wind direction towards shore
  - Water temperature above 17°C
  - Days with intermediate or dull sunlight
  - Water clarity <100 cm
  - High wave action

Discussion



Discussion continued:

- Further study is recommended to determine associations between elevated e. coli levels and a *combinations* of factors (month and water temp) and (wind direction, wave action, rain, and water clarity).

Discussion continued:

- Data recorded is subjective. What one considers to be high in value another may consider to be medium or small. The Ministry of Health and Long Term Care should provide parameters for factors to be recorded.

Discussion continued:

- Equipment may be required to measure pH, water clarity and rainfall objectively.

Discussion continued:

- Health Unit may conduct a literature review to identify known common factors.
- Share information with local Board of Health, Township of Tiny, Severn Sound Environmental Association and Ministry of Health and Long Term Care.

Questions

Questions continued:

- Where does the E. coli come from?
- Is it a persistent and natural part of our environment?

Questions continued:

- Have there been any reports of illness associated with beach use during elevated GMean events?

Questions continued:

- Should further surveys be conducted?

Questions continued:

- Does the falling water level in Georgian Bay have an effect on bathing beach water quality?

Questions continued:

- Has the increase in development along the shoreline had any impact on bathing beach water quality?