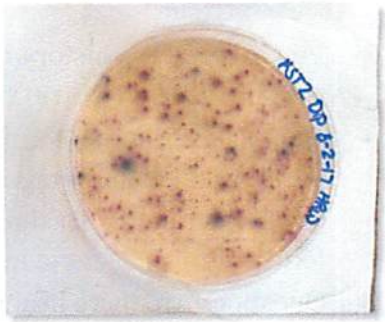
Lab Methods

- After each sample was taken, the sample swab was stored in a pre-loaded vial of 1 mL of phosphate-buffered saline (PBS). PBS, along with vortexing (fast mixing in circular motion), allows the bacteria stuck to the swab to expel itself into the liquid so that it can be transferred to the Coliscan Easgel.

After expelling bacteria, the solution is transferred into a bottle of Coliscan Easygel.

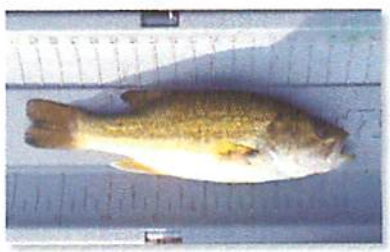
Bottle is gently swished for 10 seconds and then poured into a petri dish—ready for incubation at 37° C for 48 hrs.



Results: Each dot represents a colony forming unit x 100.
-Fecal coliform bacteria: Light pink dots with and without halos
-E. coli: Purple and blue dots with and without halos

Preliminary Results: Fish

- 88% of fish had coliform bacteria
- Of those fish, 73% had *E. coli*
- Species and length of fish do not appear to influence frequency or amount of bacteria



Preliminary Results: Angler Hands

- 78% anglers had *E. coli* on their hands after catching their first fish
- 100% of anglers had traces of fecal coliform bacteria at some point
- Just by dipping hands in the water, 78% of anglers had *E. coli* on hands
- Shore locations have higher numbers of *E. coli*—where most children fish
- Fecal coliform bacteria and *E. coli* were present on hands even when a fish hadn't been caught yet—touching line, bait, and water

Too numerous to count

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INVESTIGATION OF POTENTIAL HEALTH RISK TO ANGLERS FISHING IN PINE RIVER UPSTREAM OF ALMA DAM

ALMA COLLEGE

Why Is This Important?

- Pine River has a history of high concentrations of **thermo-tolerant** fecal **coliform bacteria** and ***E. coli.***
- Bonnie Hamilton, a former Alma College research student, introduced hatchery-raised (clean) fish into the Pine River in a cage. She found over time, they accumulated thermo-tolerant fecal coliform bacteria including *E. coli*.
- Question: Are there health risks to anglers fishing in PR?
  - Hands → food/clothing → mouth → contract bacteria
- **Objectives:**
  - Confirm presence of thermo-tolerant fecal coliform and *E. coli* on resident Pine River fish
  - Determine if thermo-tolerant fecal coliform bacteria and/or *E. coli* occur on angler hands when fishing recreationally in the Pine River

Thermo-tolerant: able to survive human body temperature

Coliform bacteria: lives in intestines of warm-blooded animals

***E. coli*:** type of coliform bacteria that could cause illness

What Did We Do?

- **1st Fishing Trip:** Took Samples Directly from Fish
  - Location: Golfside by boat and Pine River Park and Luneak Park on shore. Fished per usual
  - Swabber used sterile swab to take a sample from the side of each fish
  - Swabbed angler hands after catching their first fish and at the end of the fishing day
  - Recorded species, catch location, and length
- **2nd Fishing Trip:** Sampling Anglers' Hands
  - Same locations and fished per usual
  - Anglers assigned to specific treatments that determined when their hands were swabbed
    - Treatment 1: After first and last fish
    - Treatment 2: Every 30 minutes
    - Treatment 3 (all): Bleached hands then dipped directly into river to be swabbed