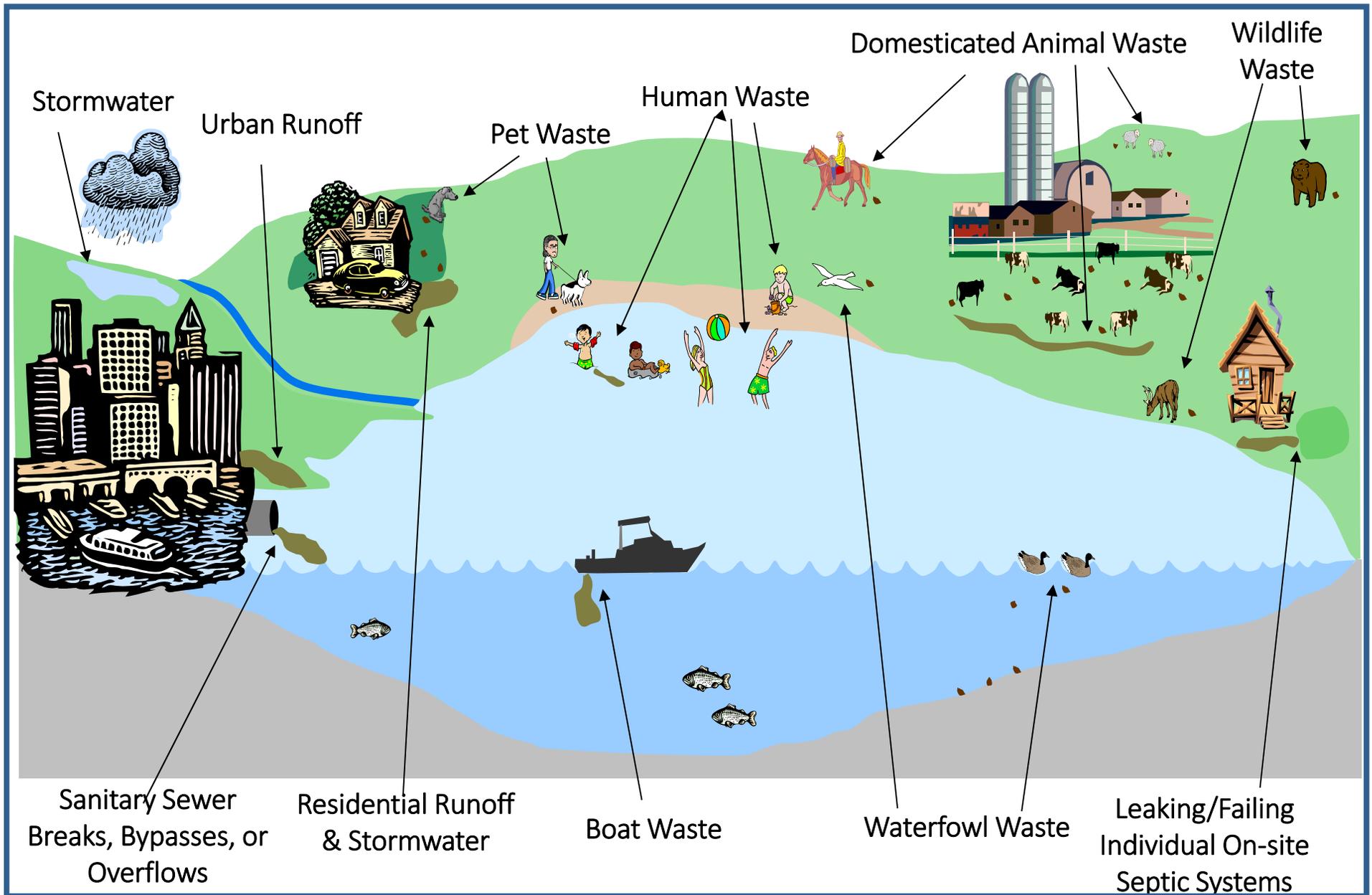


What's in the Water?



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Potential Sources of Fecal Contamination



Bacteria in Lakes

- Most bacteria in lakes do not cause illness
- Almost all illness from lakes come from untreated human waste or feces

Beach Monitoring in Minnesota

- No statewide inventory of beach testing results
- Majority of beaches are not tested
- Testing at the discretion of entity responsible for the beach (e.g., city, county, park district, local health department)
- Minnesota Department of Health runs the Lake Superior Beach Monitoring Program

Beach Monitoring

- Test for presence of fecal indicators
 - Presence indicates fecal contamination may have occurred
 - Usually not capable of causing illness

Beach Sampling

- Sample at least weekly – high priority areas more frequently
- Take sample in middle of bathing area
 - Longer beaches sample every 500 meters
- Sample at knee depth



Federal Acceptable Water Standard

- Geometric mean based on not less than 5 samples within a 30-day period shall not exceed 126 *E. coli* colonies per 100 ml of water

AND

- Content shall not exceed 235 *E. coli* colonies per 100 ml of water in a single sample

State Acceptable Water Standard

- Geometric mean based on not less than 5 samples within a 30-day period shall not exceed 200 fecal coliform colonies per 100 ml of water

AND

- Content shall not exceed 400 fecal coliform colonies in more than 10% of all samples taken during any 30-day period

Advisory Signs

- Posted when sample results indicate bacteria levels over standards
- Recommendations to the public to avoid water contact until further testing reveal safe conditions
- Removed when sample results return to below the standard

Beach Testing Limitations

- Water contamination is transient
- Takes 24 hours to get results
 - Find out today we should not have gone in the water yesterday
- Samples may not be collected frequently enough
 - Decisions are often made based on a single sample taken at one point in time
- Levels might not be from recent pollution
 - Indicator bacteria can survive in sand
 - Can pathogenic bacteria survive, too?

Beach Safety

- Same recommendations regardless of if the beach is monitored
- Avoid swimming after heavy rains
- Don't swim near storm drains
- Look for trash and signs of pollution on the water
- Don't swallow the water

Minimizing Recreational Water Contamination: At the Beach

- Don't swim if you have diarrhea
- Take children for frequent bathroom breaks
- Change diapers frequently and away from the water's edge (ideally in a bathroom)
- Don't feed birds or wildlife
- Dispose of trash (including animal waste) in proper receptacles
- Empty portable toilet waste in proper onshore sanitary facilities

Minimizing Recreational Water Contamination: At Home

- Maintain private septic systems
- Use lawn care products properly
- Keep pollution out of storm drains

Waterborne Illnesses

Neurologic infections

Naegleria fowleri

Ear infections

Pseudomonas

Acute gastroenteritis

*Cryptosporidium, Giardia,
E. coli O157, Shigella,
Norovirus*

Skin infections

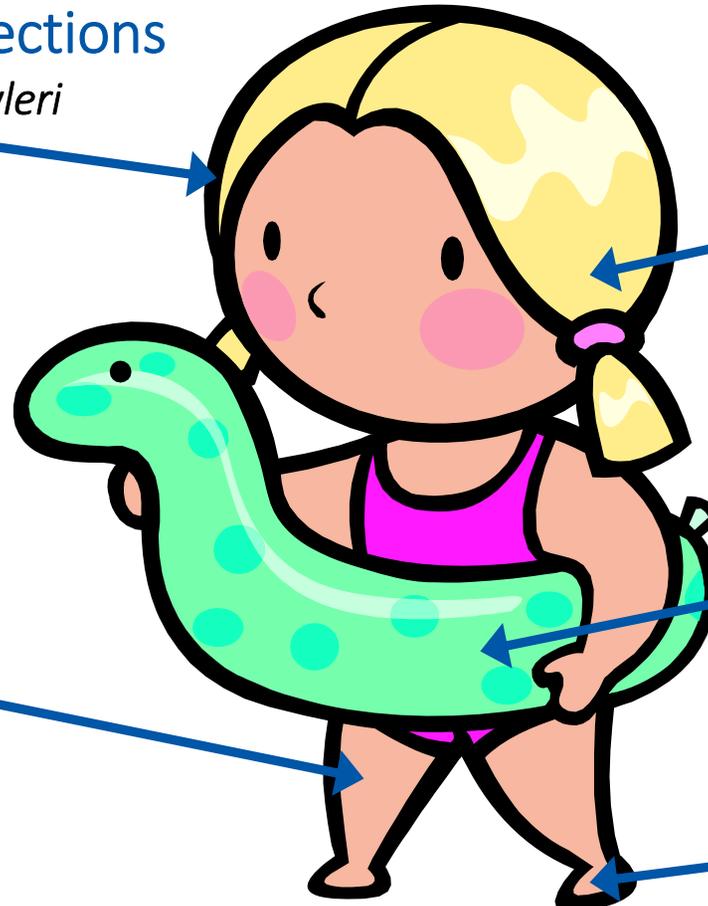
Pseudomonas

Wound infections

Vibrio

Multiple manifestations

Cyanobacteria



How Are Diarrheal Illnesses Spread in Water?

- On average people have 0.14 grams of feces on their bottoms, which when rinsed off, can contaminate the water
- When someone is ill with diarrhea their stool contains millions of germs
- Swallowing even a small amount of contaminated water can make a person sick



Healthy Swimming Steps

- Stay out of the water if you have diarrhea
- Shower before you get in the water
- Don't swallow the water





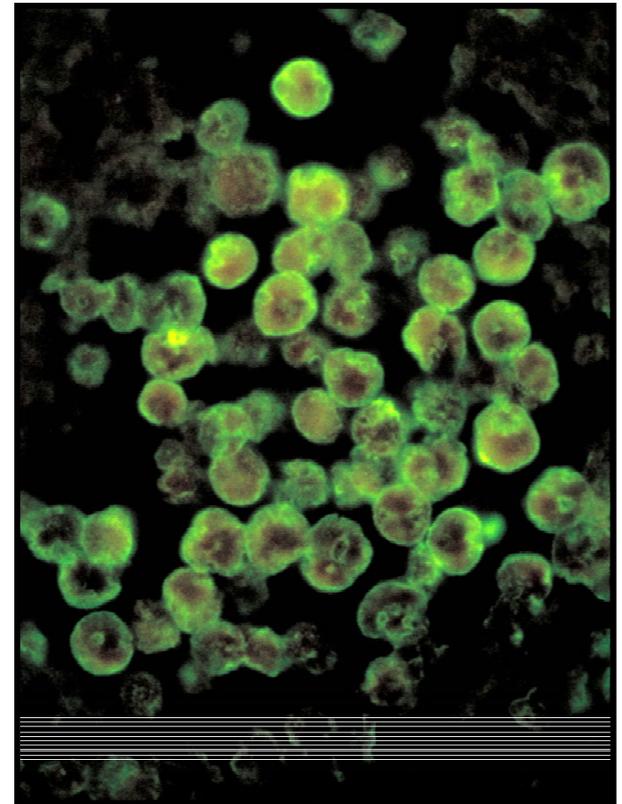
Harmful Algal Blooms

Harmful Algal Blooms (HABs)

- HABs are blue-green algal blooms that contain toxins that can cause illness in humans and animals
- HABs can occur everywhere in Minnesota, but thrive in warm, shallow, nutrient-rich lakes
- People are exposed to toxins by swallowing, having skin contact with, or breathing in droplets of air
- Symptoms may include vomiting, diarrhea, rash, eye irritation, cough, sore throat, headache
- If in doubt, stay out!

Naegleria fowleri

- Ameba commonly found in warm freshwater
 - No quick, reliable test
- Introduced into nose during activities in water
- Migrates to the brain and destroys brain tissue
- Causes Primary Amebic Meningoencephalitis (PAM)



Primary Amebic Meningoencephalitis (PAM)

- Symptoms start about 5 days after exposure
- Symptoms similar to bacterial meningitis
 - Headache, fever, nausea, vomiting
 - Stiff neck, confusion, seizures, hallucinations
- Disease progresses rapidly
- Almost always fatal (>97%)
- 138 cases in United States (1962-2015)
 - Most were children (84%)
 - Most were male (75%)

Preventing PAM

- Only sure way is to avoid participation in freshwater-related activities
- Can reduce risk by limiting the amount of water that goes up the nose



Preventing PAM

- Avoiding putting your head under the water
- Holding your nose shut or using nose clips
- Avoiding warm freshwater when water temperatures are high and water levels low
- Avoiding digging or stirring up the sediment in shallow, warm freshwater areas

Thank You!

