E.coli Monitoring in the Red Bird River Watershed

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Stakeholder Concerns

- Garbage
- Safe drinking water
- Fishing and hunting
- Recreation use
- Safe swimming and wading
How do we determine if the Water is Safe for Swimming?
Monitor for Bacteria in the Water

• Bacteria

  – Organisms we can’t see. Many are helpful but some can make us sick.

  – There are six fecal coliform bacteria found in feces of humans and warm blooded mammals.
Escherichia coli (E. coli)

• Many strains are harmless but their presence can indicate that other harmful bacteria, viruses or parasites may be present.
Is it safe to swim in the water?

• What’s the likelihood that enough of these harmful bacteria, viruses or parasites are in the water that could make me sick if I get the water in my mouth, nose, eyes, ears or other openings (cut or scrape)?

What’s the risk?
Clean Water Act

• Requires states to establish water quality standards

• Primary Contact Recreation (PCR) standard

• Standard is based on scientific research, input from the public, approval from EPA and it’s included in our Kentucky Administrative Regulations
# Primary Contact Recreation (PCR) Standard for *E. coli*

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Geometric Mean (colonies/100 ml)</th>
<th>Maximum (colonies/100 ml)</th>
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</thead>
<tbody>
<tr>
<td><em>E. coli</em></td>
<td>130 (from 5 samples collected within 30 days)</td>
<td>240 (number not to be exceeded in more than 20% of the samples)</td>
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</tbody>
</table>
What does that mean?

• Based on scientific data, input from the public, our lawmakers and EPA...

  – Levels of *E.coli* found in a waterbody greater than the standard indicate a potential health risk for people swimming in the water
What does this mean for the Red Bird River?
E. coli Results
(during PCR season)

- E. coli 5/15/12 (wet)
- E. coli 8/13/12 (dry)

Sampling Sites (headwaters to mouth)

E. coli (colonies/100 mL)
Questions

• Where are potential sources of impairment?
• Where can we target implementation to address these sources?

And...

• How can we answer these questions with limited resources?
KDOV Sampling Points
Field Work

Lab Work

Mix reagents with sample, pour into incubation tray

Count yellow cells as total coliform; fluorescent cells as *E. coli*.

Seal, incubate

Pictures courtesy of Idexx Corp., Westbrook, Maine
Colilert Quanti-Tray/2000®
Problems

WEATHER!
Not enough rain

Rainfall data from the University of Kentucky Agricultural Weather Center - collected at Buckhorn Lake
KDOW
E. coli
Results

E. coli (colonies/100 mL)
Pollutant Loads

AVERAGE ANNUAL E.COLI LOAD (CFU/year)

Sampling Points from Headwaters to Mouth

- RED BIRD CREEK
- LAWSON CREEK
- RED BIRD CREEK
- PHILLIPS FORK
- RED BIRD RIVER
- UPPER JACKS CREEK
- RED BIRD RIVER
- RED BIRD RIVER
- RED BIRD RIVER
- RED BIRD RIVER
- ELK CREEK
- BIG CREEK
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% LOAD REDUCTION NEEDED

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% LOAD REDUCTION NEEDED
What’s Next

• KDOW to complete a full 5 in 30 sampling event in May 2014

• Capture wet and dry weather events

• Analyze the results

• Use the results to target implementation