Licking River Watershed Watch Bacteria Sampling 2008

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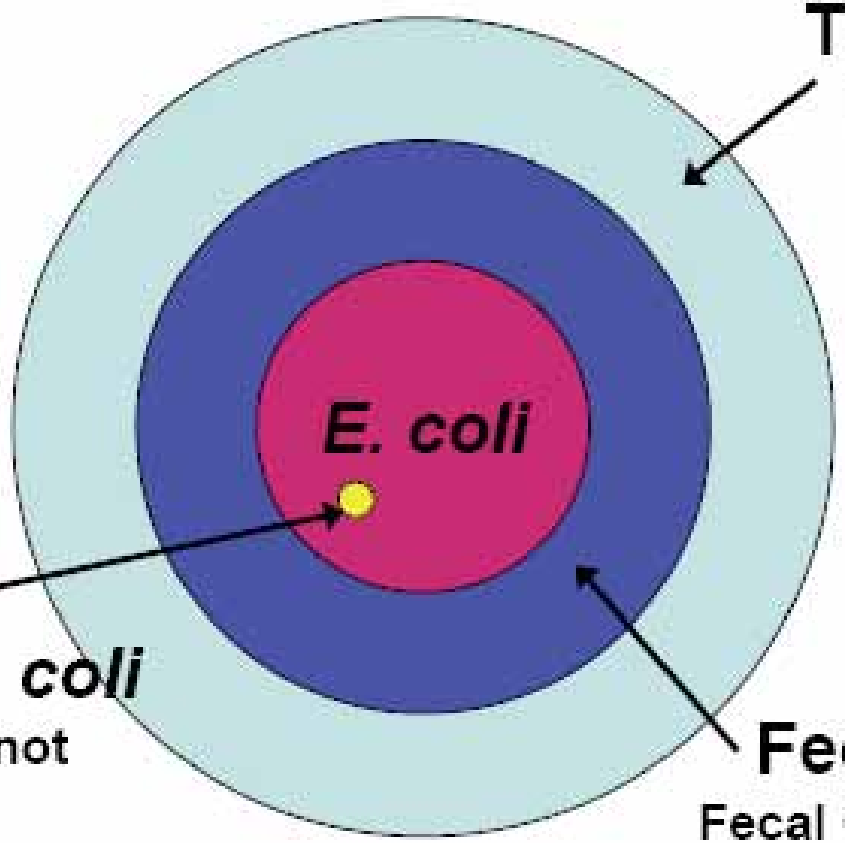
What is a Coliform?



Total Coliform

Total Coliform = Environmental Contamination

Pathogenic *E. coli*

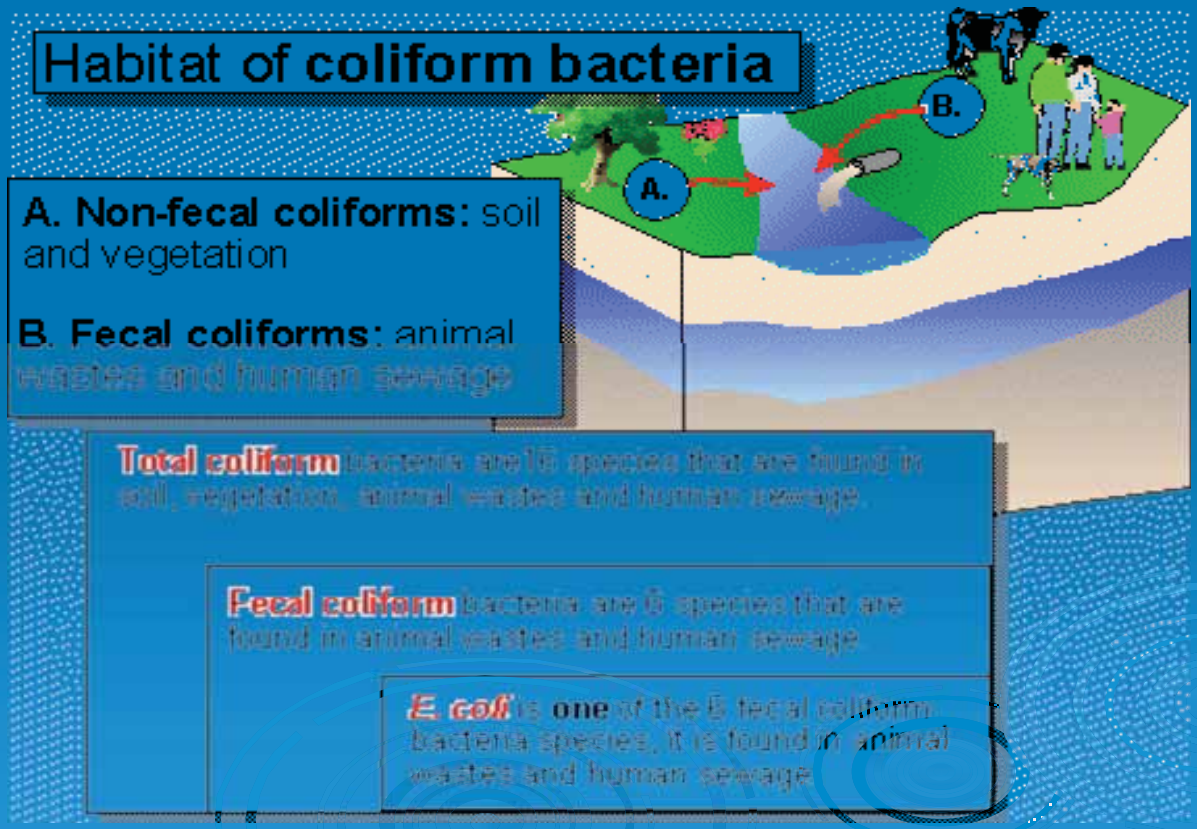
Some of which are not detectable by Total Coliform detection methods

Fecal Coliform

Fecal Coliform & *E. coli* = Fecal Contamination

WHY TEST FOR *E. COLI*?

Habitat of Coliform Bacteria



Why Test for *E.coli*

Animal	# Tested	*E.coli*	Klebsiella spp	Enterobacter/ Citrobacter
Human	26	96.8%	1.5%	1.7%
Cow	15	99.9	-	0.1
Horse	3	100	-	-
Sheep	20	97	-	3
Pig	15	83.5	6.8	9.7
Average		94.5%		

Source:*E.coli*:Fecal Coliform A.P. Dufour. Special Technical Publication 65, ASRM. Pp48-58, 1977

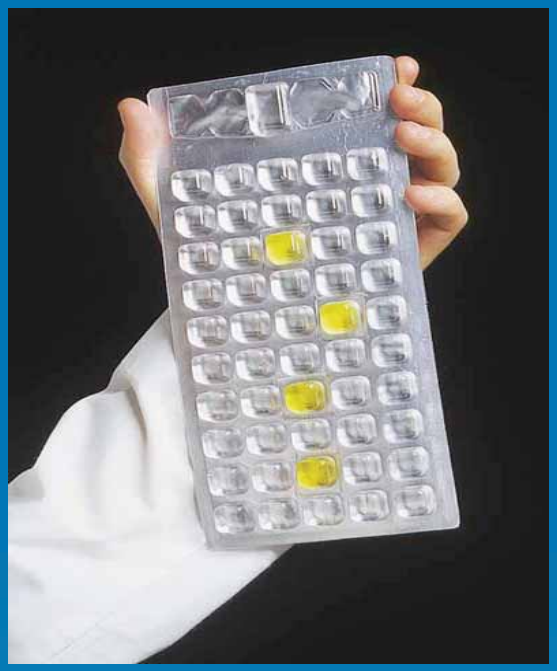
Quanti-Tray Demonstration

Add Colilert to sample and shake to dissolve

Pour mixture into a Quanti-Tray

Quanti-Tray Demonstration

Seal and then incubate at 35°C for 24 hours



Count positive wells and refer to MPN table

E.coli Positive Tray

EPA Criteria For *E. coli*

- According to the EPA's Ambient Water Quality for Bacteria For Marine and Fresh Recreational Water the following standard was set in 2005:
  - *E. coli*
    - 130 CFU/100ml for geometric mean
    - 240 CFU/100ml for single sample exceedance

Overview of 2008 Sampling Events

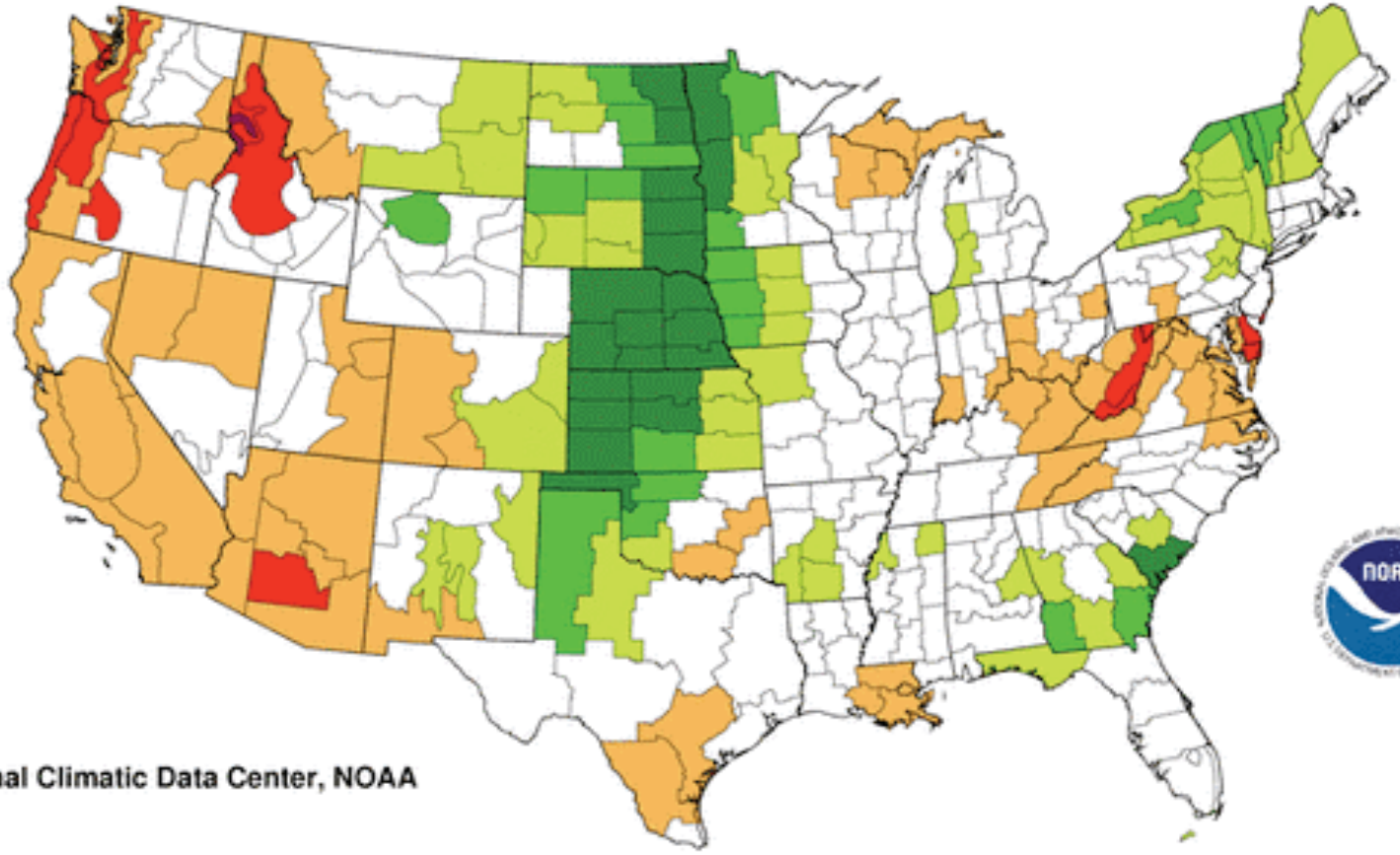
Sampling Event	Number of Samples	Number Exceeding 240 CFU/100 ML	% of Samples Exceeding Standard
MAY 2008	94	67	71%
JULY 2008	69	37	54%
OCT. 2008	56	25	45%

Rain Events for 2007 & 2008

- Rainfall Reported by Volunteers for Each Event 2007
  - May — Ranged from 0.0 – 0.1
  - July — Ranged from 0.0 - 1.5
  - September — No Rainfall Reported
- Rainfall Reported by Volunteers for Each Event 2008
  - May — Ranged from 0.0 – 2.0
  - July — Ranged from 0.0 - 1.0
  - October — Ranged from 0.0 – 0.5

Palmer Z Index
Short-Term Conditions

October 2008



National Climatic Data Center, NOAA

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
-2.75 and below	-2.00 to -2.74	-1.25 to -1.99	-1.24 to +0.99	+1.00 to +2.49	+2.50 to +3.49	+3.50 and above

Licking River Watershed Watch
2007 vs. 2008 *E. coli* Data for Specific Sites

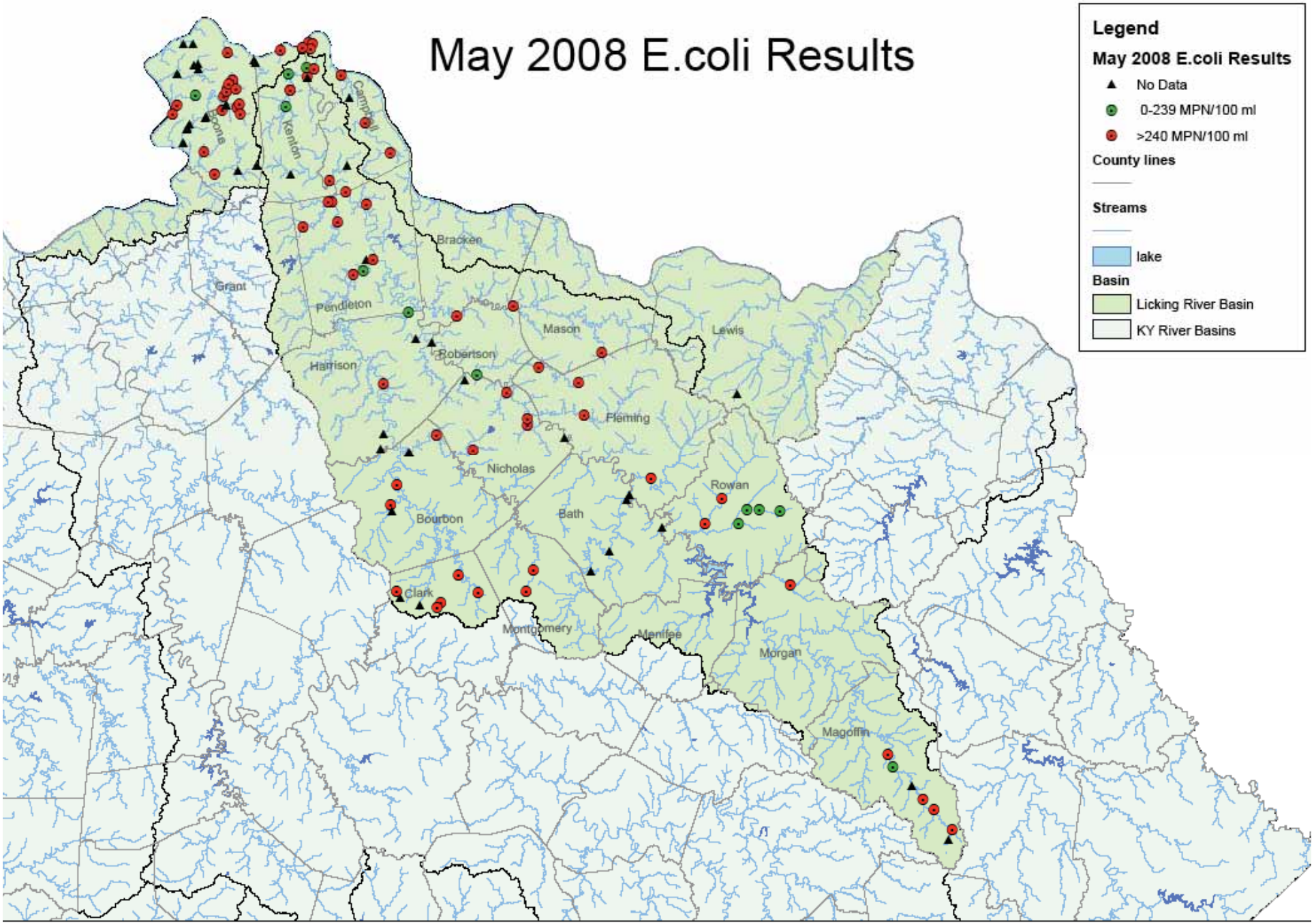
County and Stream	Station	May-07	May-08		Jul-07	Jul-08		Sep-07	Oct-08
Bath									
Licking River	L76	100				80		60	
Slate Creek	L113	320				580		880	
Boone									
Gunpowder Creek	L210	80			180	100			
Gunpowder Creek	L458		650		380			560	360
Gunpowder Creek	L459		560		260			520	560
Gunpowder Creek	L460		800		220			460	680
Gunpowder Creek	L461		300		420	440			
Gunpowder Creek	L462	320	560		1120	920			
Gunpowder Creek	L466	440	1200		680	860		60	
Gunpowder Creek	L467	320	540		60	300		60	
Gunpowder Creek	L472		0		200	40		140	
Gunpowder Creek	L287		680		220	320			
Gunpowder Creek	L452				34	20		2	
UT Gunpowder Creek	L457		340		80	240			

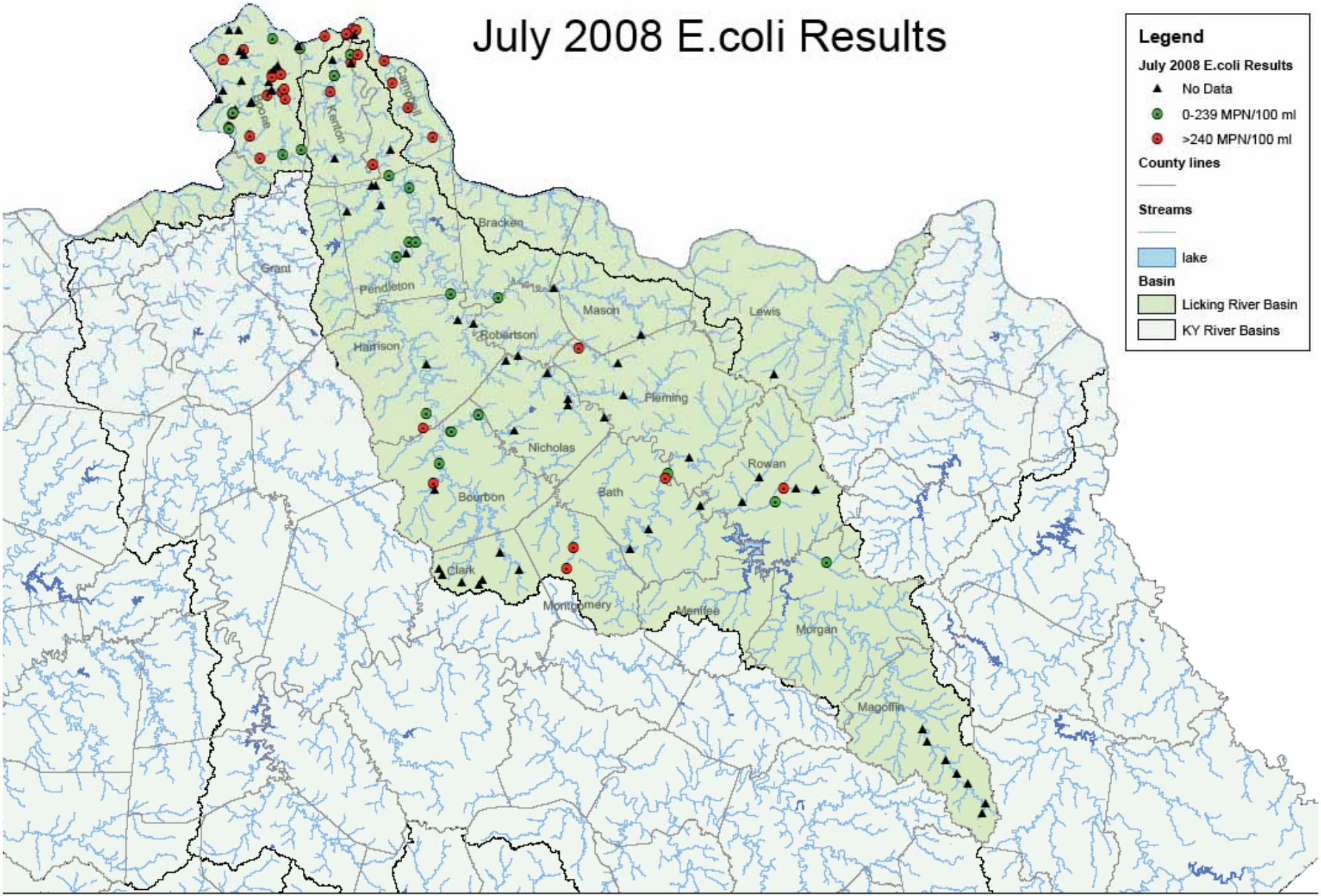
County and Stream	Station	May-07	May-08		Jul-07	Jul-08		Sep-07	Oct-08
Boone									
McCoys Fork	L241	240			140	180		80	
Woolper Creek	L245	40			480	300		20	200
Ashby Fork	L246	100			320	340			1080
Big Bone	L249	200	920		120	290		40	40
Mud Lick Creek	L250	40	300		200	540		20	240
Woolper Creek	L255	360			660	580		120	
Pleasant Run	L406		400		1140	860		80	4960
Middle Creek	L412	1600	240		560				120
Middle Creek	L413	1160	180		120				1360
Elijahs Creek	L417	20	680		860	101		160	160
McCoys Fork	L447				340	200		40	
Riddles Run	L453				220	340		80	
Bourbon									
Houston Creek	L42	600	380		640	400		80	
Stoner Creek	L43	600	646		780	120		40	
South Fork Licking	L46	20	1000		1240			60	
Townsend Creek	L47	160			380	281			
South Fork Licking	L54	40	120					20	
South Fork Licking	L78	220			120			20	160
Hinkston Creek	L79	80	4020		640	200		20	
Stoner Creek	L218				200	100		1720	80
Hinkston Creek	L225				320	220		60	200

County and Stream	Station	May-07	May-08		Jul-07	Jul-08		Sep-07	Oct-08
Campbell									
Twelvemile Creek	L05	260	3680		480	261			
Fourmile Creek	L48	80	540		360	700		80	320
Licking River	L60	60	120		460	140		40	120
Tug Fork	L073	440	240			1020			
Twelvemile Creek	L112	300	4960		100	260		960	
Phillips Creek	L153	40	300		100	320			1040
Taylor Creek	L178	6160	4960		2340	940		1060	4680
Taylor Creek	L179	9760	860		4500	3040		1220	17400
Licking River	L411	160	80			160			
Threemile Creek	L419	160	320			1100			
Licking River	L444		700		480	900		20	
Clark									
Stoner Creek	L17		10960		680				460
Little Stoner Creek	L45		9780		1860				
Fleming									
Mill Creek	L23	180	34660		1980				
Johnson Creek	L24	580	24060		39720				
Fleming Creek	L25	20	7740		620				20
Fox Creek	L27	60	22400		3700				520
Harrison									
Richland Creek	L216	220	100		620	100			
North Fork Licking	L217		240		200				

County and Stream	Station	May-07	May-08		Jul-07	Jul-08		Sep-07	Oct-08
Kenton									
Banklick Creek	L38		1080		580	480		220	160
Banklick Creek	L39		240		100	460		20	600
Banklick Creek	L470		240			120		40	0
Banklick Creek	L471		120			960		40	240
Magoffin									
Trace Fork	L192	460	300		560				0
Licking River	L235	400	180					340	82
Licking River	L236	880	320		1240			60	62
Salt Lick	L237	400	560		800				
Brushy Fork	L446	2220	6520		880			400	218
Montgomery									
Hinkston Creek	L61X	9220	4560			3440		720	
Hinkston Creek	L62	840	1620		2300	2100		1560	
Morgan									
North Fork Licking	L431	320	240		620	40			440
Nicholas									
Licking River	L83		240		80			20	120
Brushy Fork of Blue Lick	L89	420	620		280			160	80
Licking River	L91		6900		460			20	240
Fleming Creek	L92		7320		720			120	400

County and Stream	Station	May-07	May-08		Jul-07	Jul-08		Sep-07	Oct-08
Pendleton									
Licking River	L07		260		60	100		20	
South Fork Licking	L34		400		100	100		40	
Licking River	L61		440		80	20		20	0
Middle Fork Grassy Creek	L69	80	2260		720				
South Fork Licking	L127				120	100		20	80
Licking River	L128		460		60	141		80	200
Robertson									
Johnson Creek	L87	580	40		40			420	
North Fork Licking	L88	0	620		580			20	
Rowan									
North Fork Triplett Creek	L404	160	220		500	218		60	520
North Fork Triplett Creek	L405	320	520		900	170		0	480
Licking River	L434							80	80
Licking River	L436	80			180			20	40
Laurel Fork	L473	900			1220	440			
Christy Creek	L502	160	160		240	320		60	960
Dry Creek	L503	120	180		480	180		280	200


May 2008 E.coli Results
Legend
May 2008 E.coli Results
No Data
0-239 MPN/100 ml
>240 MPN/100 ml
County lines
Streams
lake
Basin
Licking River Basin
KY River Basins
Boone
Kenton
Campbell
Bracken
Grant
Pendleton
Mason
Lewis
Robertson
Harrison
Fleming
Nicholas
Rowan
Bourbon
Bath
Clark
Montgomery
Menifee
Morgan
Magoffin


July 2008 E.coli Results
Legend
July 2008 E.coli Results
No Data
0-239 MPN/100 ml
>240 MPN/100 ml
County lines
Streams
lake
Basin
Licking River Basin
KY River Basins
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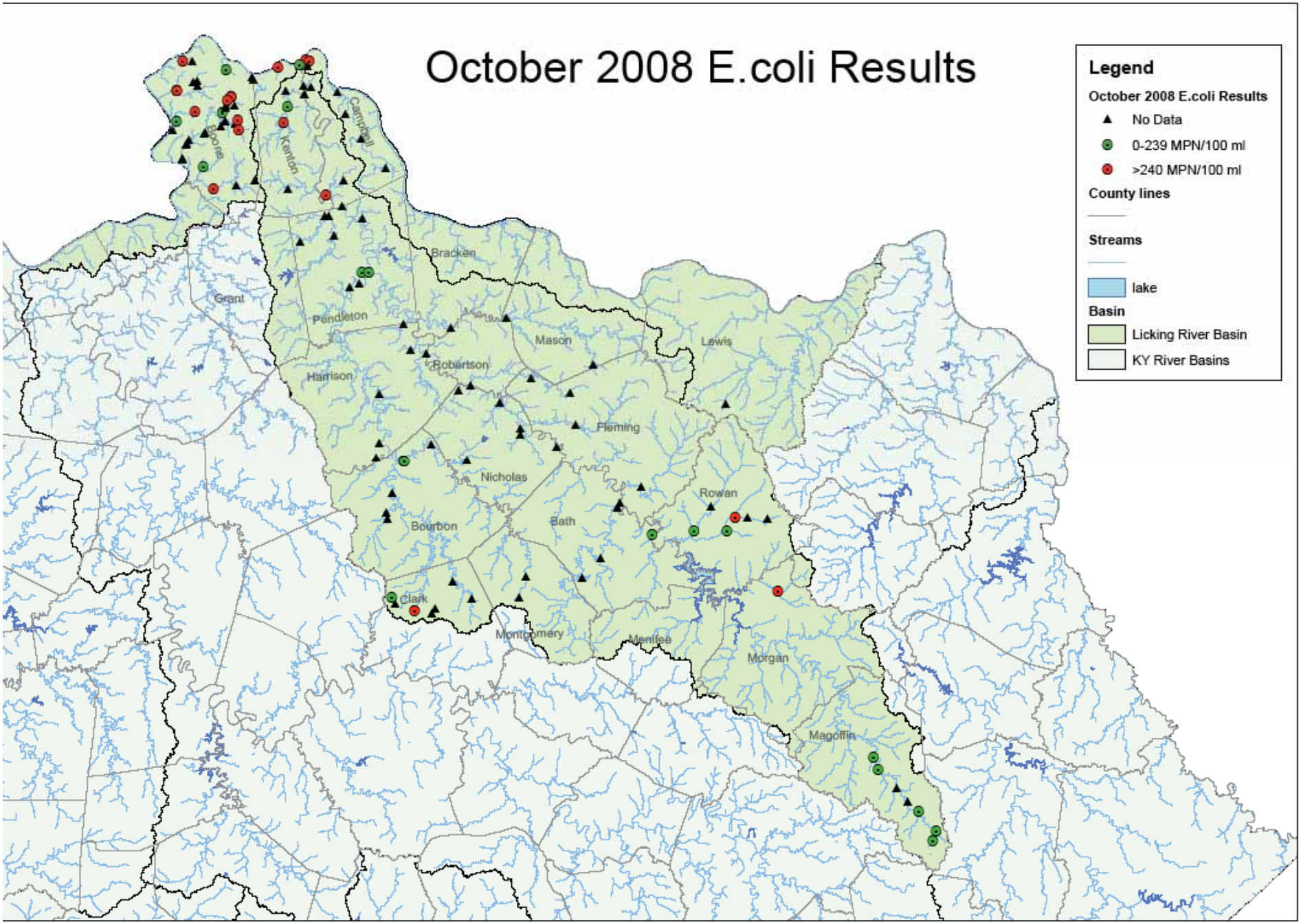
October 2008 E.coli Results
Legend
October 2008 E.coli Results
No Data
0-239 MPN/100 ml
>240 MPN/100 ml
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Morgan
Magoffin


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06/24/2008 13:01

Conclusion

- Percentage of samples out of compliance for primary contact recreation were higher during the May 2008 sampling event. This could be possibly due to a recent rain event.
- Rain events do have influence over the number of *E. Coli* found in surface water samples.
- LRWW should continue using *E. Coli* as its indicator of watershed contamination in order to adhere to the ambient water regulation.