

LT2 Round 1 *Cryptosporidium* Matrix Spike Recovery

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Outline

- ***LT2 Matrix Spike (MS) Recovery Projections (next slide)***
- Round 1 MS Recovery Data
- Summary

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LT2 MS Recovery Projections

- Spike recovery (the fraction of spiked oocysts that are counted, expressed as a percentage) varies from assay to assay.
- Recovery distribution (method 1622/1623)
 - Mean recovery = **40%**
 - Standard deviation of recovery = **20%**
 - RSD = $20\% / 40\% = \mathbf{50\%}$
- We did not attribute additional variability to matrices or laboratories.

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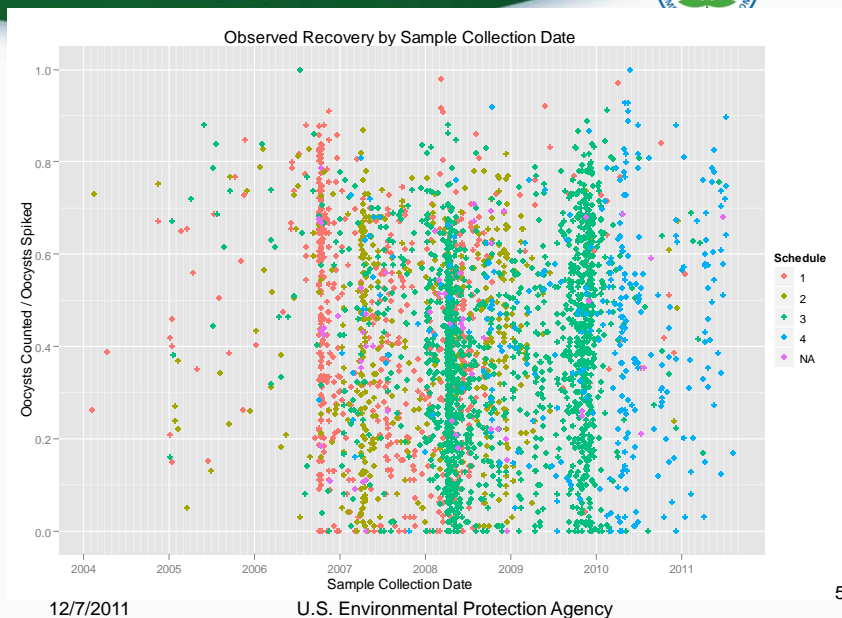
Outline

- LT2 MS Recovery Projections
- ***Round 1 MS Recovery Data (next 6 slides)***
- Summary

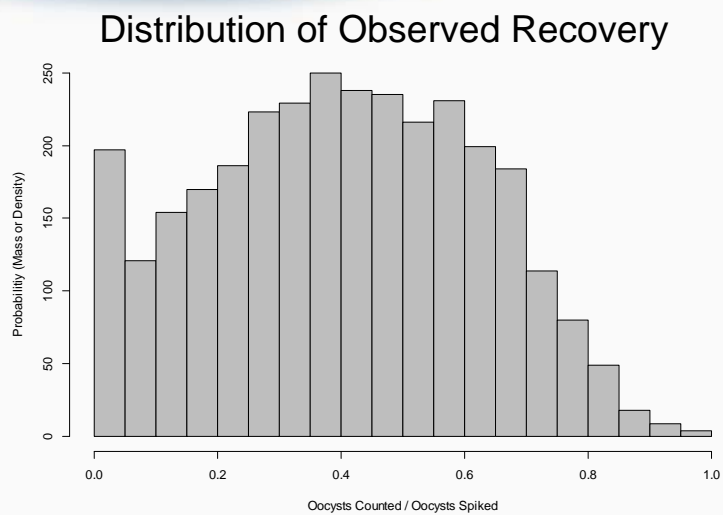
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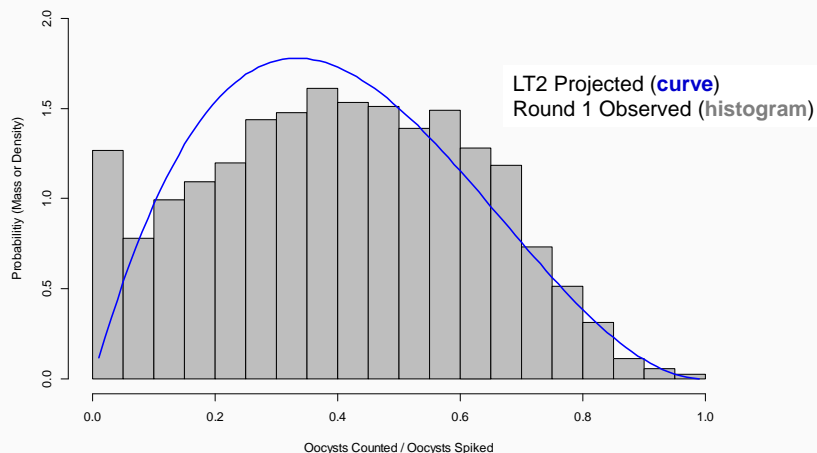
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Observed and LT2-Projected Recovery Distributions



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Cryptosporidium MS Recovery Summary Statistics for Samples

- 3107 records are used for understanding recovery
 - 3107 samples with at least 95 oocysts spiked, full sample volume assayed, and recovery not greater than 100% are included.
 - 127 samples with too few oocysts spiked, less than full volume assayed, and infeasible recoveries are excluded.
- Observed recoveries range from 0% to 100%.
- Average recovery is **40.4%** (LT2 projected **40%**)
- Standard deviation of recovery is **21.9%** (LT2 **20%**)
- Relative standard deviation of recovery is **54.2%** (LT2 **50%**)
- Small variation due to water type.

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Cryptosporidium Mean MS Recovery by Water Type

Water Type*	Number of Facilities	Number of Records	Mean Recovery
Res/Lake (LR)	698	1412	41.7%
River/Stream (FS)	596	1209	39.1%
Both (LR & FS)	57	105	39.4%
GWUDI-FS	70	146	37.0%
GWUDI-LR	35	62	45.1%
NA**	101	173	41.5%
Total	1557	3107	40.4%

*GWUDI = ground water under direct influence of surface water.

**NA = not available. Water Type was missing for some facilities.

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Cryptosporidium MS Recovery Summary Statistics for Labs

- Using same 3107 records
- 50 Labs
- Lab-specific average recoveries
 - Minimum = 21.3%
 - Median = 41.4%
 - Maximum = 90.5%
- Between-lab variability is due to both differences in lab performance and matrix effects. (*LT2 assumed no systematic matrix or lab effects.*)

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Outline

- LT2 MS Recovery Projections
- Round 1 MS Recovery Data
- **Summary (next 2 slides)**

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MS Recovery Summary

- Overall recovery distribution is very much like that assumed in LT2 EA, but with higher frequency of very low recoveries.
- Large variability remains between Labs and matrices, but the DCTS data are of limited value for separating the contributions of these two variance components (lab and matrix).

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Occurrence Summary

- Key statistics regarding reduced occurrence:
 - Zero counts in about **93%** of samples (vs. **86%** for LT2)
 - All-zeros for **51%** of plants (vs. **20%**)
 - Average measured concentration **0.016/L** (vs. **0.053**)
 - **4.7%** of source water means equal or exceed 0.075/L (vs. **14%**)
 - Higher occurrence for flowing streams than reservoirs & lakes
 - Occurrence increases with system size (Schedule)
 - Nearly 10% of schedule 4 facilities have means above 0.075
- ***The occurrence reduction appears to be real. The reduction is not due a systematic change in recovery.***