

The observed (raw, unadjusted) *Cryptosporidium* data from the Information Collection Rule and ICRSS do not accurately characterize true concentrations because of (a) the low and variable recovery of the analytical method, (b) the small volumes analyzed, and (c) the relatively small number of sample events. EPA employed a statistical treatment to estimate the true underlying occurrence that led to the data observed in the surveys and to place uncertainty bounds about that estimation.

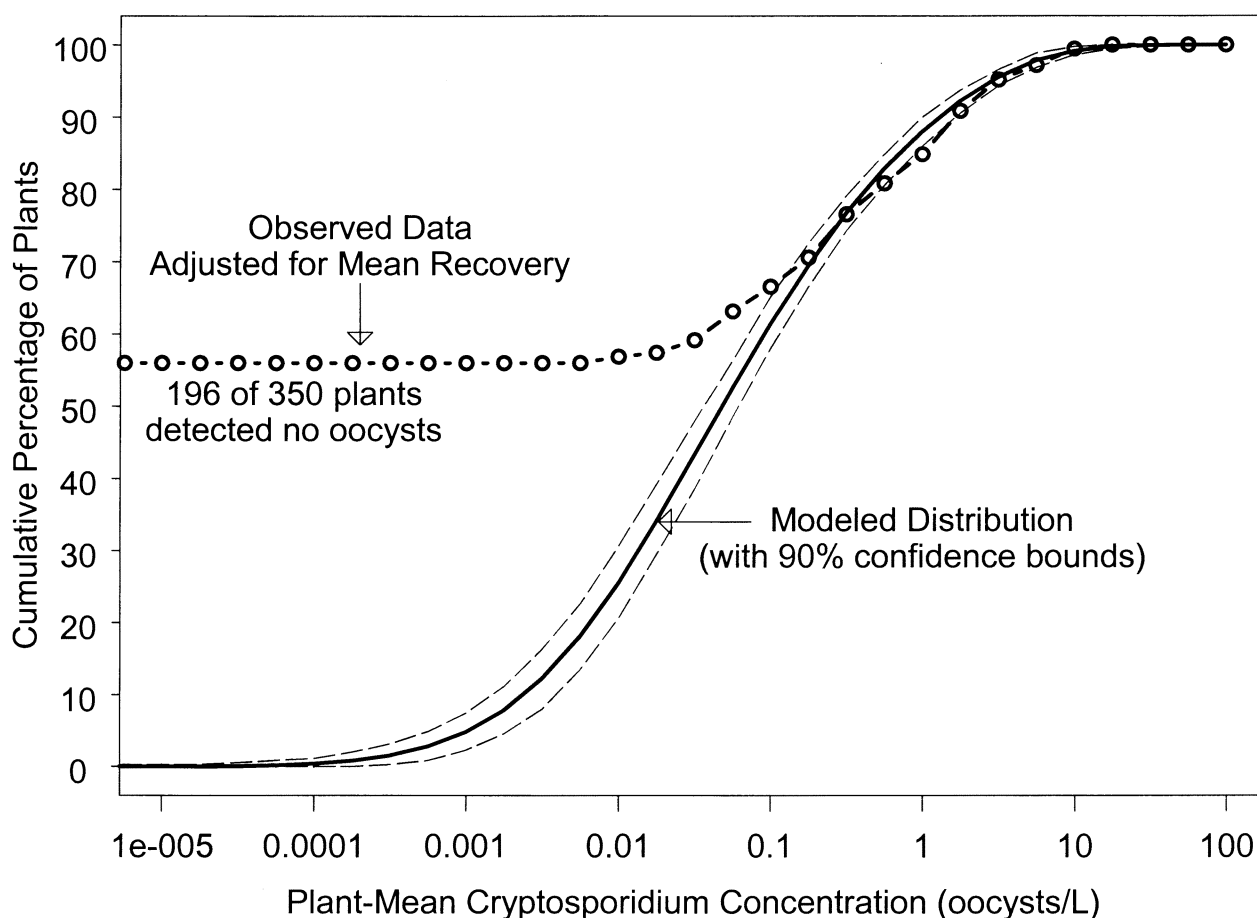
A hierarchical model with Bayesian parameter estimation techniques was used to separately analyze filtered and unfiltered system data from the Information Collection Rule and the

large and medium system data from the ICRSS. The model included parameters for location, month, source water type, and turbidity. Markov Chain Monte Carlo methods were used to estimate these parameters, producing a large number of estimate sets that represent uncertainty. This analysis is described more completely in Occurrence and Exposure Assessment for the Long Term 2 Enhanced Surface Water Treatment Rule (USEPA 2003b).

a. *Information Collection Rule results.* Figure III-1 presents plant-mean *Cryptosporidium* levels for Information Collection Rule plants as a cumulative distribution. Included in Figure III-1 are distributions of both the observed raw data adjusted for mean analytical

method recovery of 12% and the modeled estimate of the underlying distribution, along with 90% confidence bounds. The two distributions (observed and modeled) are similar for plants where *Cryptosporidium* was detected (196 of 350 Information Collection Rule plants did not detect *Cryptosporidium* in any source water samples). The modeled distribution allows for estimation of *Cryptosporidium* concentrations in sources where oocysts may have been present but were not detected due to low sample volume and poor method recovery (this concept is explained further later in this section).

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**Figure III-1.-- Plant-Mean *Cryptosporidium* Levels for Information Collection Rule Plants**

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The results shown in Figure III-1 indicate that mean *Cryptosporidium* levels among Information Collection Rule plants vary widely, with many plants having relatively little

contamination and a fraction of plants with elevated source water pathogen levels. The median and 90th percentile estimates of Information Collection Rule plant-mean *Cryptosporidium* levels are

0.048 and 1.3 oocysts/L, respectively. These levels are lower than *Cryptosporidium* occurrence estimates used in the IESWTR (USEPA 1998c), and the distribution of Information