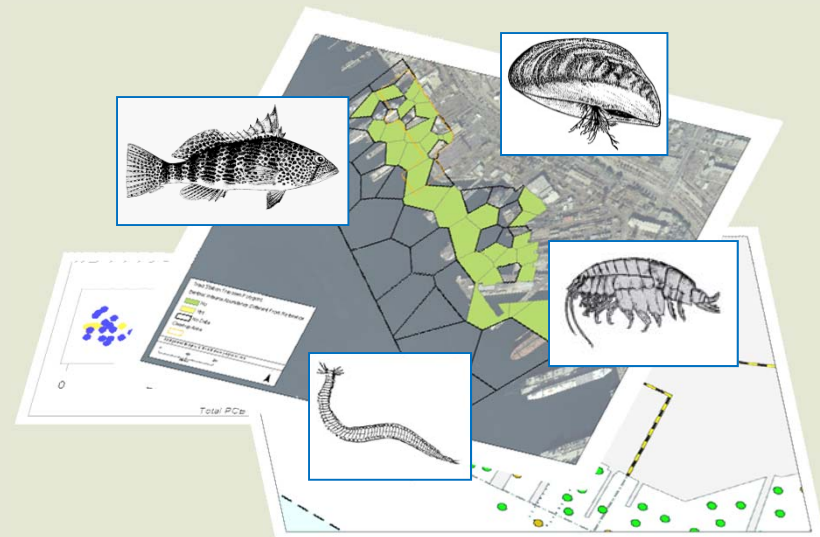


# Cleanup Thresholds

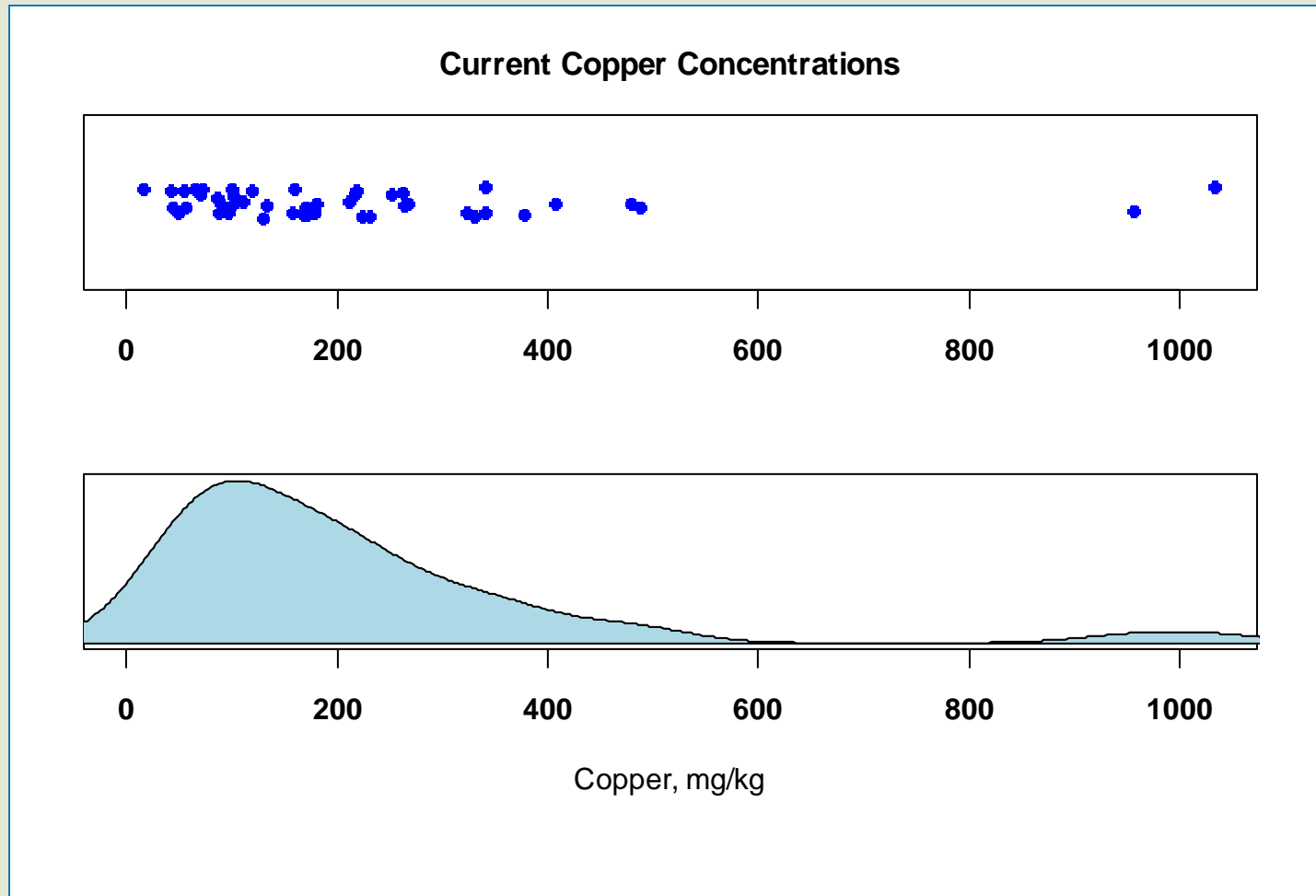
## San Diego Shipyard Site

Dreas Nielsen

On behalf of BAE Systems



# Environmental Concentration Data



# Duplicate Laboratory Analyses

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- Inorganic chemicals
  - Solids: Relative Percent Difference <20% (or <35%)
  - Source: U.S. EPA. 1994. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review
- Organic chemicals
  - Solids: Relative Percent Difference <19-50%
  - Source: U.S. EPA. 2008. USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods in Data Review

# Accounting for Uncertainty During Post-Remedy Sampling

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- For a sample: 120% of background
- For the site: upper confidence limit of the SWAC-based ACL

# EPA Guidance on Background Comparisons

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*The action level for background comparisons is the largest value of the difference in means that is acceptable to the decision maker.*

*It is necessary to specify a gray region...because the decision may be “too close to call” due to uncertainty...*

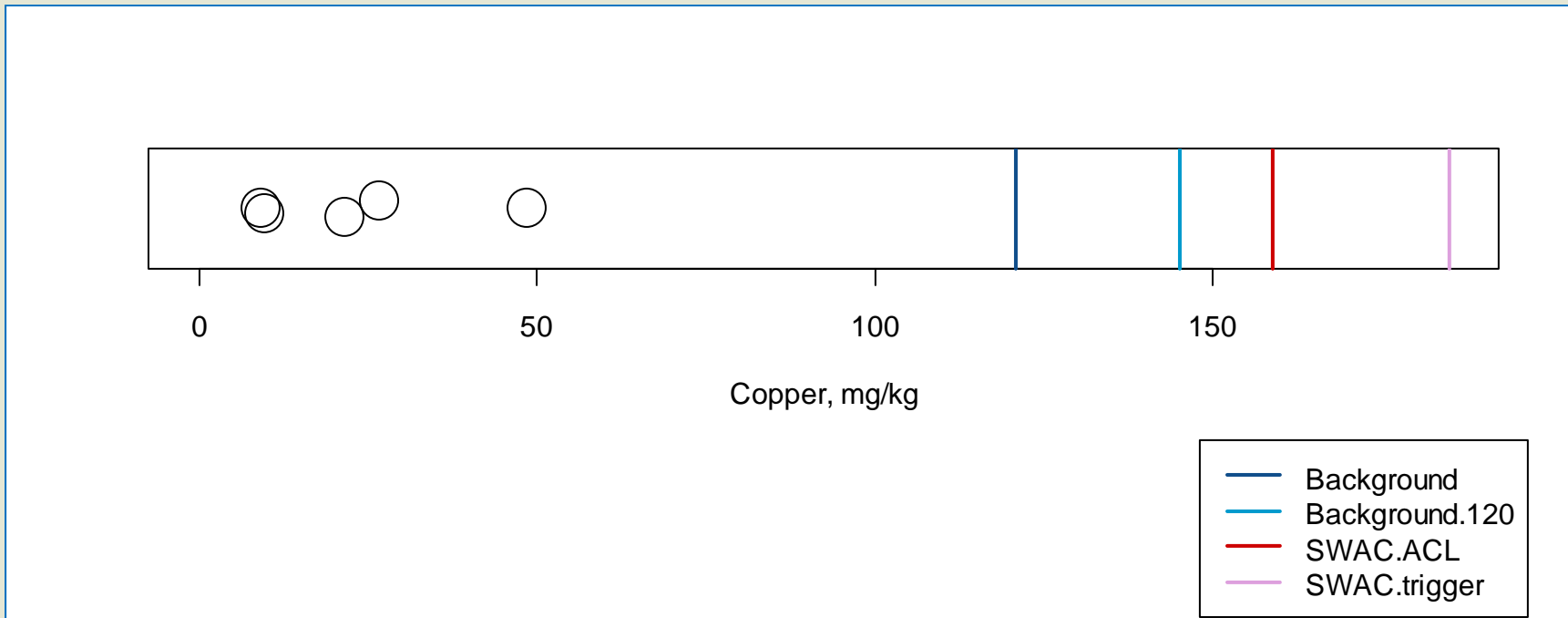
U.S. EPA. 2002. Guidance for comparing background and chemical concentrations in soil for CERCLA sites.

# Dredging Results at BAE Systems

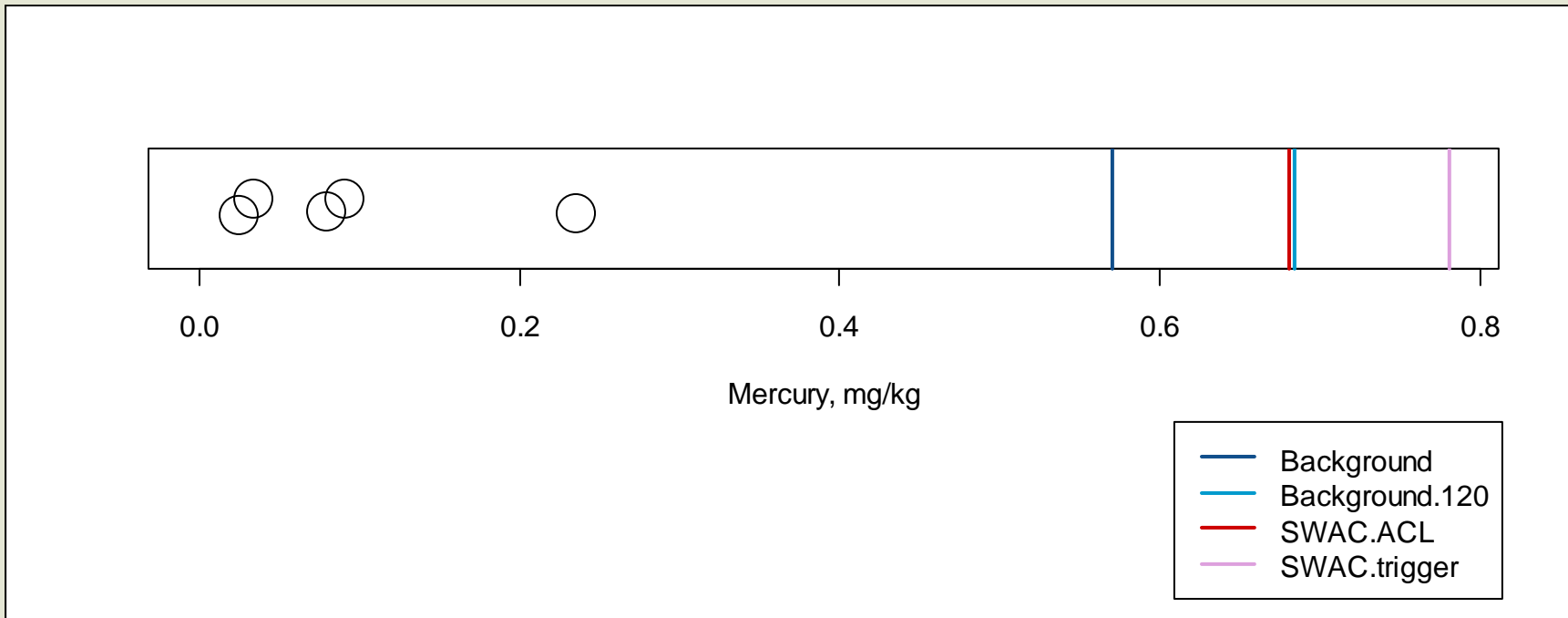
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- Dry dock sump dredged
- Partially in cleanup area
- Dredged to < 120% background
- Result: All COCs were less than background

# Dredging Results: Copper

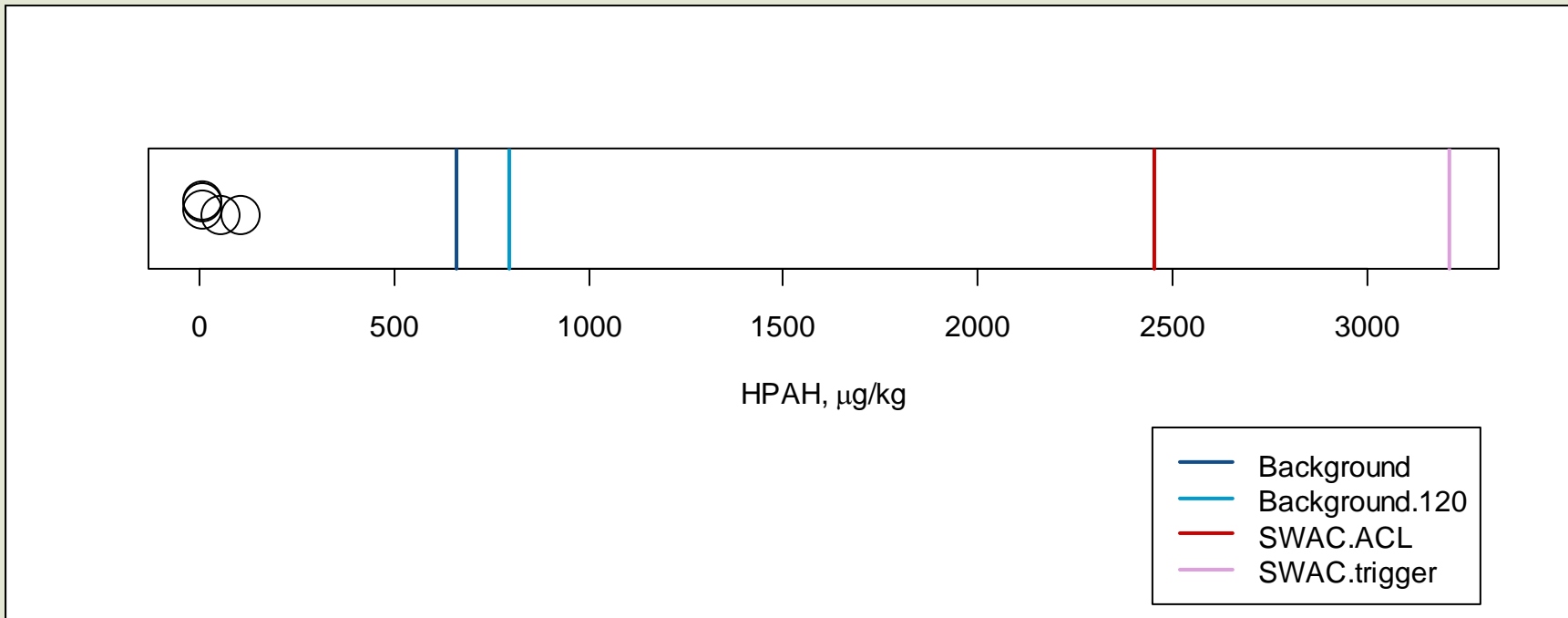


# Dredging Results: Mercury

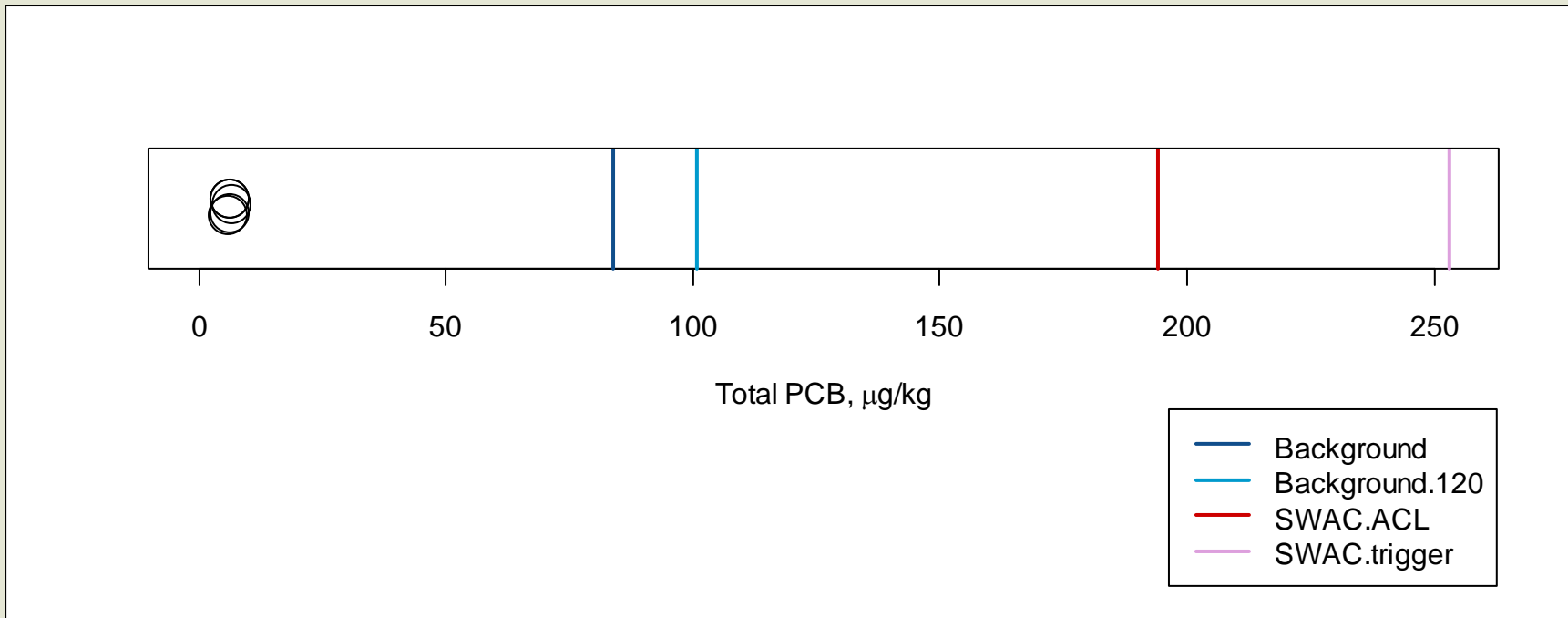




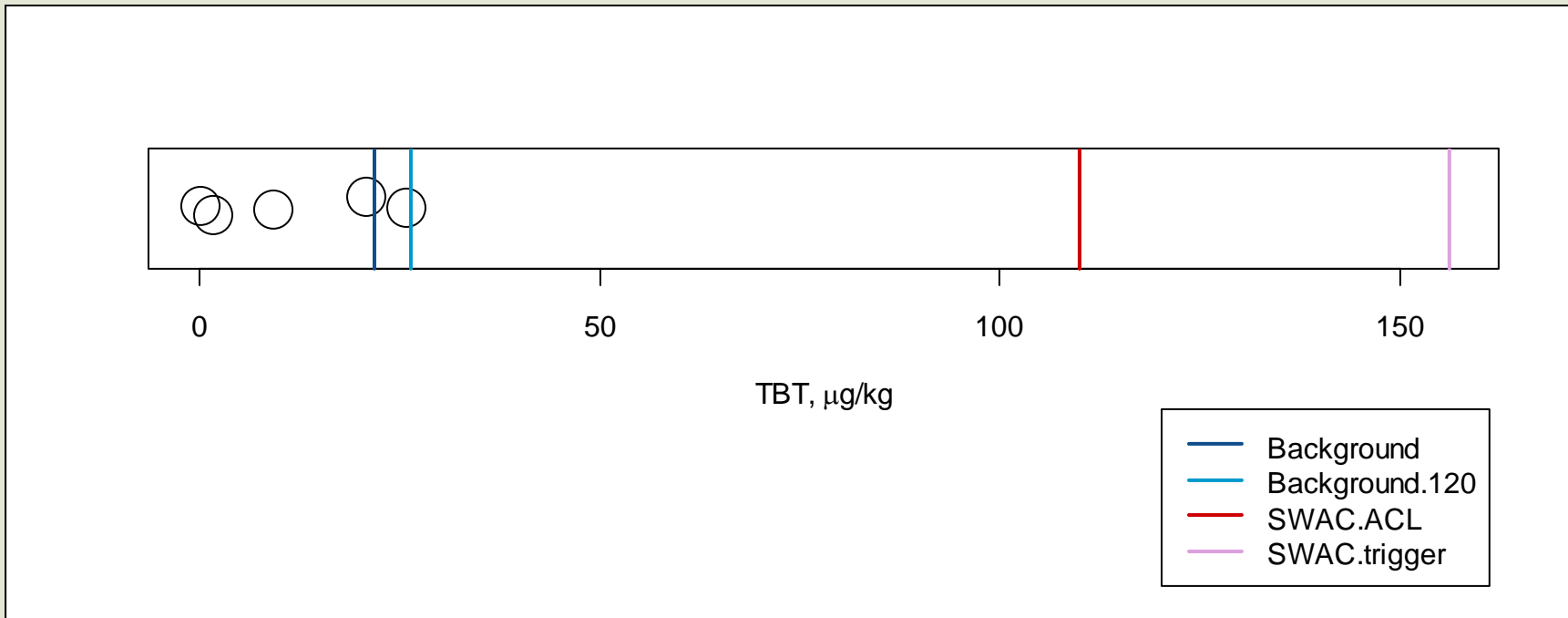
# Dredging Results: HPAH



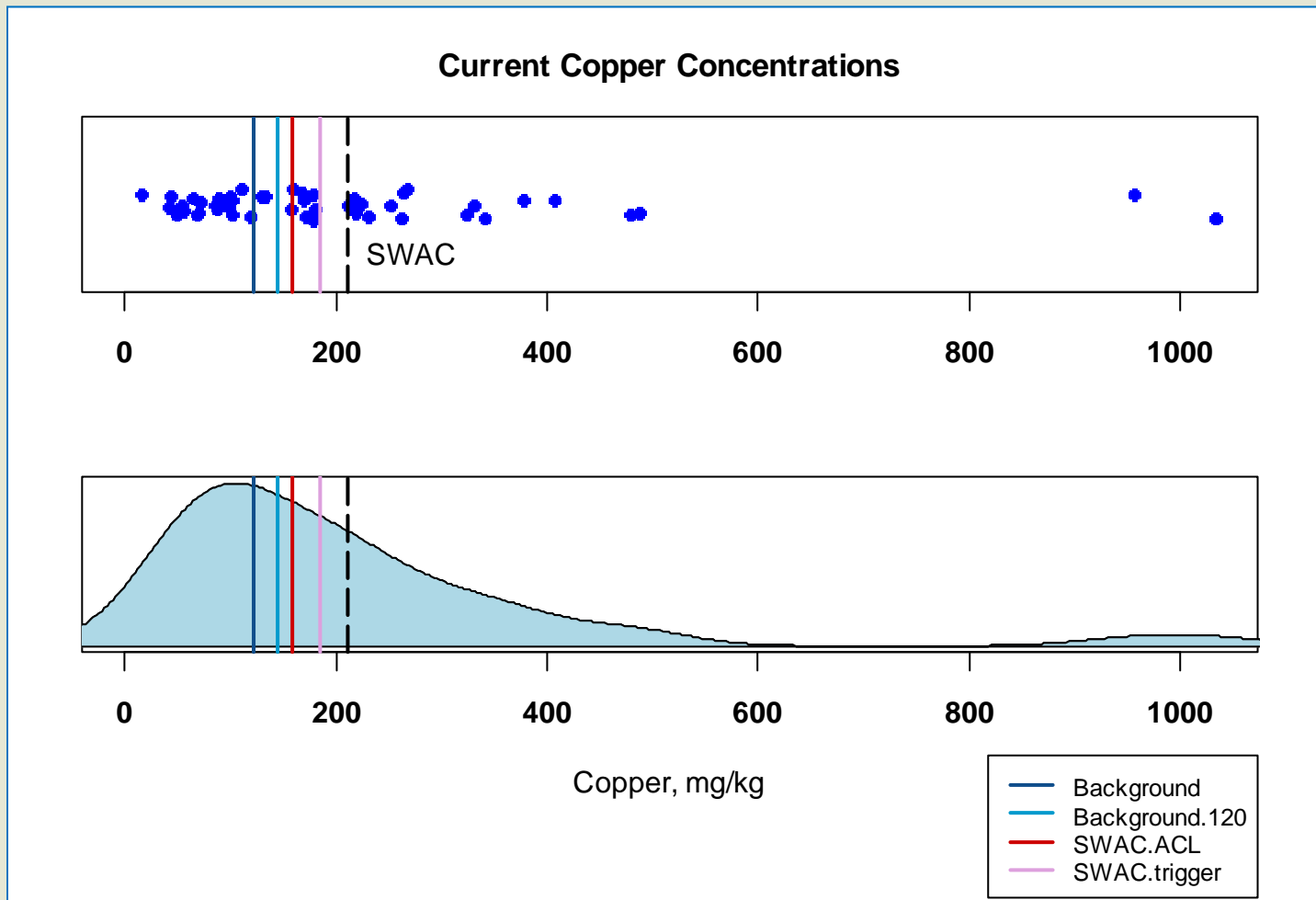
# Dredging Results: PCBs



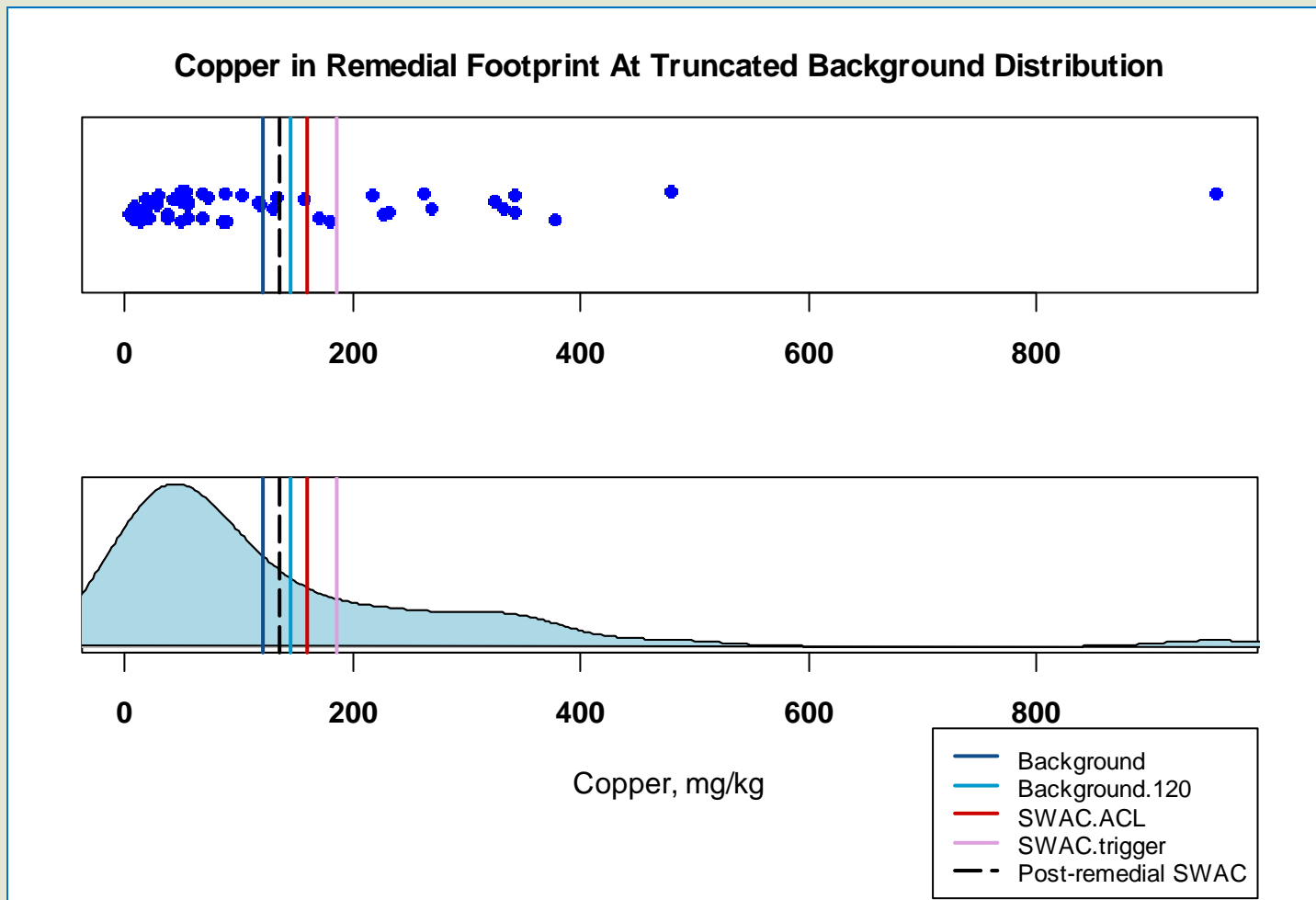
# Dredging Results: TBT



# Example: Copper, Pre-Remedy



# Example: Copper, Post-Remedy



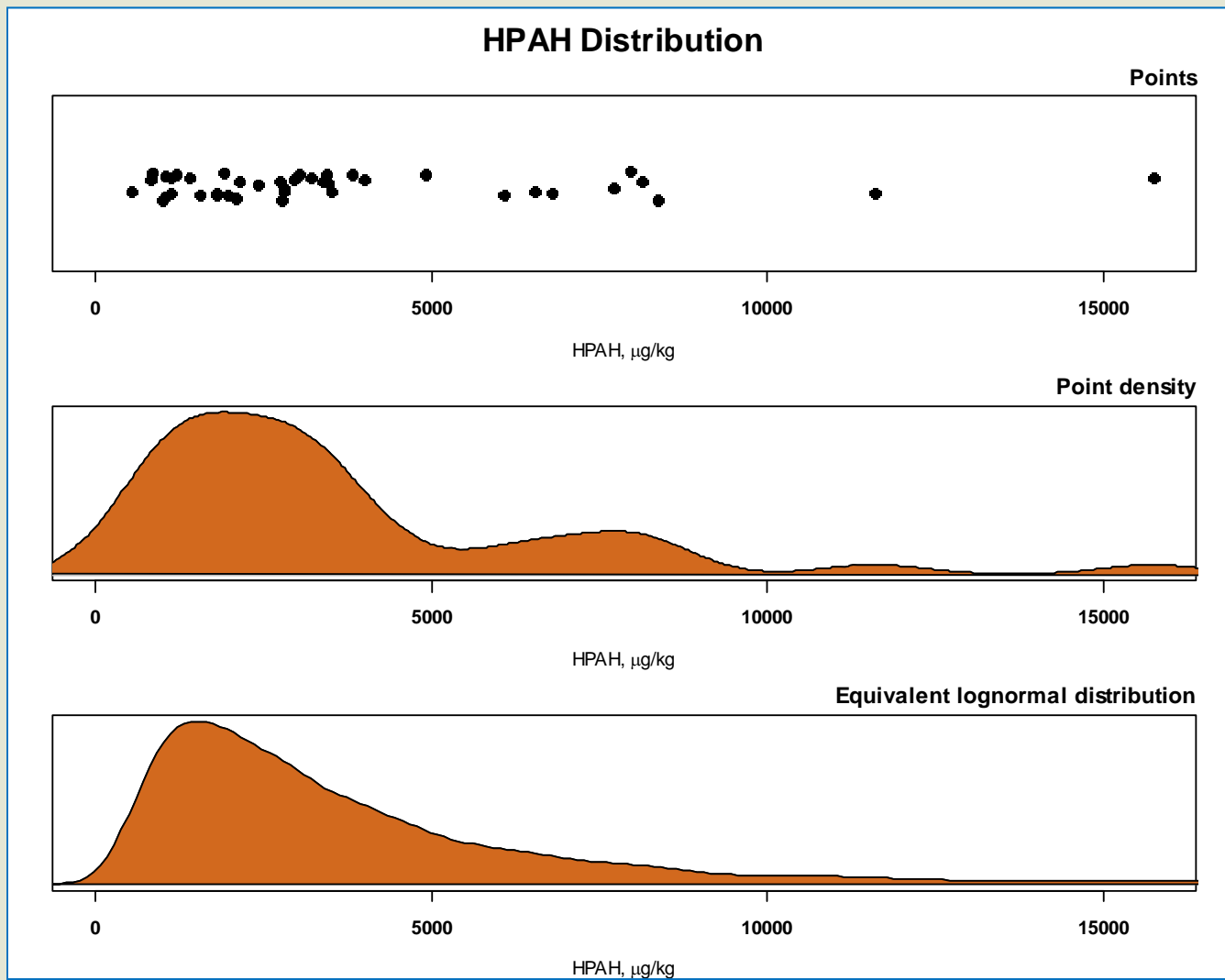
# EPA Guidance on Use of Confidence Limits

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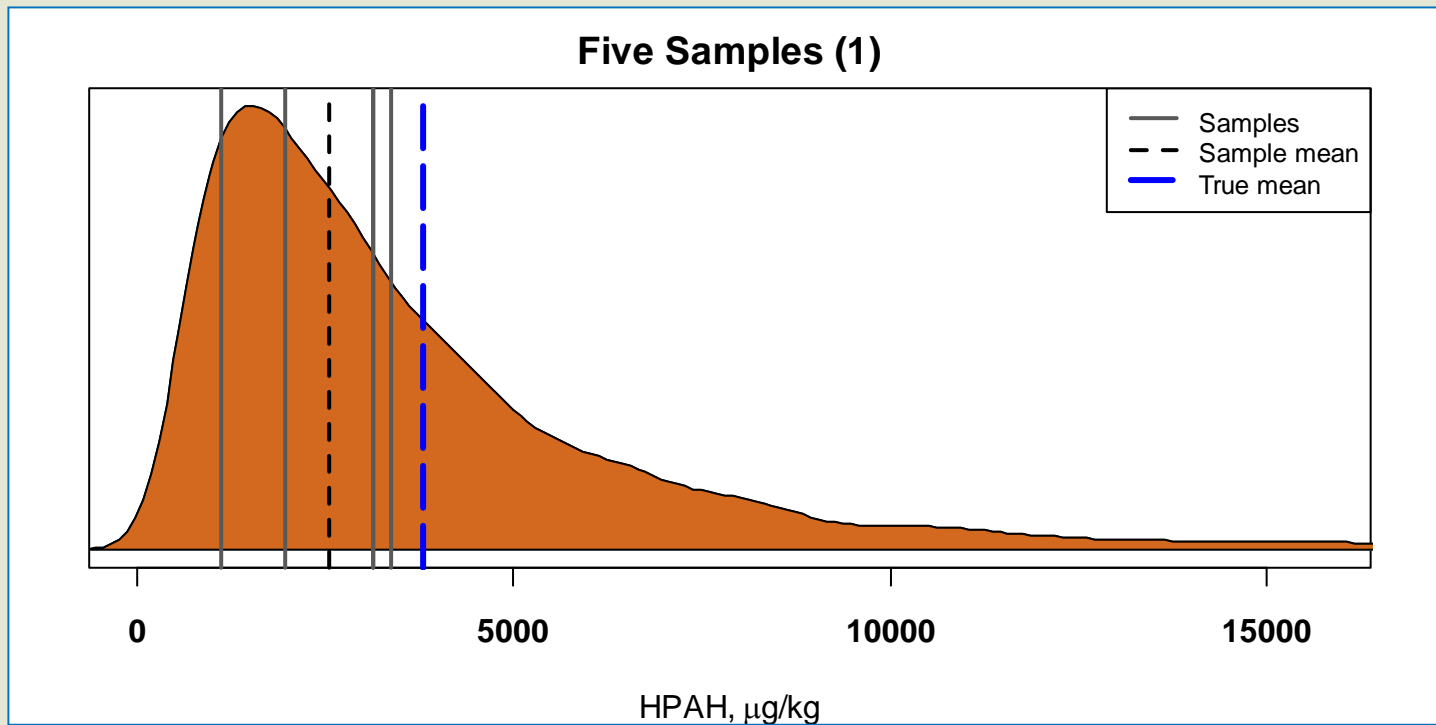
*A confidence interval can be used to make decisions... Confidence intervals are analogous to two-sided hypothesis tests. If the threshold value lies outside of the interval, then there is evidence that the population parameter differs from the threshold value. In a similar manner, confidence limits can also be related to one-sided hypothesis tests. If the threshold value lies above (below) an upper (lower) confidence bound, then there is evidence that the population parameter is less (greater) than the threshold.*

U.S. EPA. 2006. Data Quality Assessment: Statistical Methods for Practitioners.

# Confidence Limits on the Mean

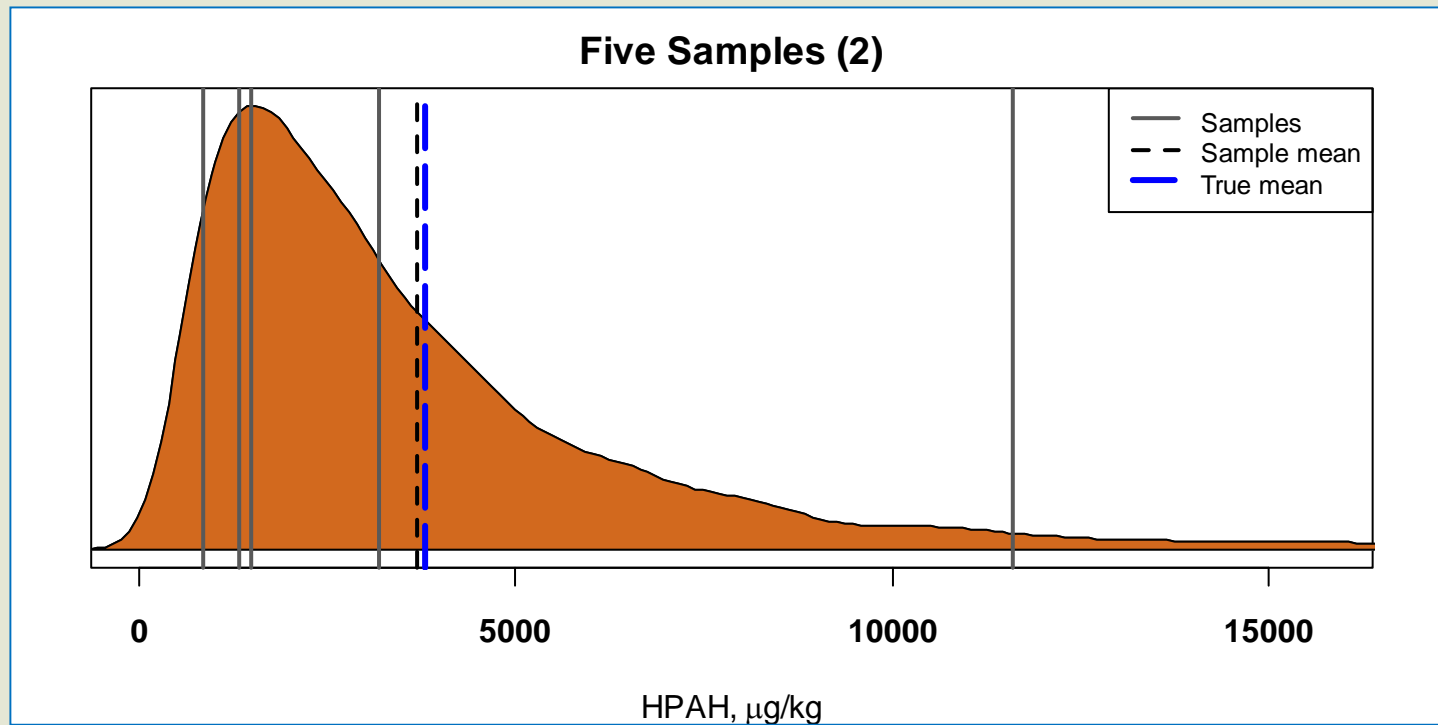


# Confidence Limits on the Mean

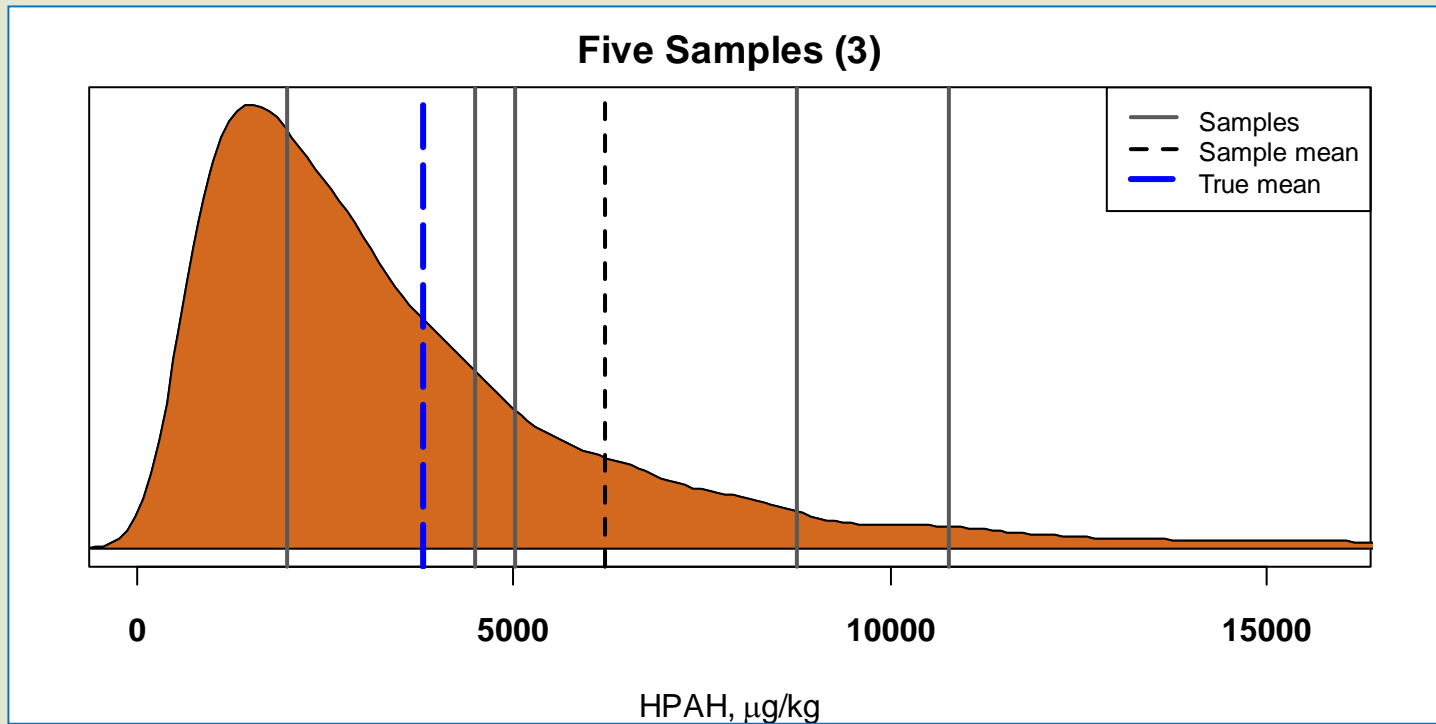




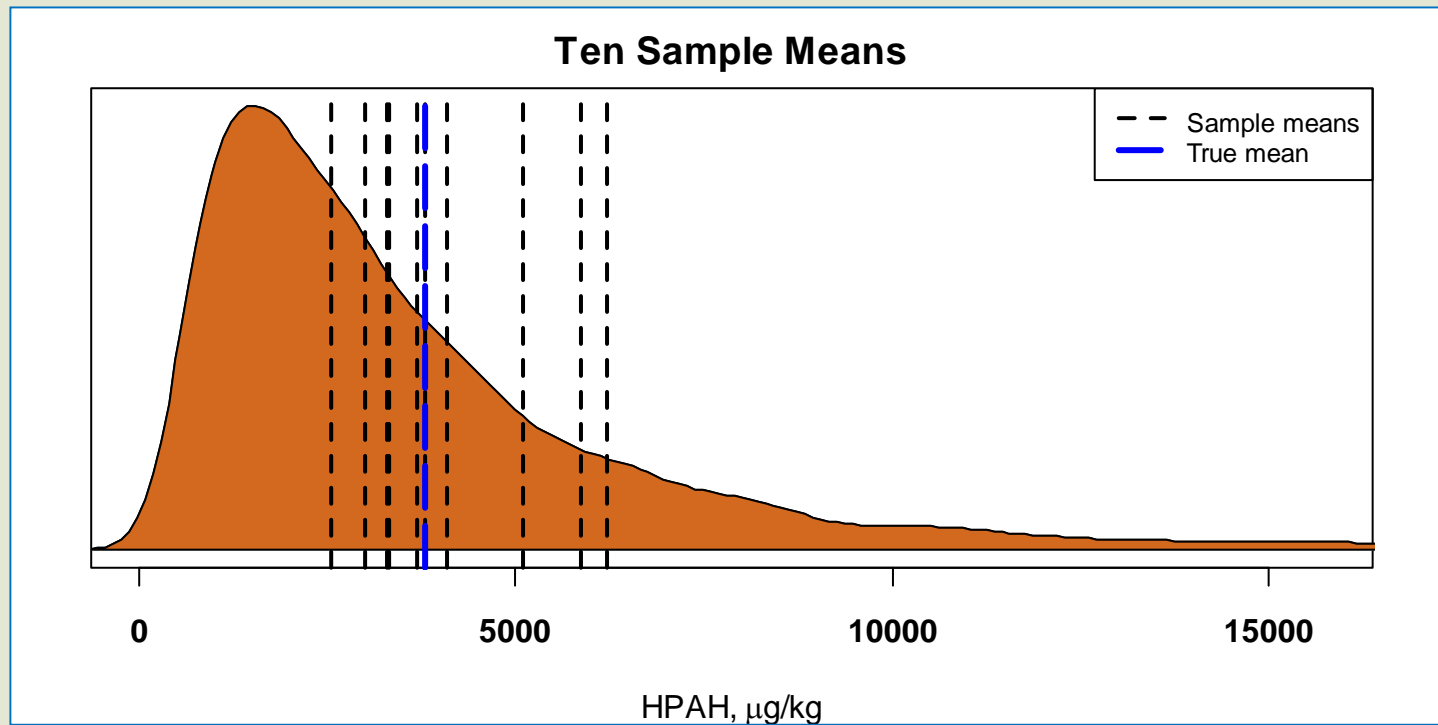
# Confidence Limits on the Mean



# Confidence Limits on the Mean



# Confidence Limits on the Mean



# Summary

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- Sample concentration limit of 120% of background
  - Allows for measurement variability
  - Average concentrations expected to be below background
- SWAC limit at the upper confidence limit of the ACL
  - Allows for measurement variability
  - Consistent with EPA guidance

# Cleanup Thresholds

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