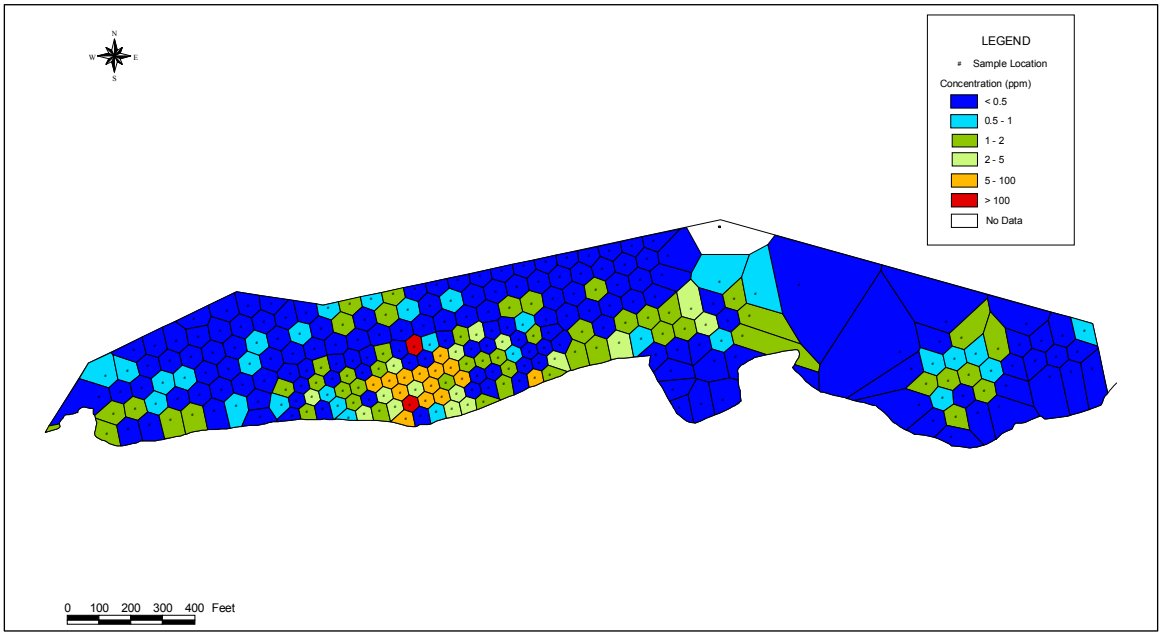
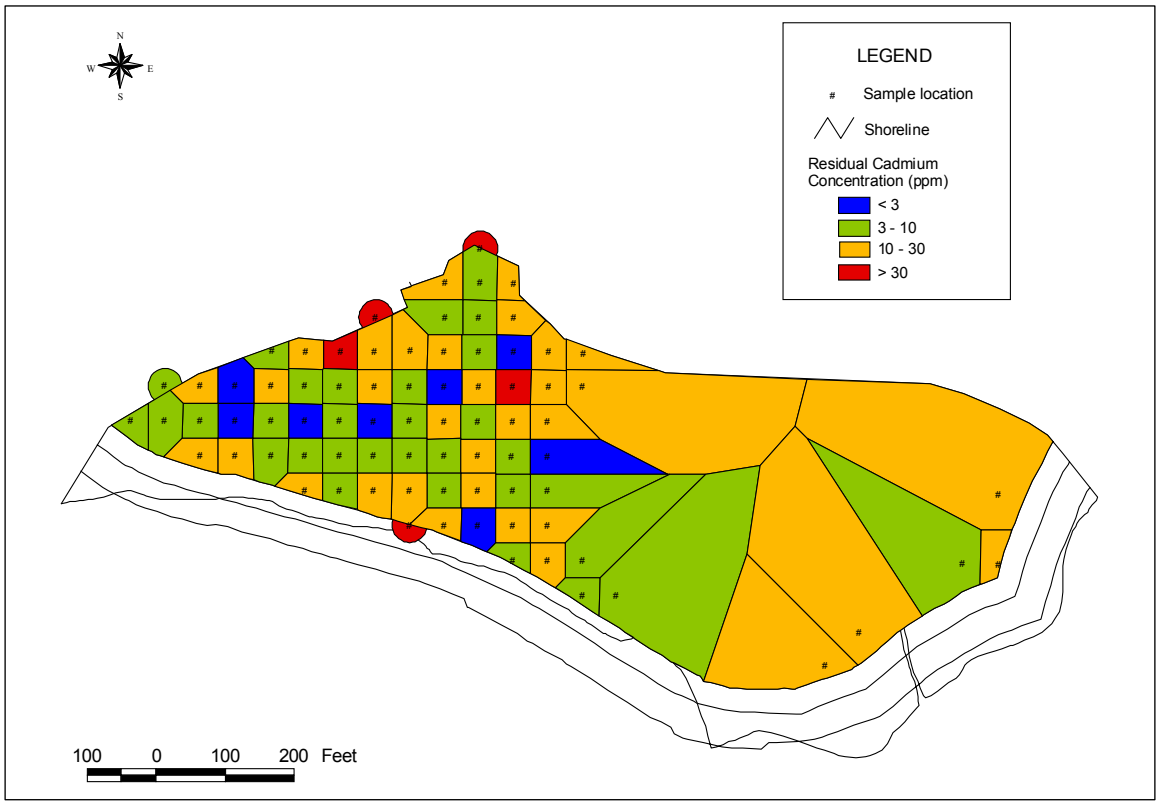
Figures

Figure 2-1
Polygonal Declustering for Case Study Sites

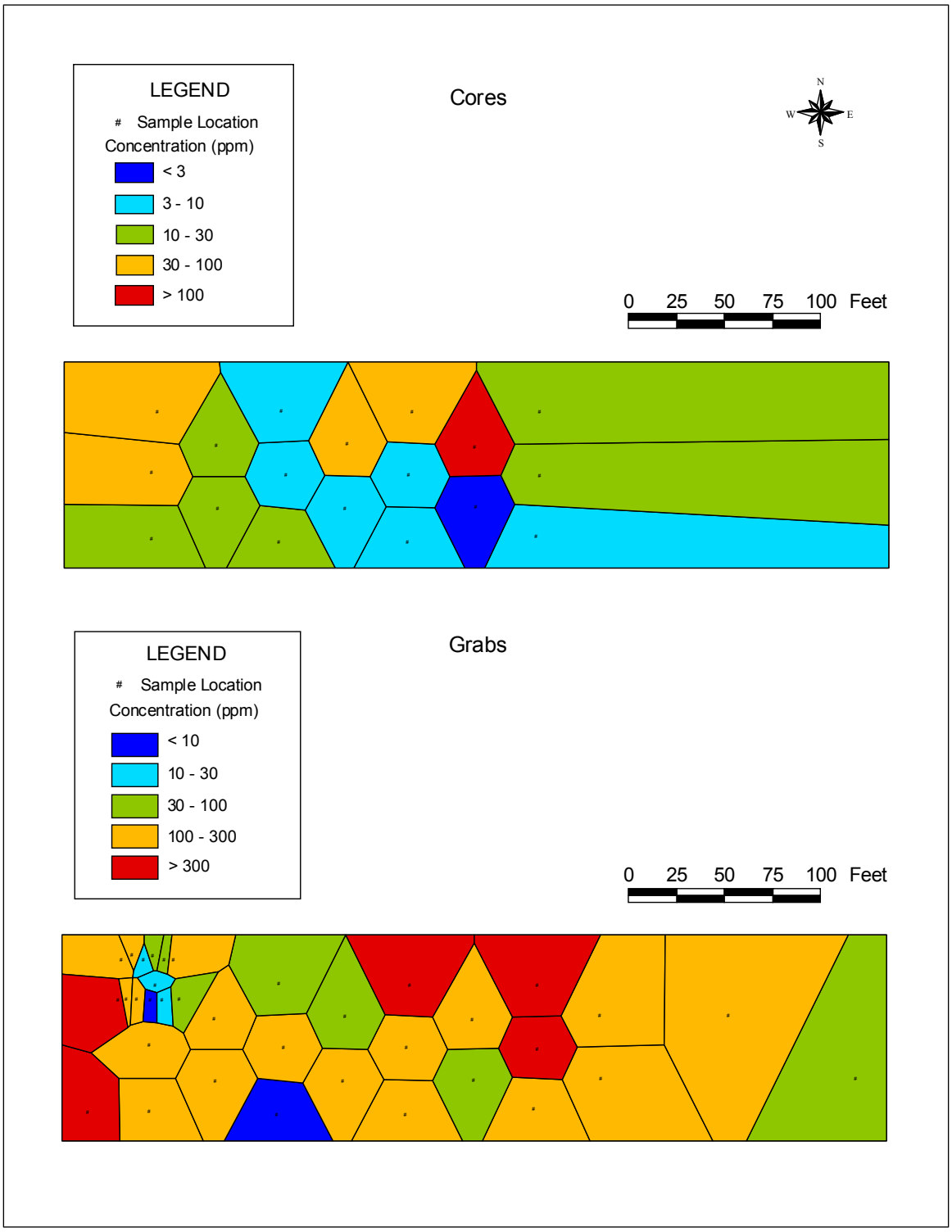


Revnolds Metals



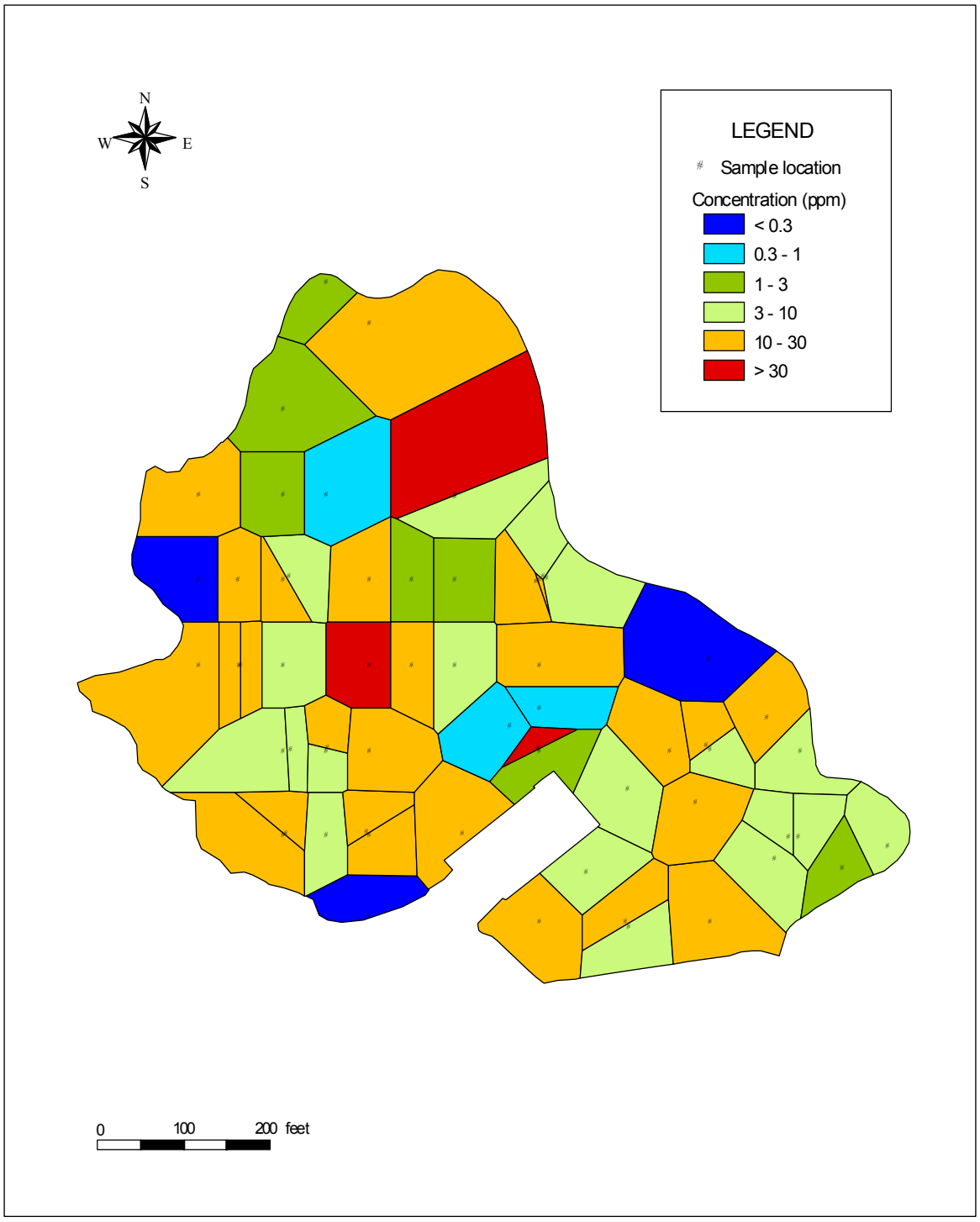
Marathon Battery East Foundry Cove

Figure 2-1
Polygonal Declustering for Case Study Sites



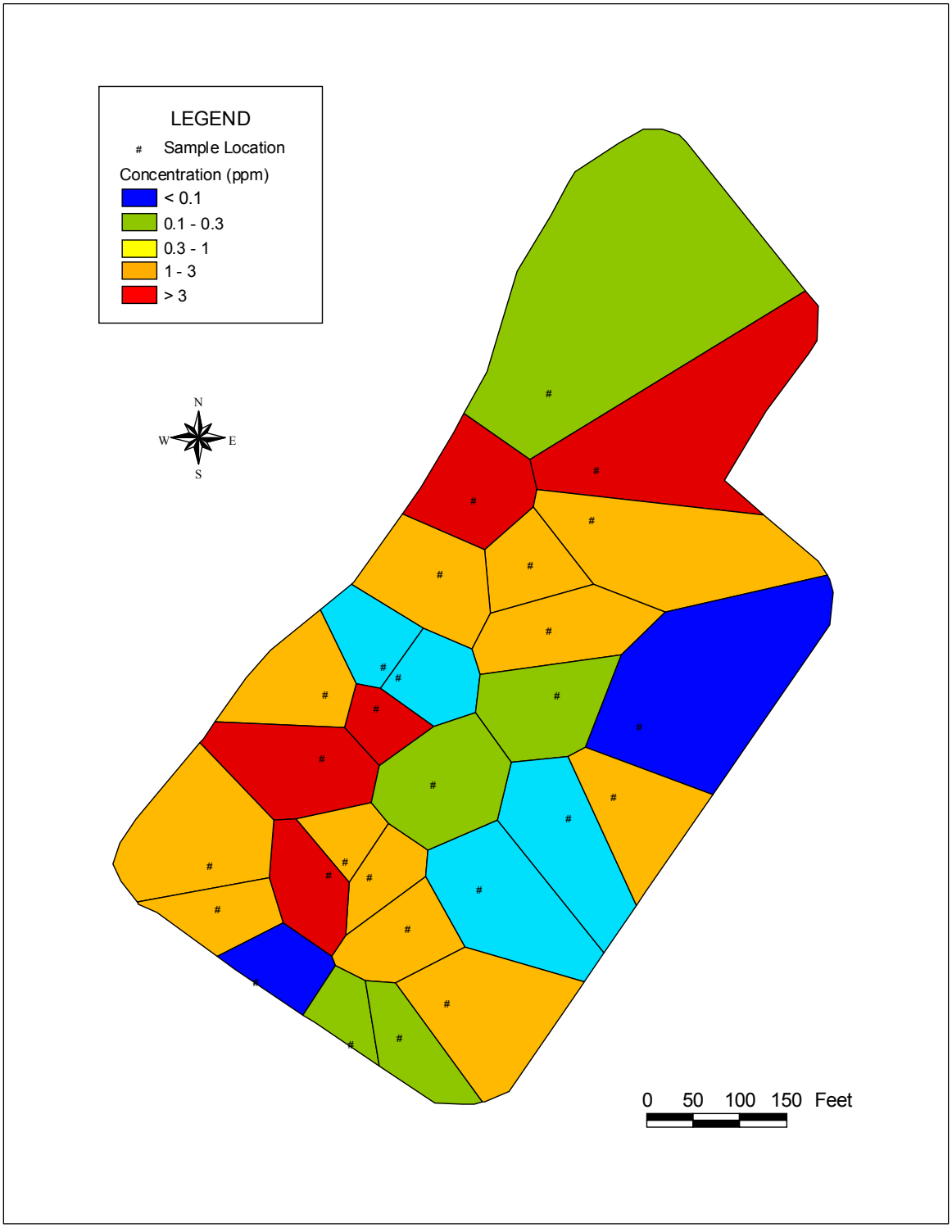
New Bedford Harbor

Figure 2-1
Polygonal Declustering for Case Study Sites



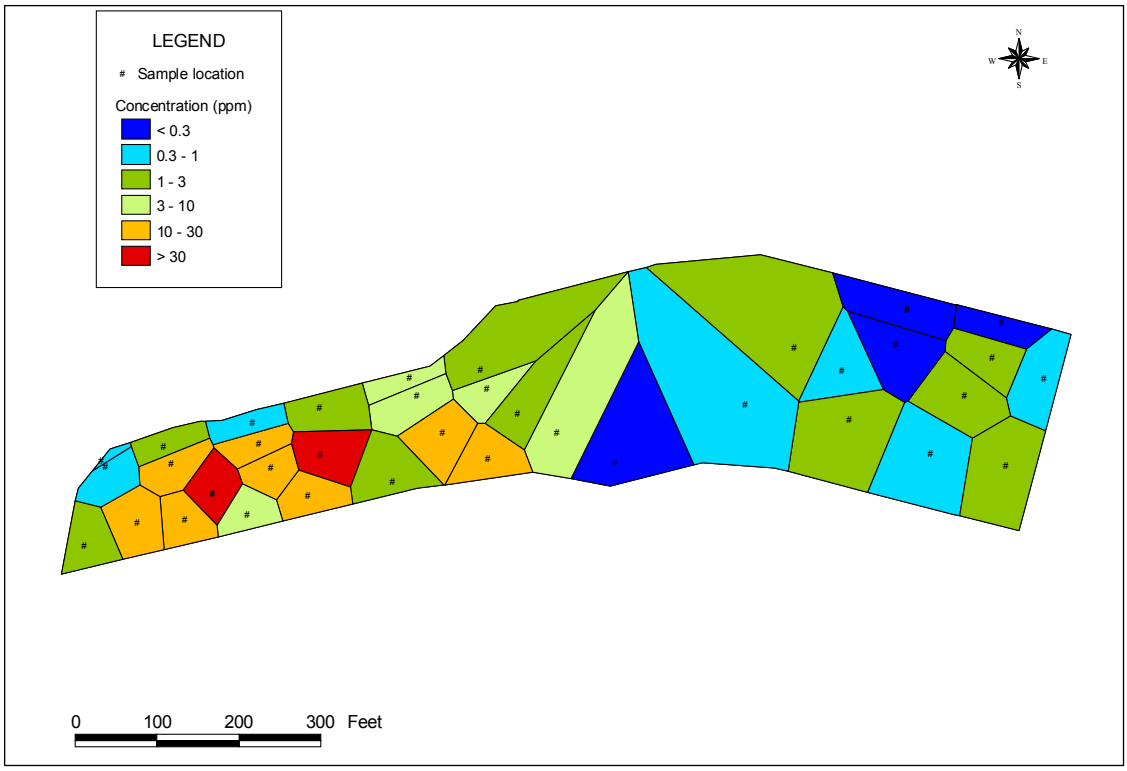
Cumberland Bay

Figure 2-1
Polygonal Declustering for Case Study Sites

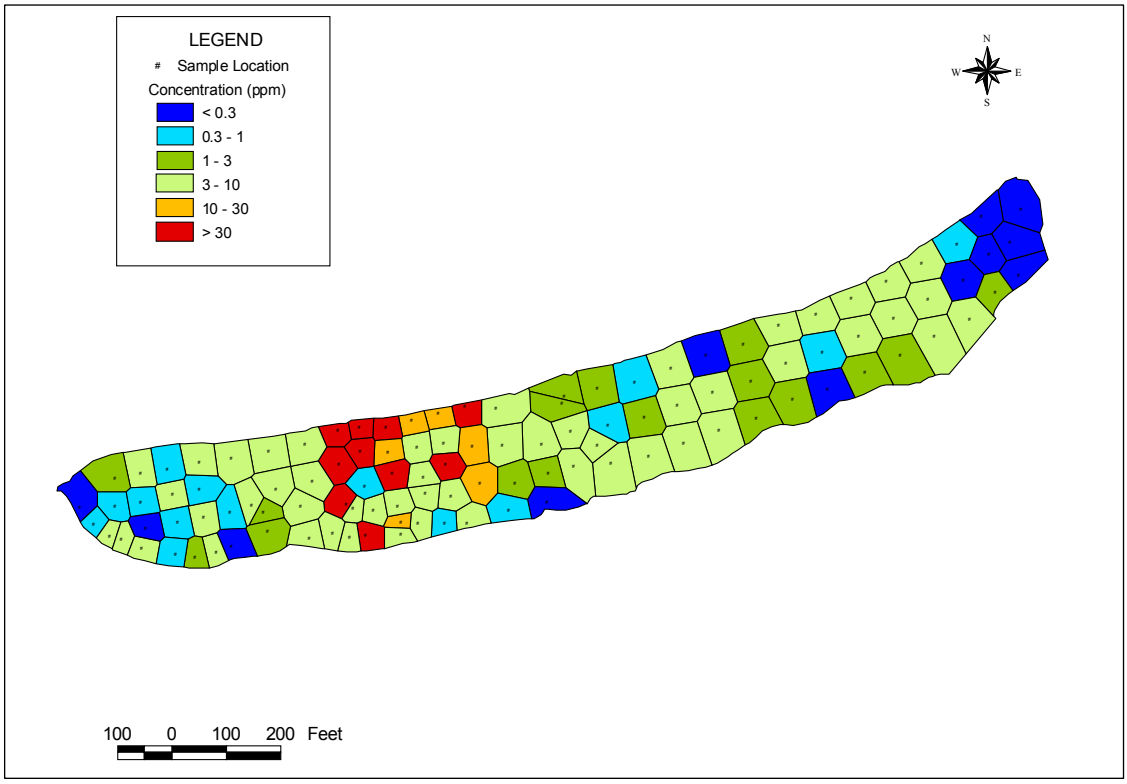


Fox River SMUs 56/57

Figure 2-1
Polygonal Declustering for Case Study Sites



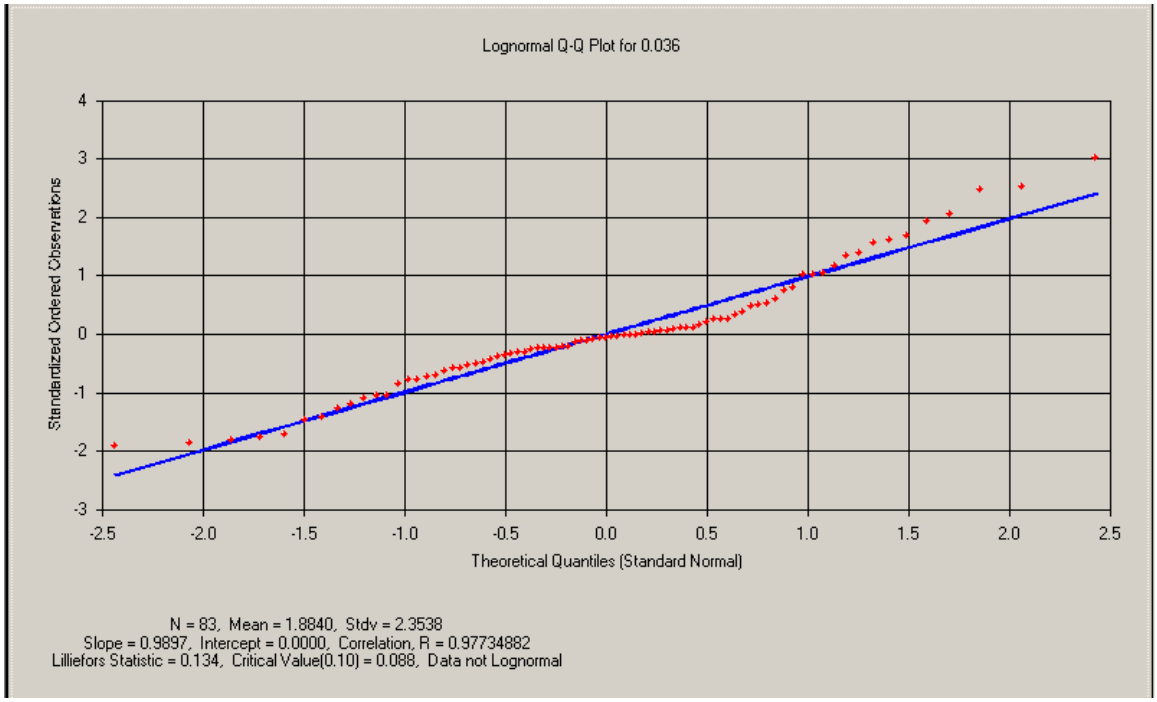
Fox River Deposition N



GM Massena

Figure 2-2
Q-Q Plots – Test for Lognormal or Approximately Lognormal Distributions (alpha=0.10)

GM Massena Pass 1



GM Massena Pass 2

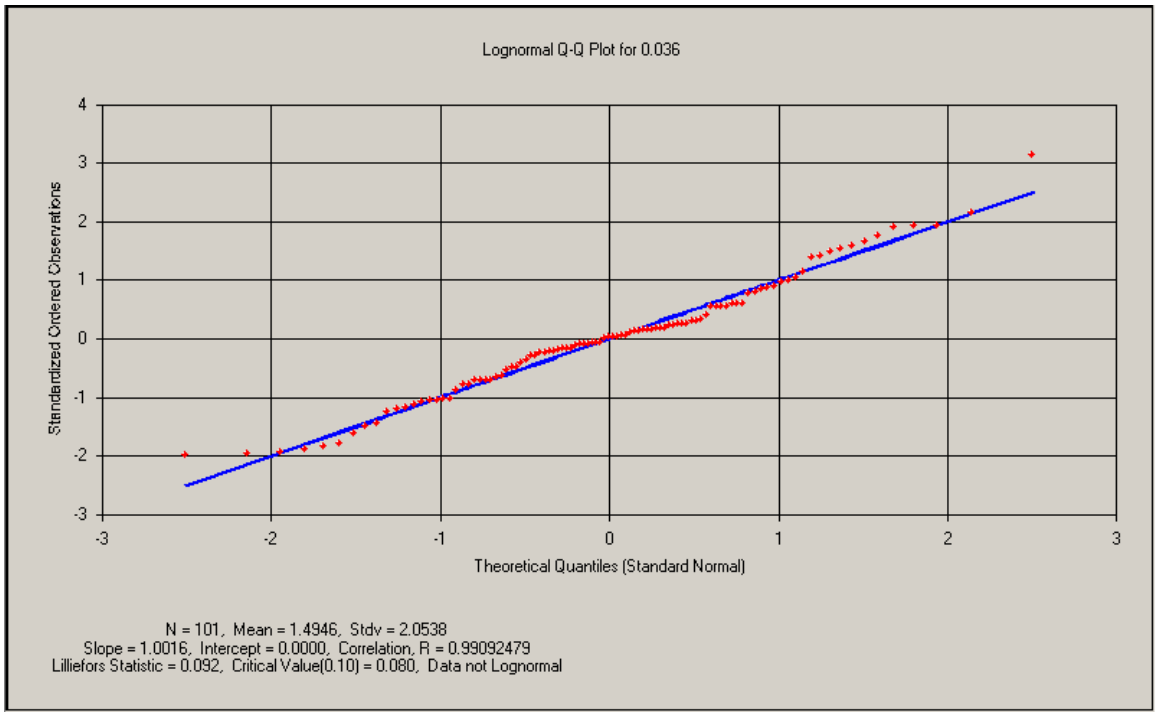
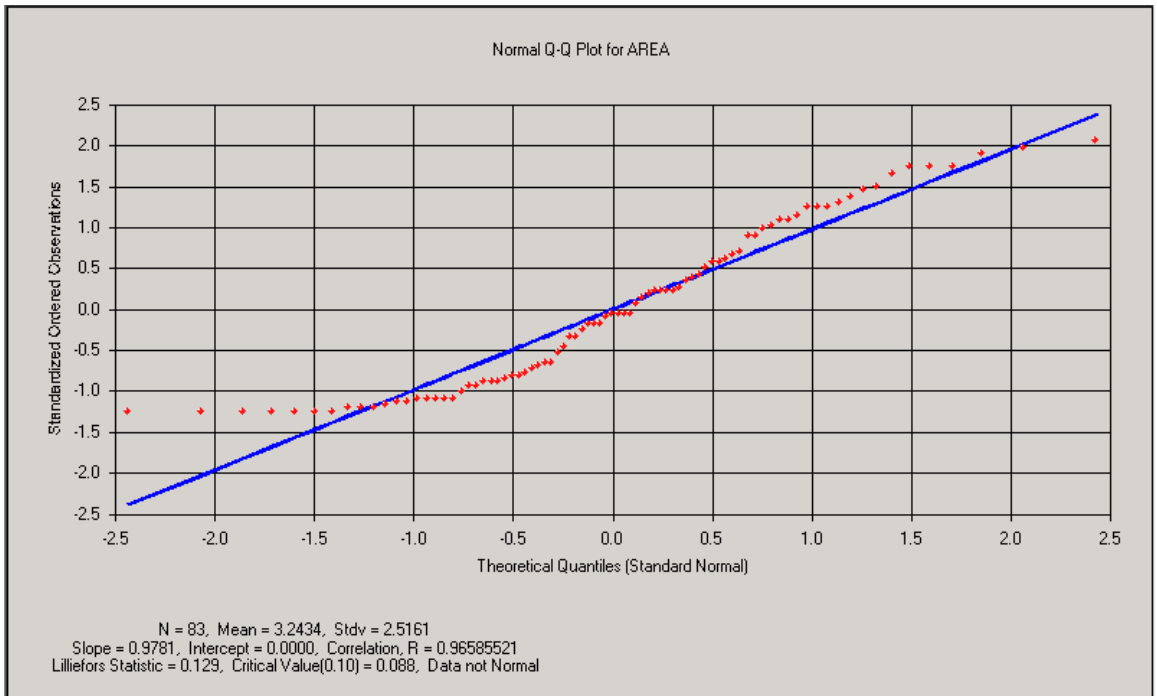


Figure 2-2
Q-Q Plots – Test for Lognormal or Approximately Lognormal Distributions (alpha=0.10)

GM Massena Uncapped Area



Reynolds Metals

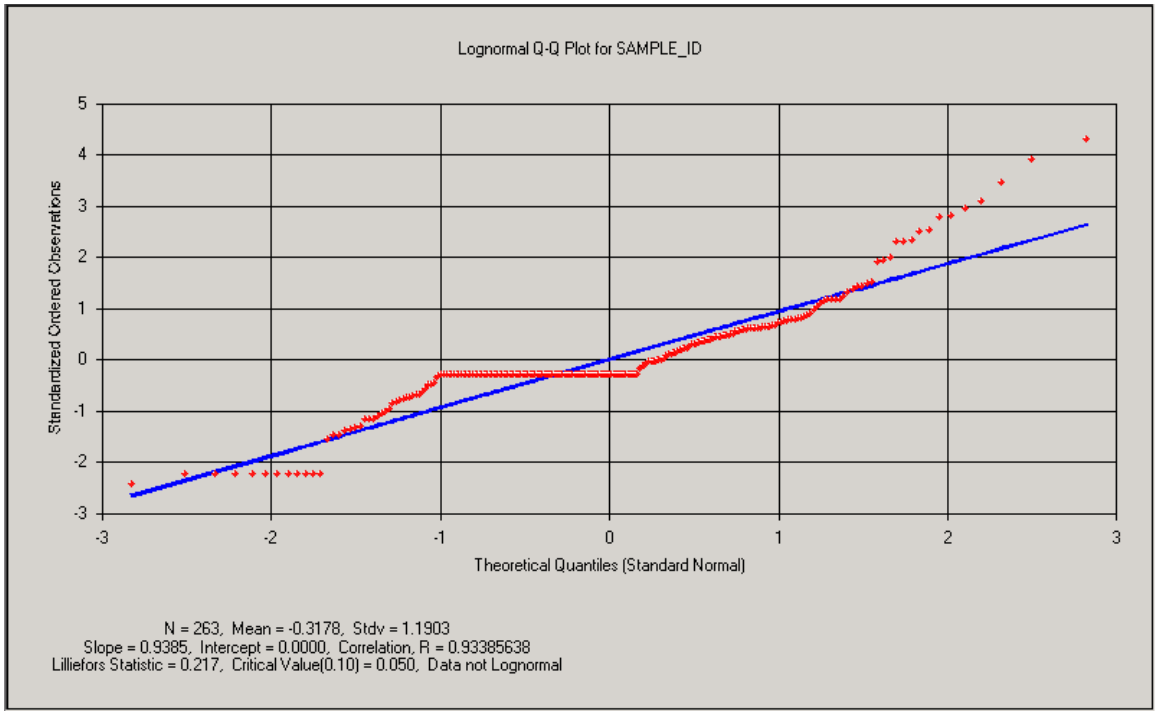
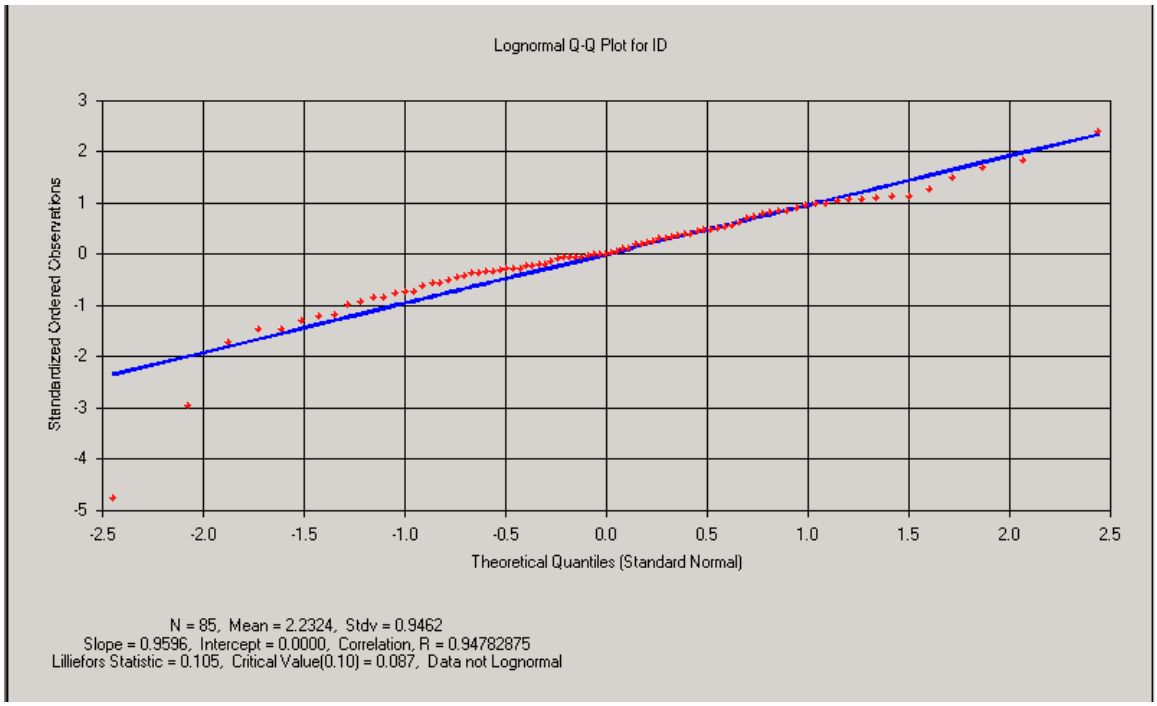


Figure 2-2
Q-Q Plots – Test for Lognormal or Approximately Lognormal Distributions (alpha=0.10)

Marathon Battery



New Bedford Harbor 0-1'

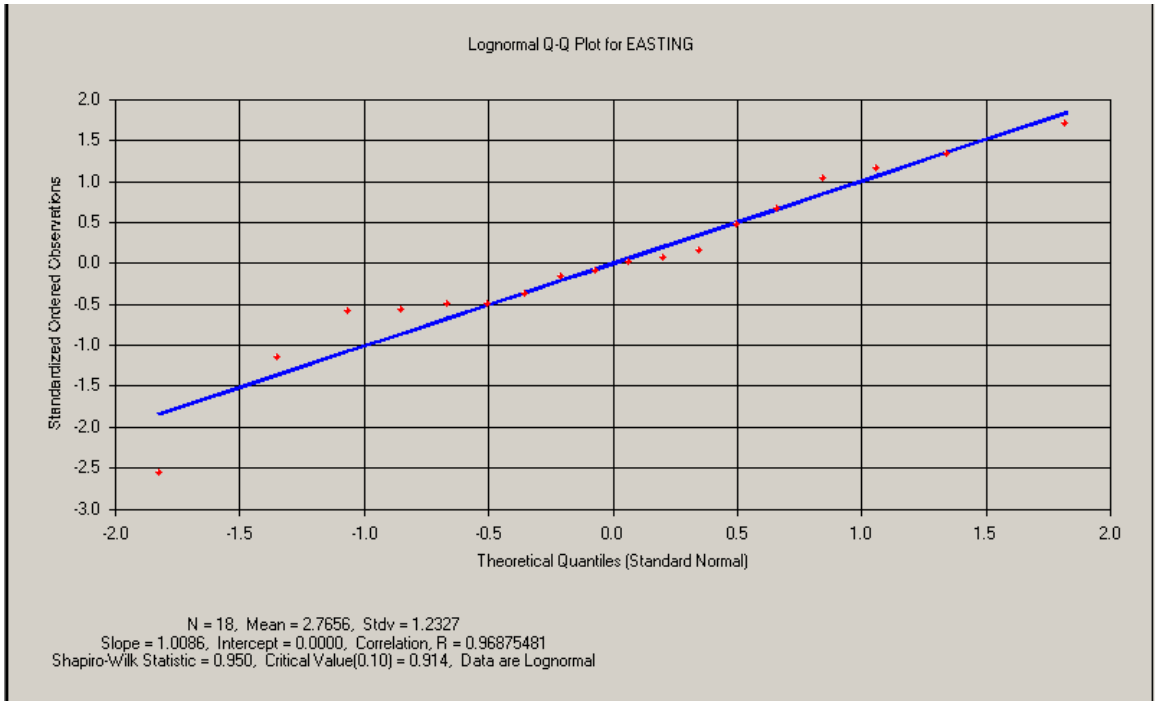
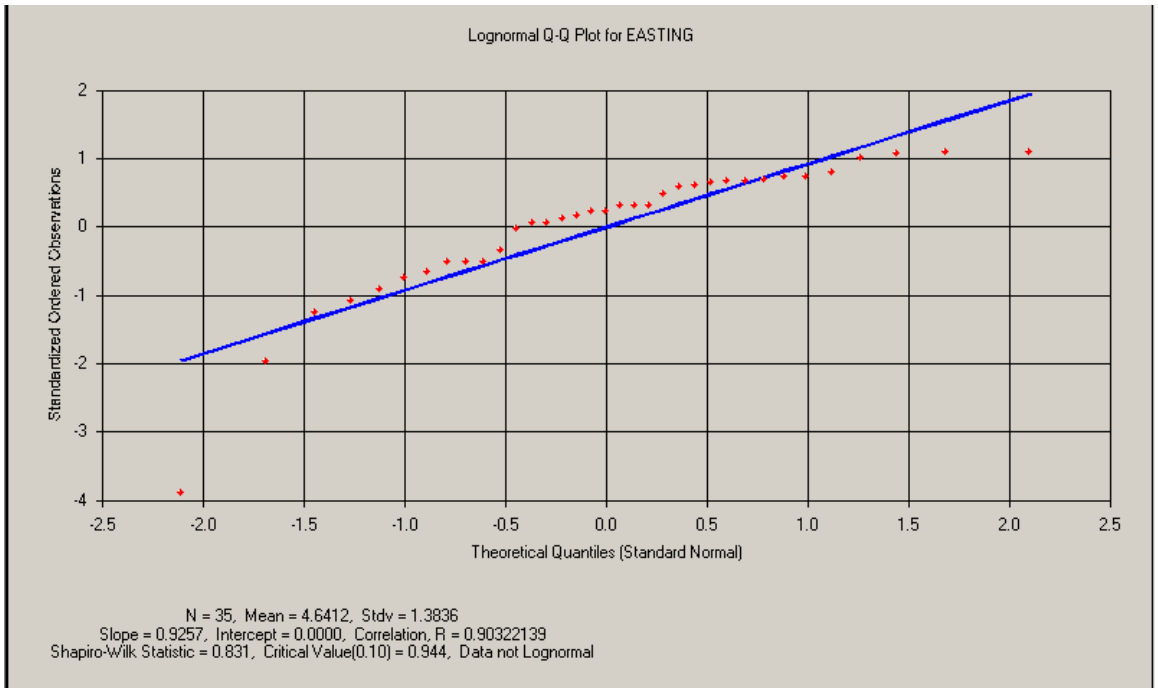


Figure 2-2
Q-Q Plots – Test for Lognormal or Approximately Lognormal Distributions (alpha=0.10)

New Bedford Harbor 0-2 cm



Cumberland Bay

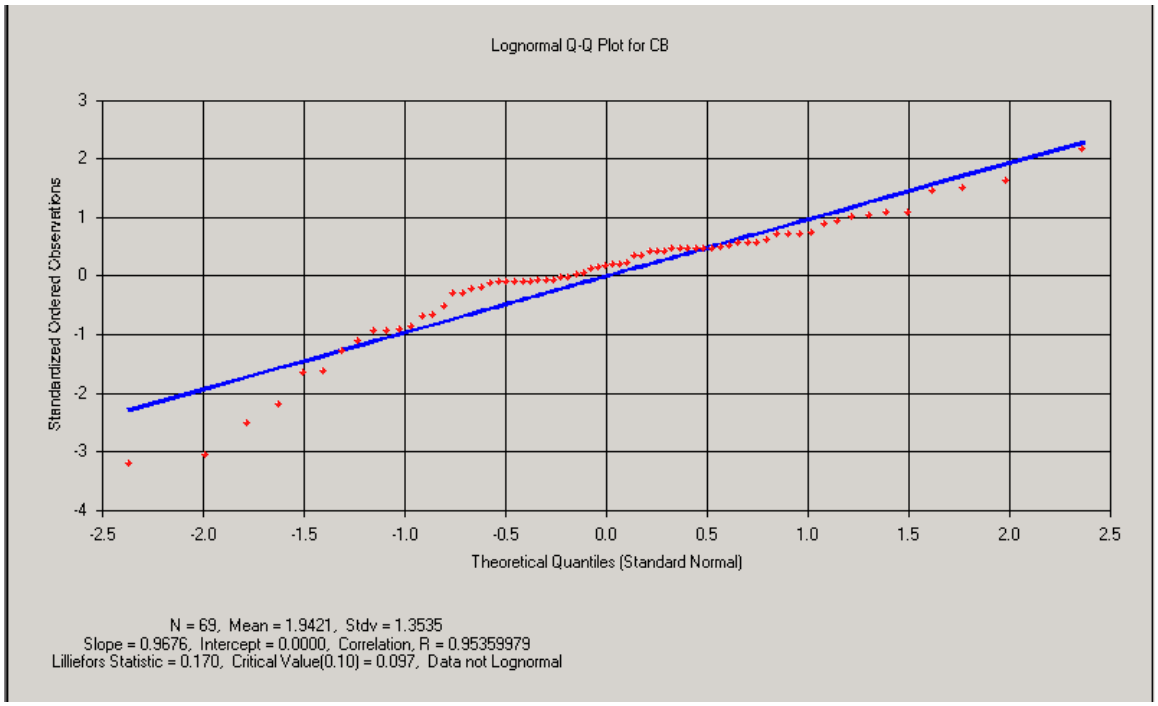
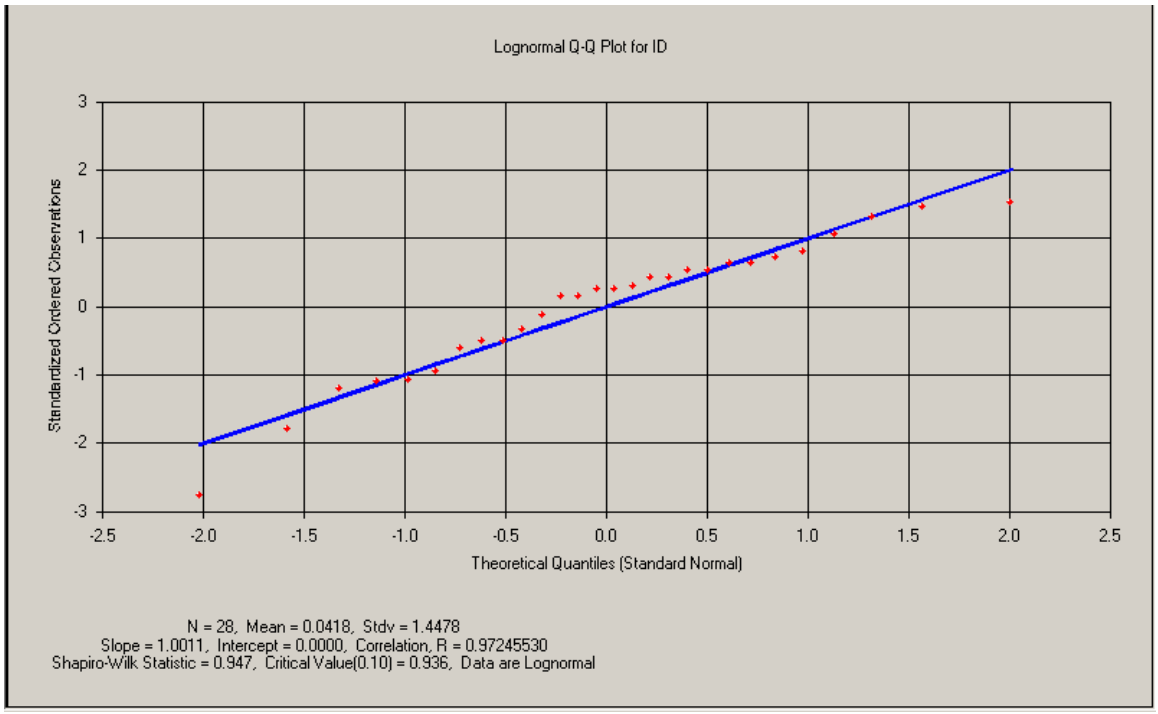


Figure 2-2
Q-Q Plots – Test for Lognormal or Approximately Lognormal Distributions (alpha=0.10)

Fox River SMUs 56/57



Fox River Deposit N

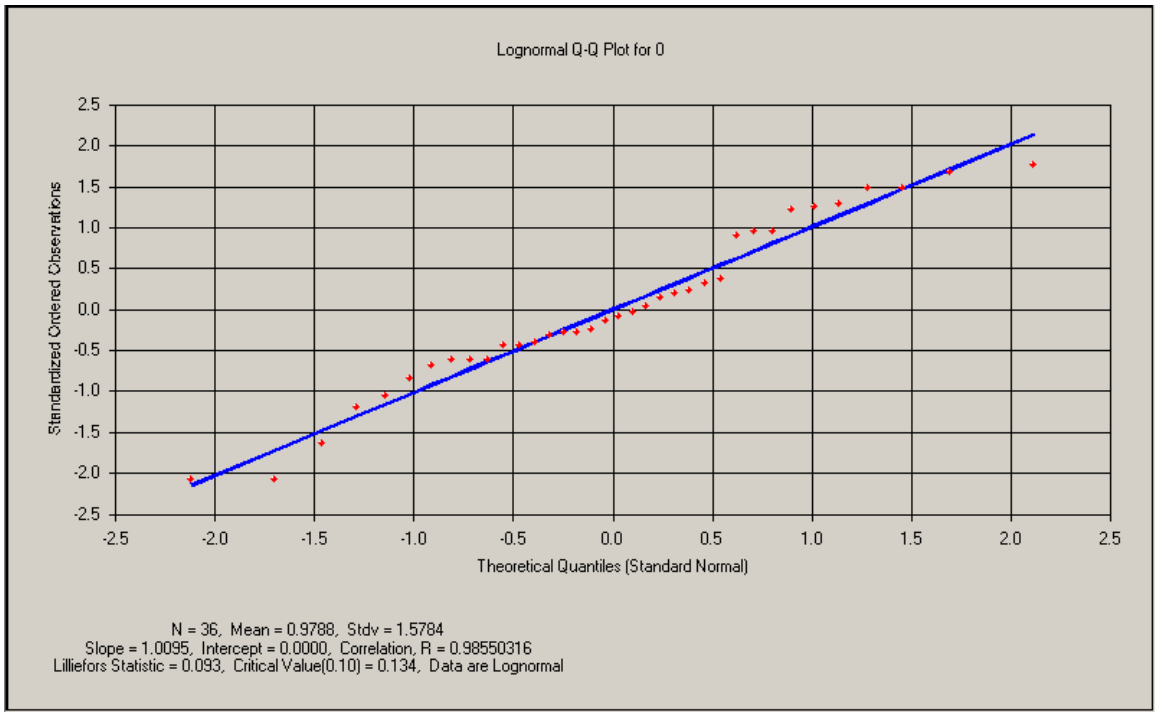
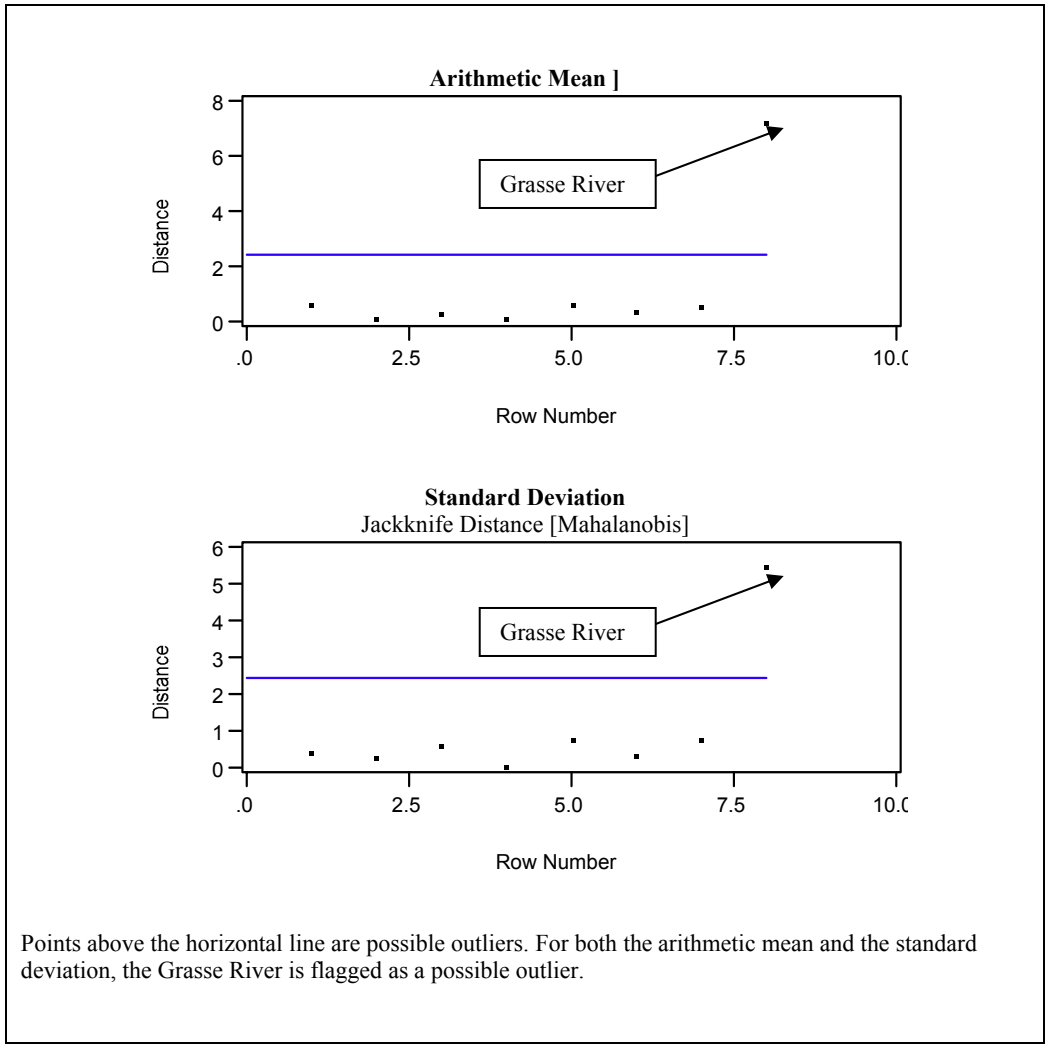


Figure 2-3
Mahalanobis Jackknife Distance for the Eight Case Studies



Points above the horizontal line are possible outliers. For both the arithmetic mean and the standard deviation, the Grasse River is flagged as a possible outlier.

Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

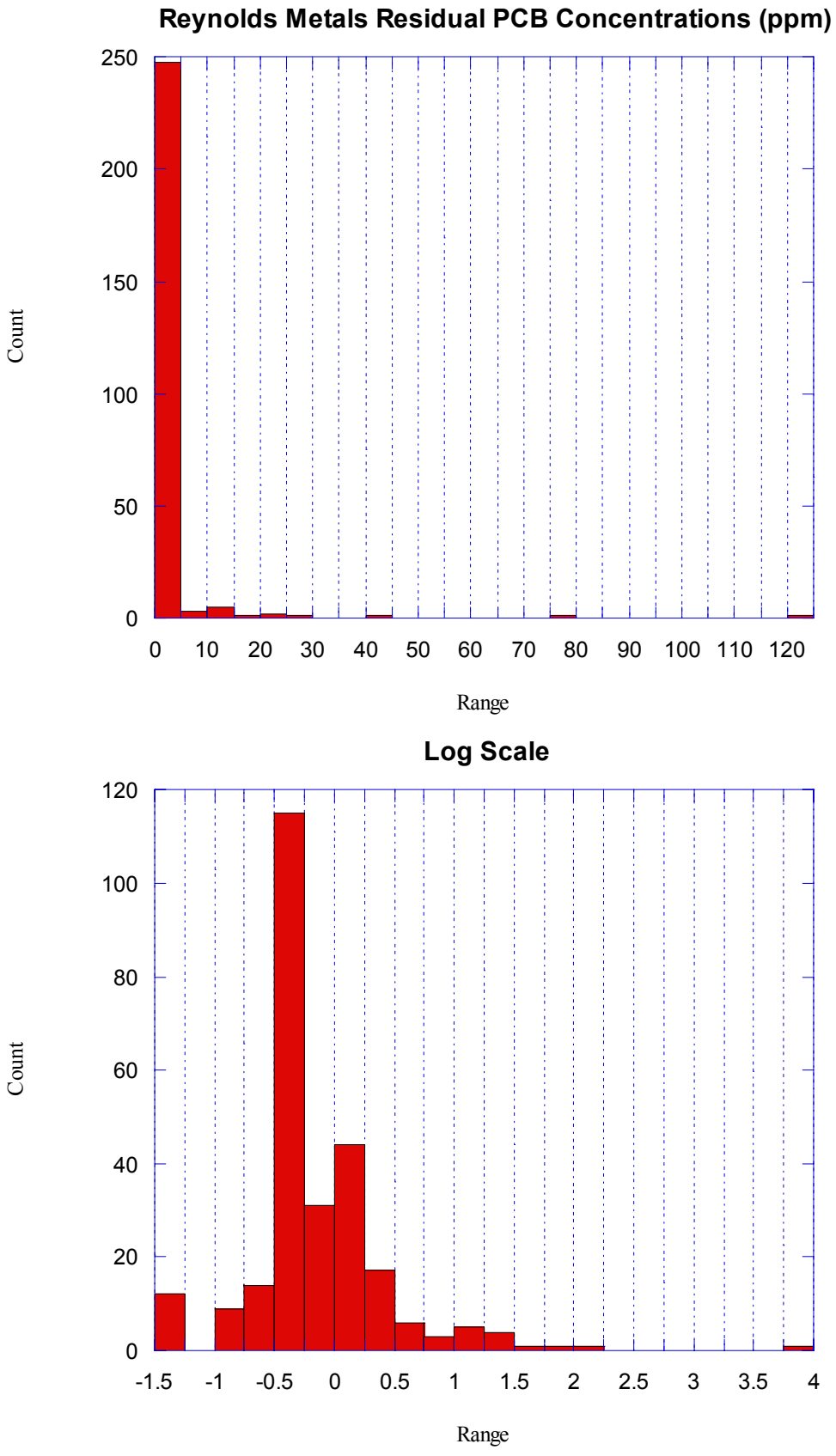


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

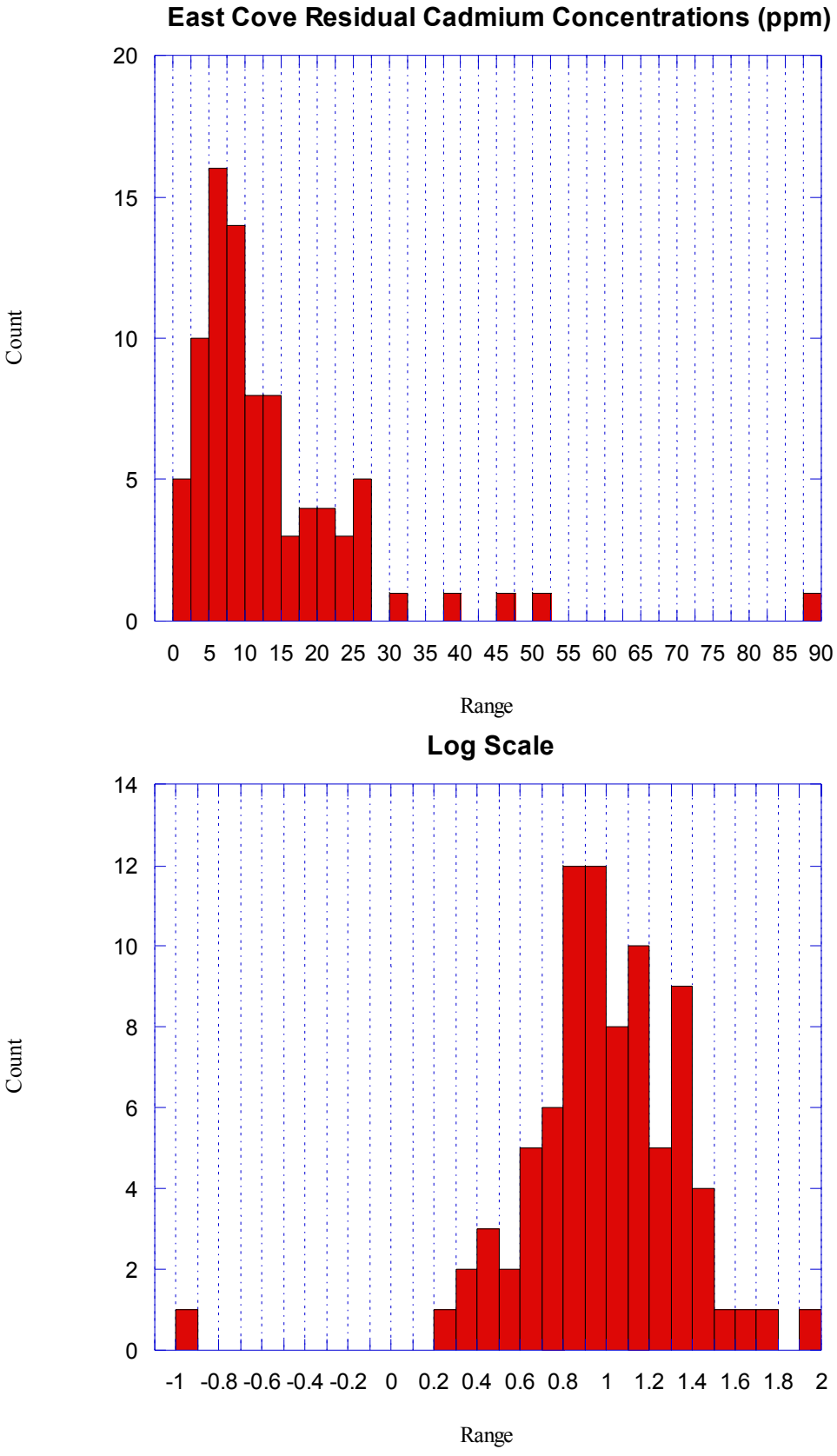


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

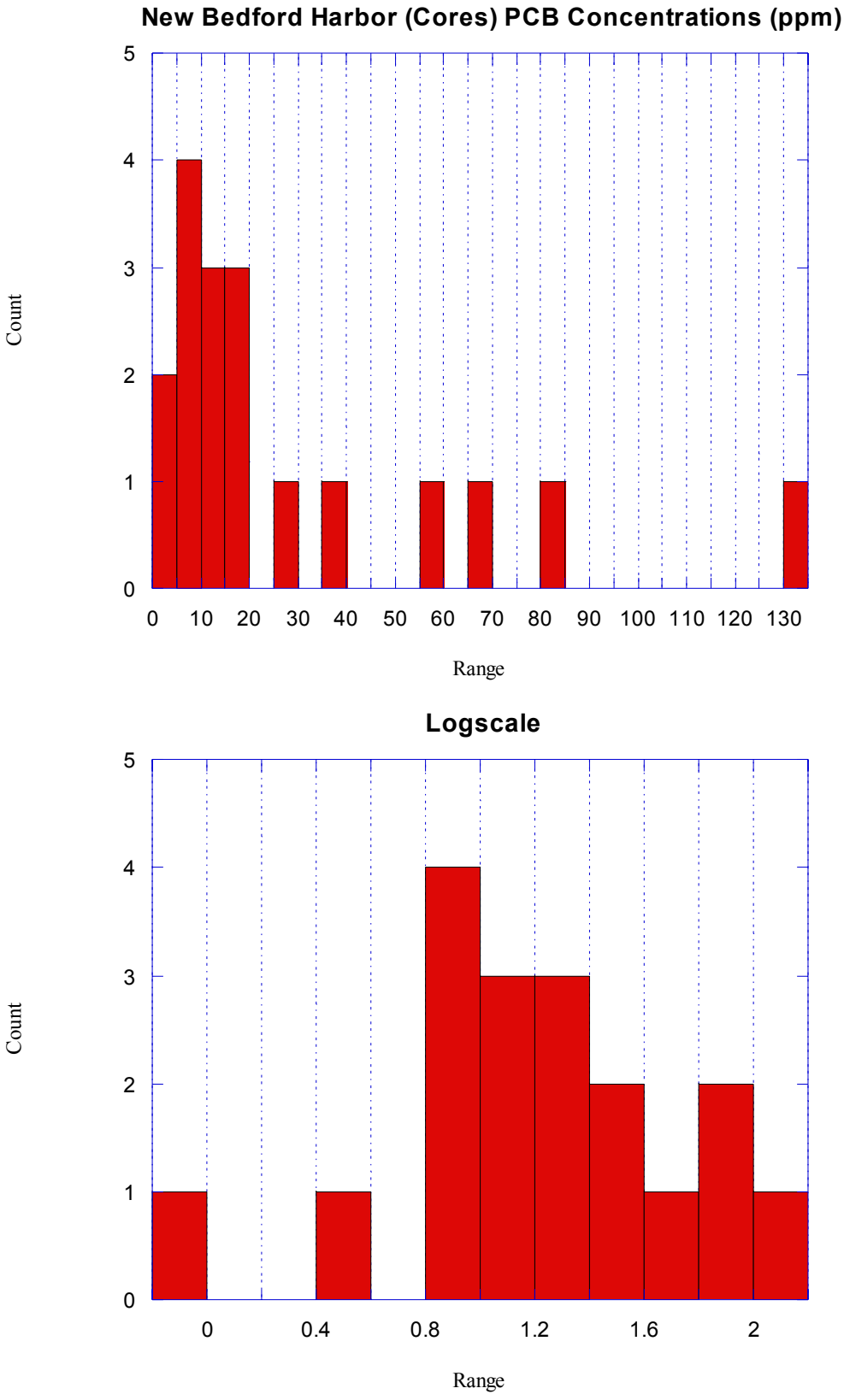


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

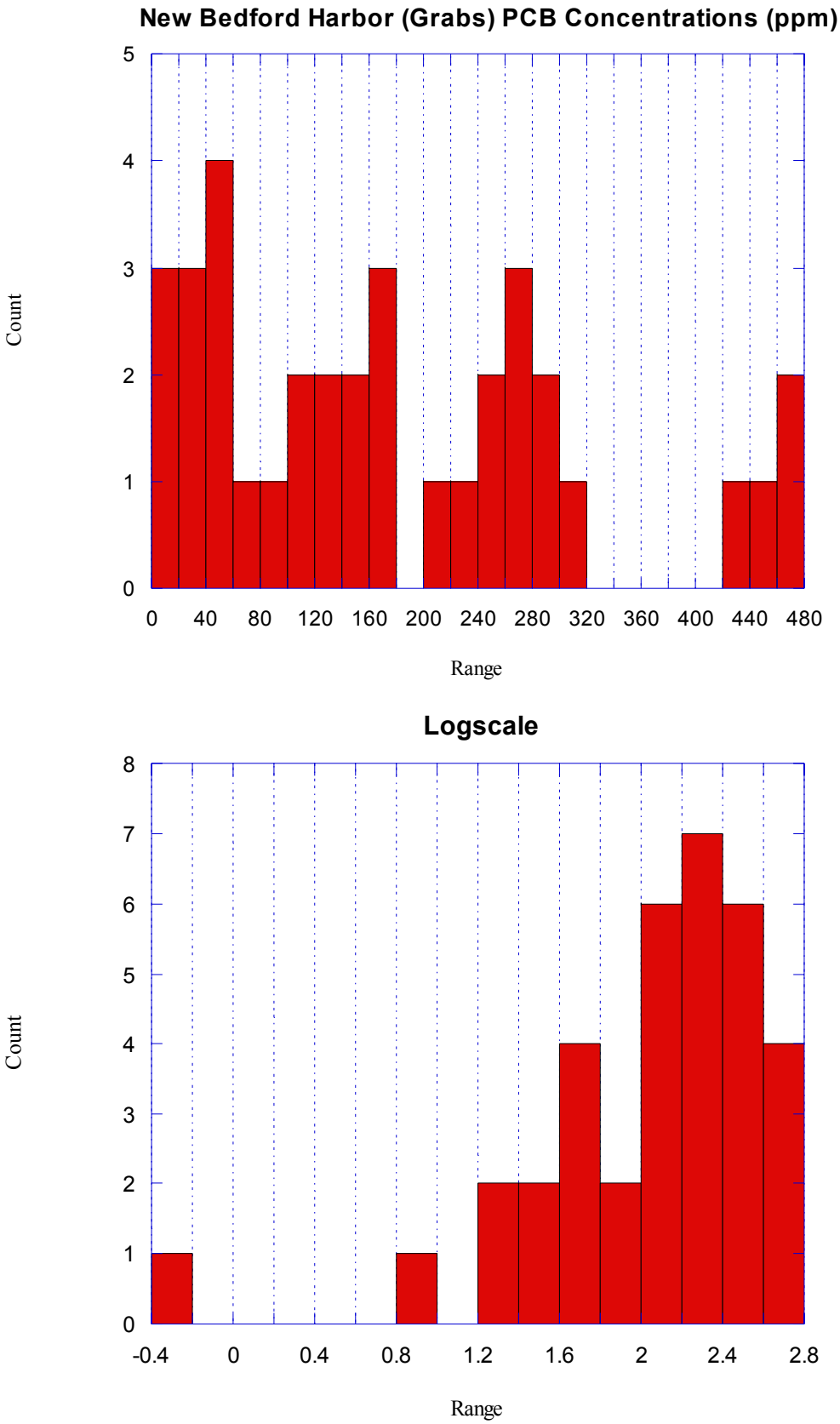


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

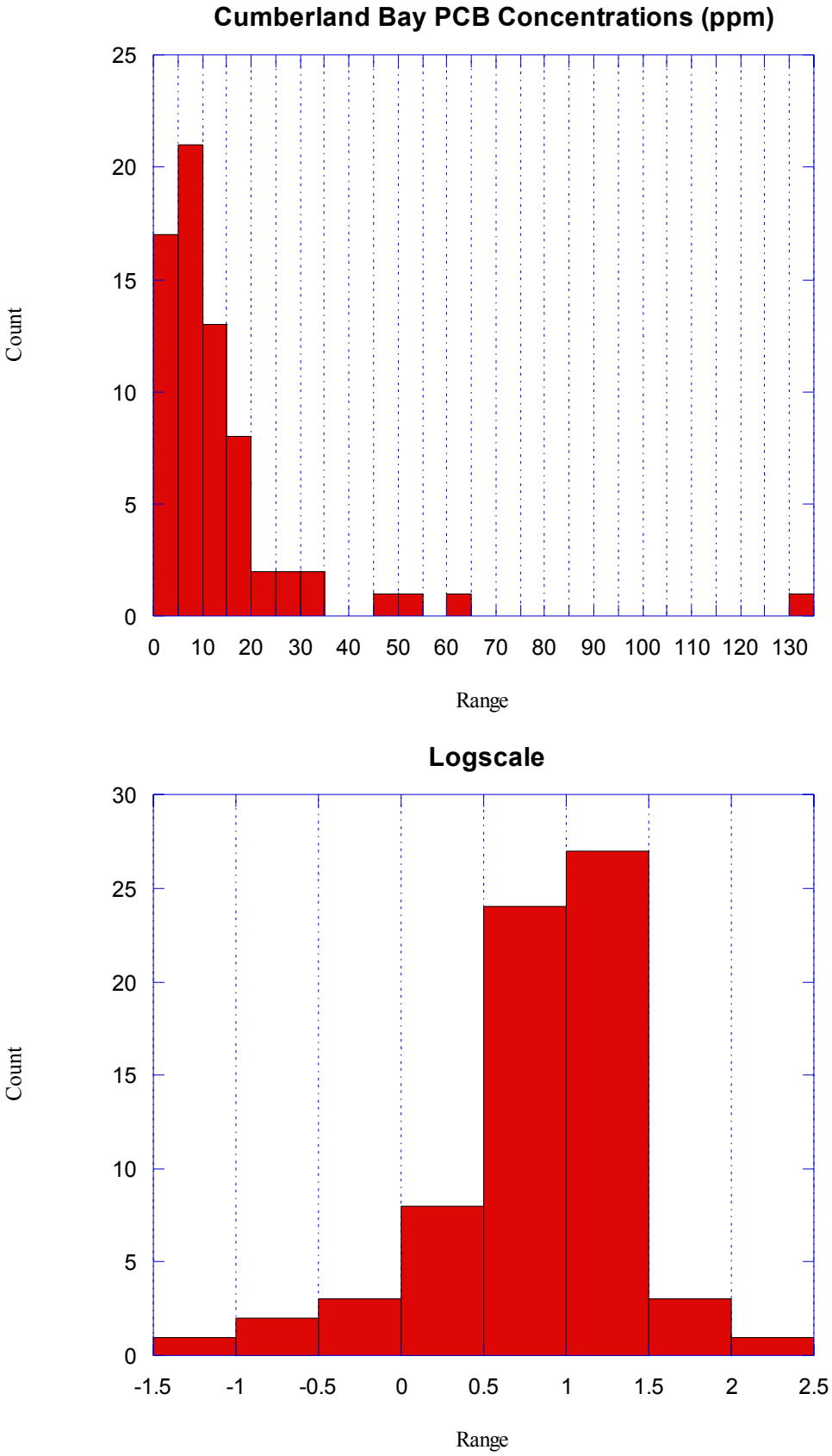
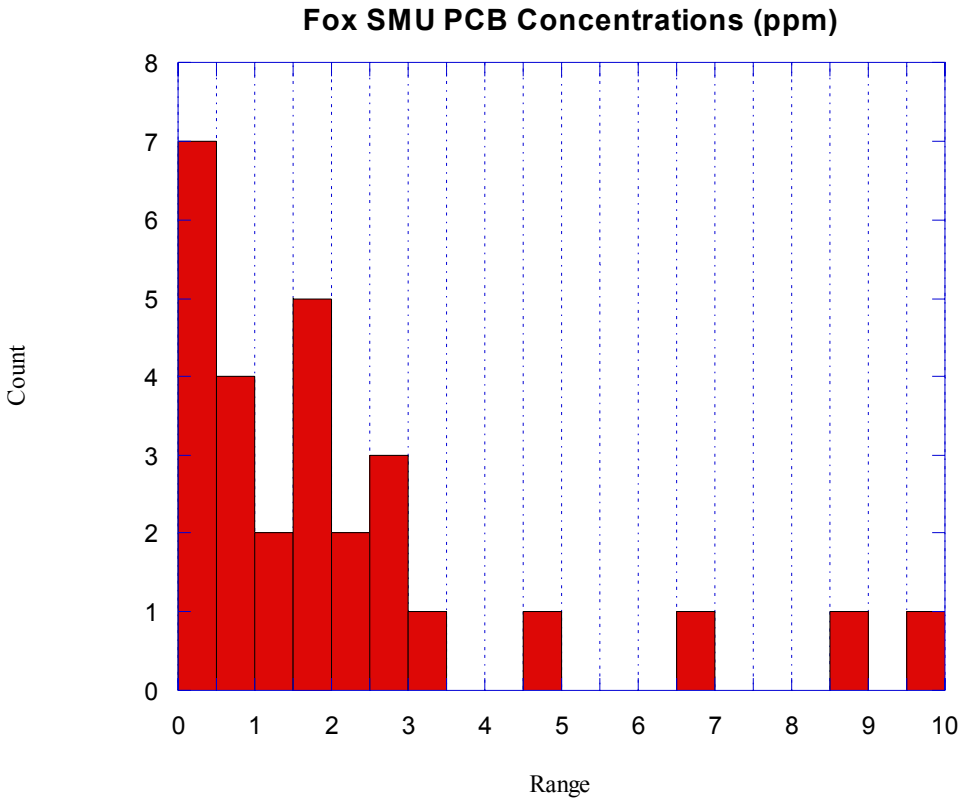


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets



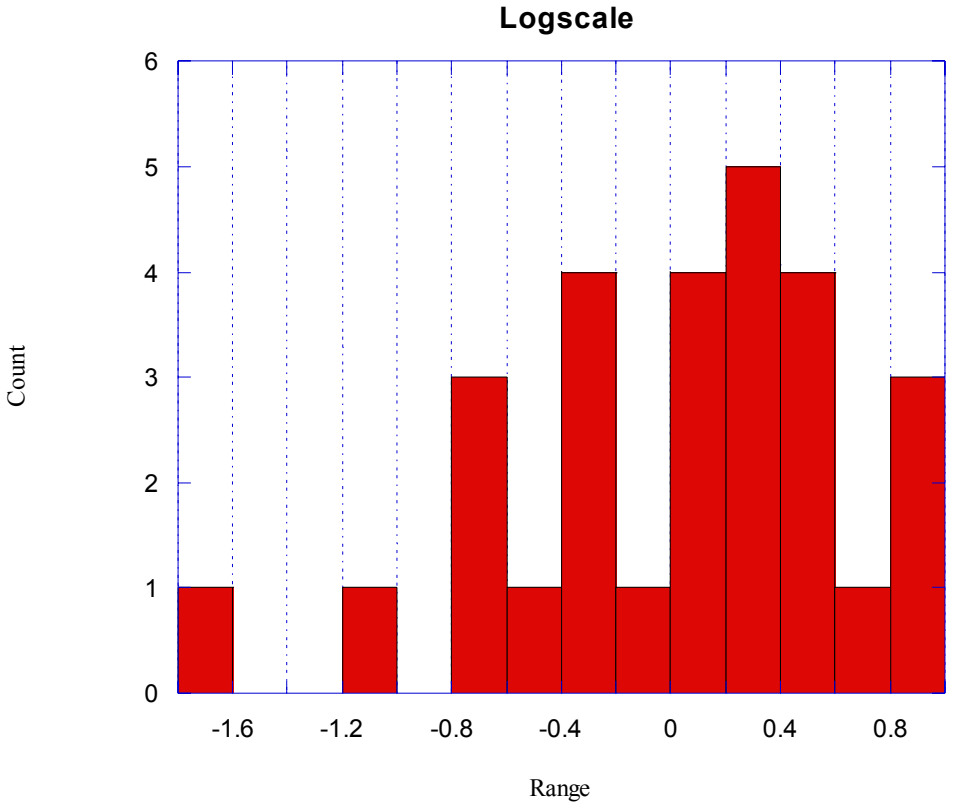
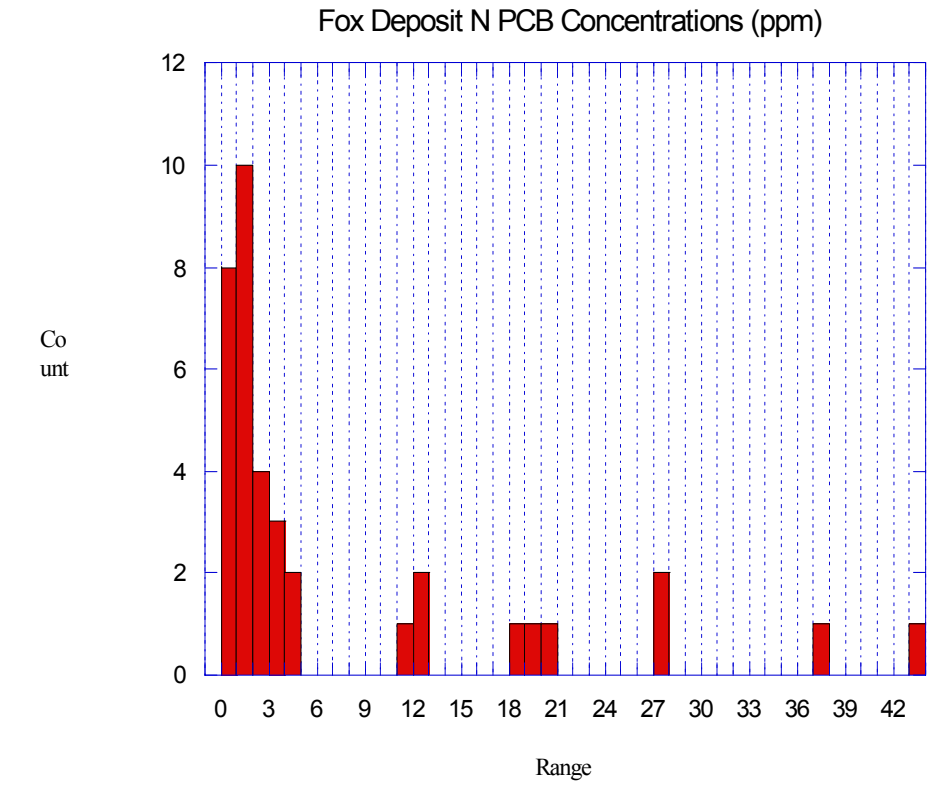


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets



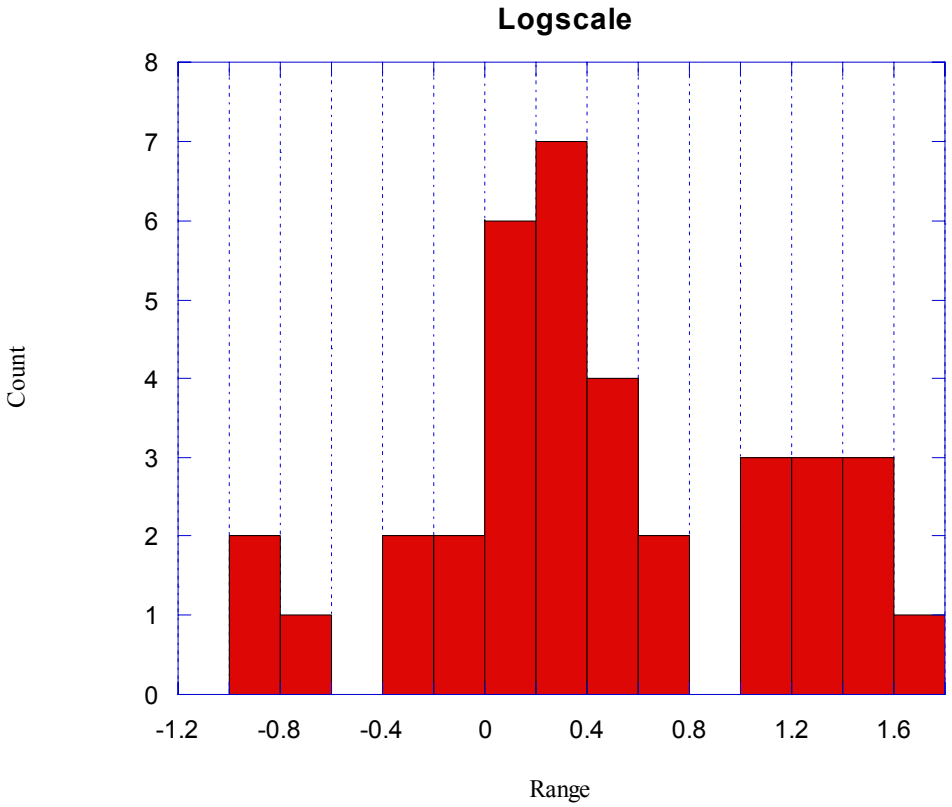


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

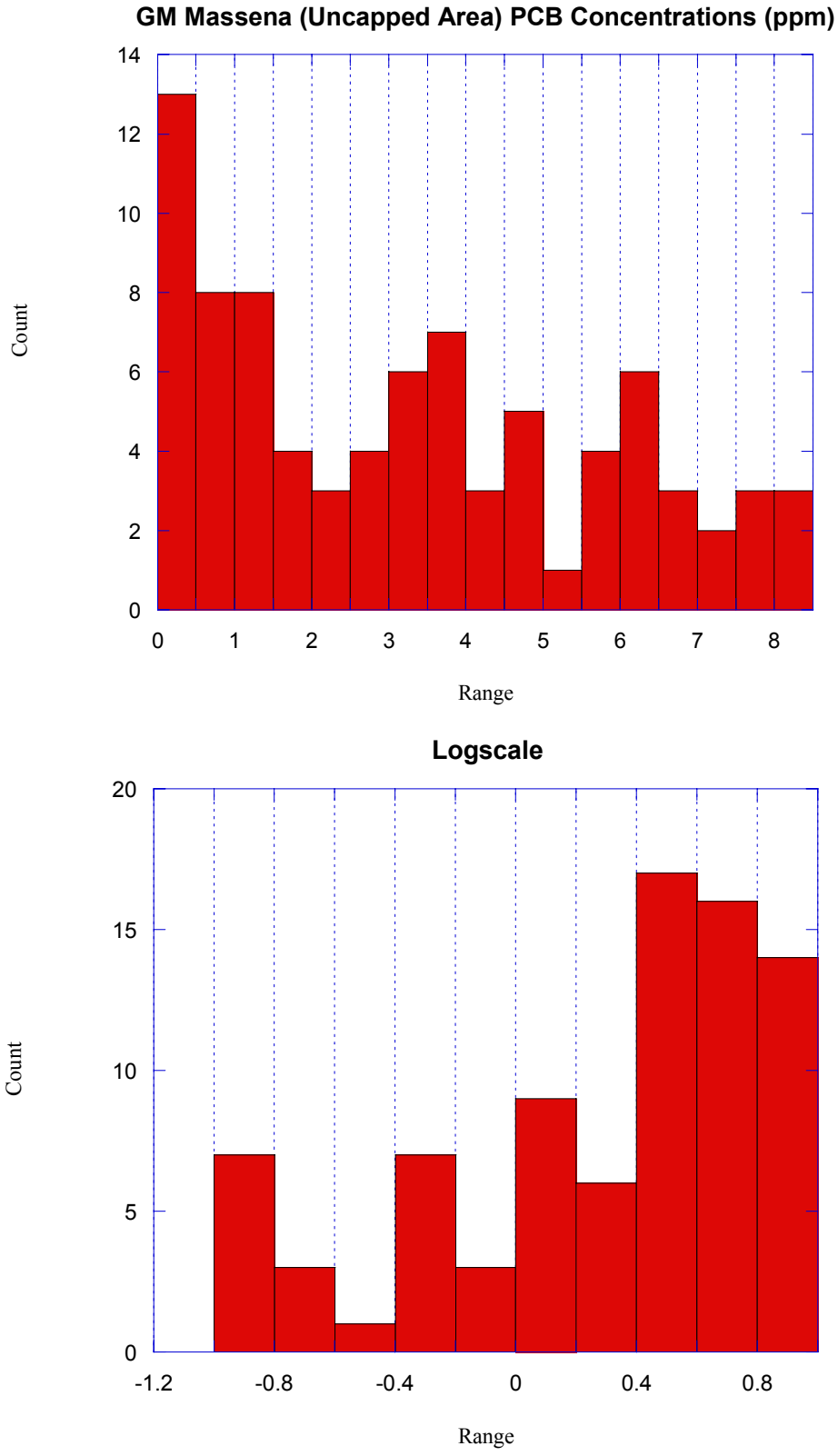


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

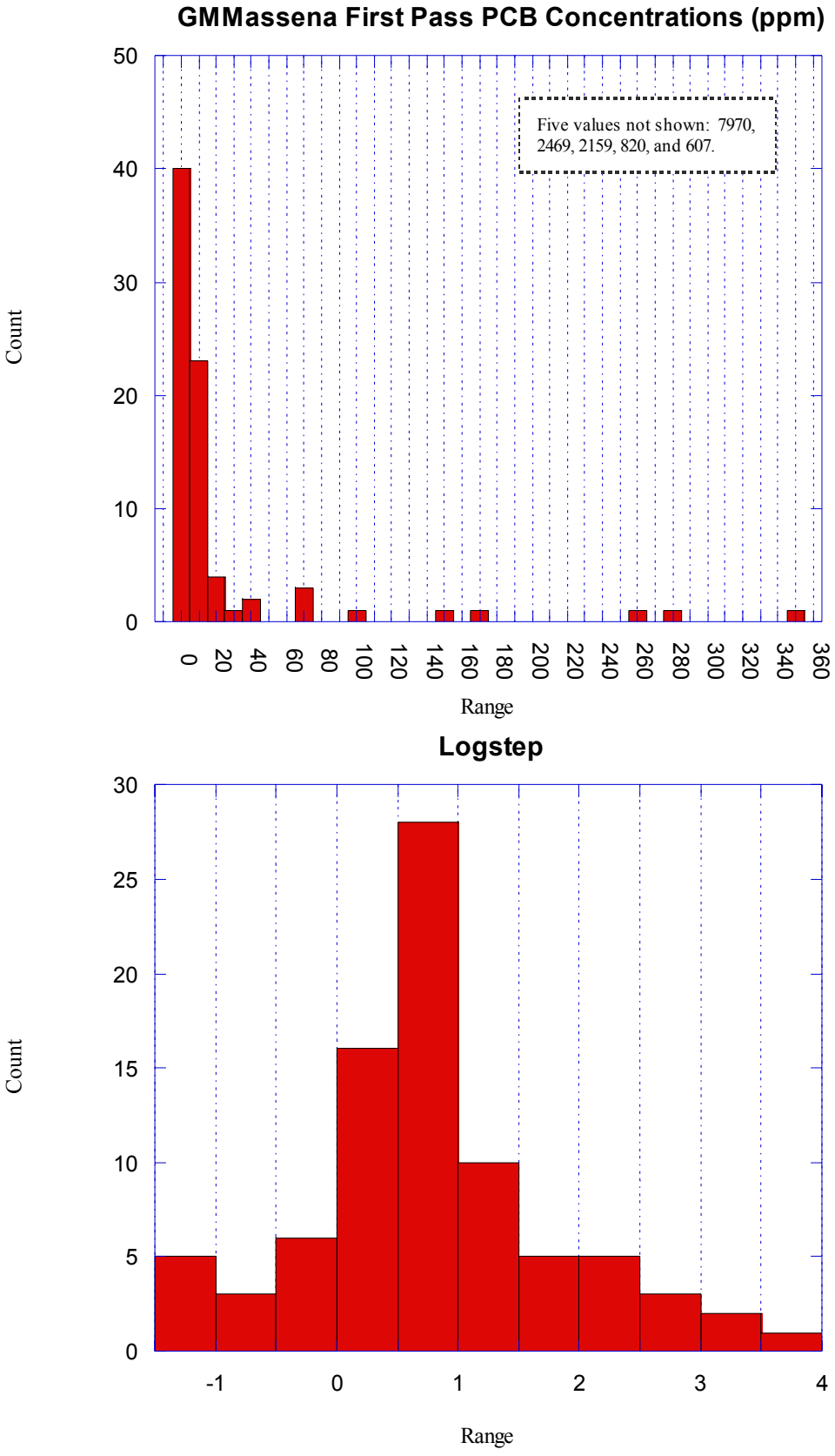


Figure 2-4
Histograms for Lognormal or Approximately Lognormal Data Sets

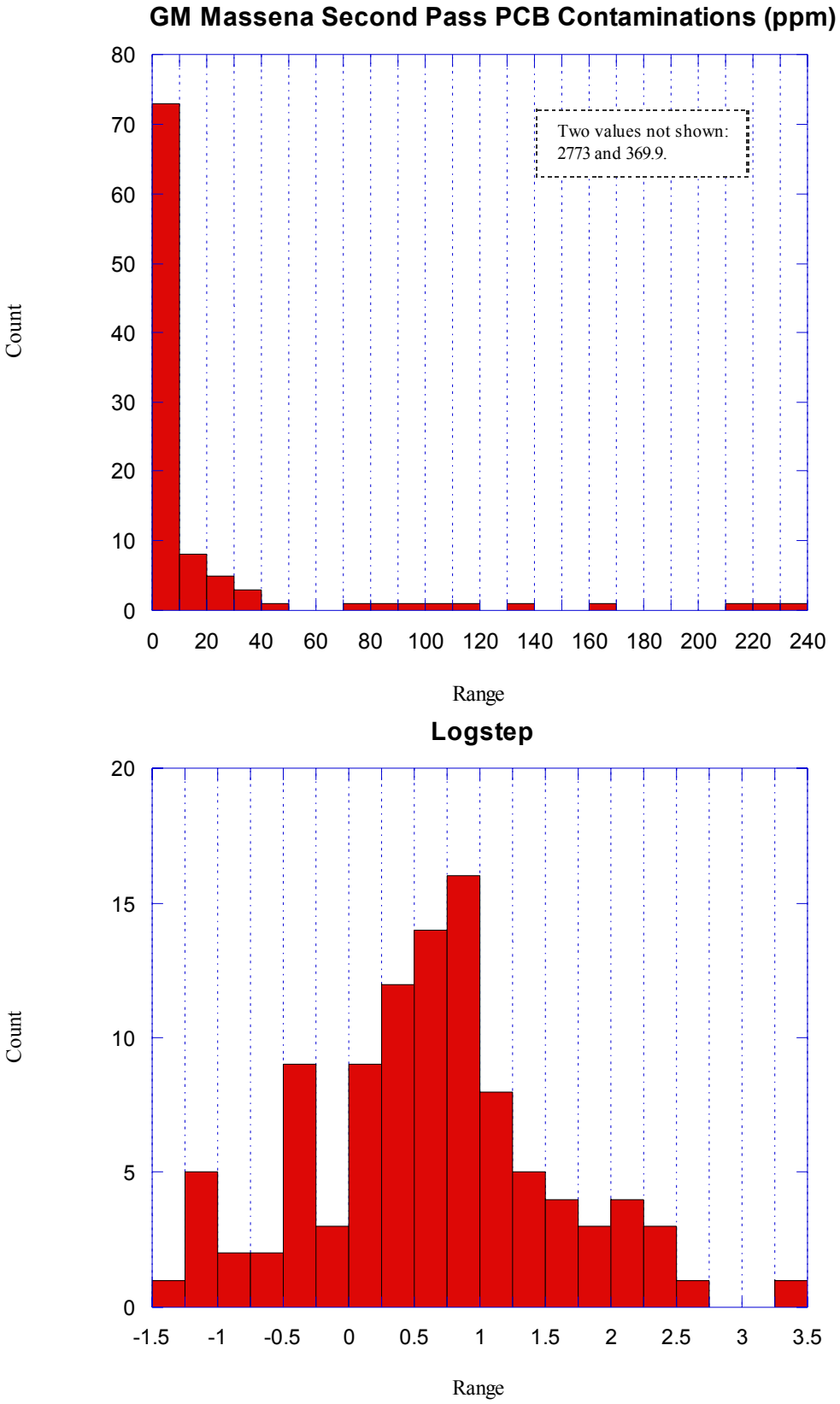
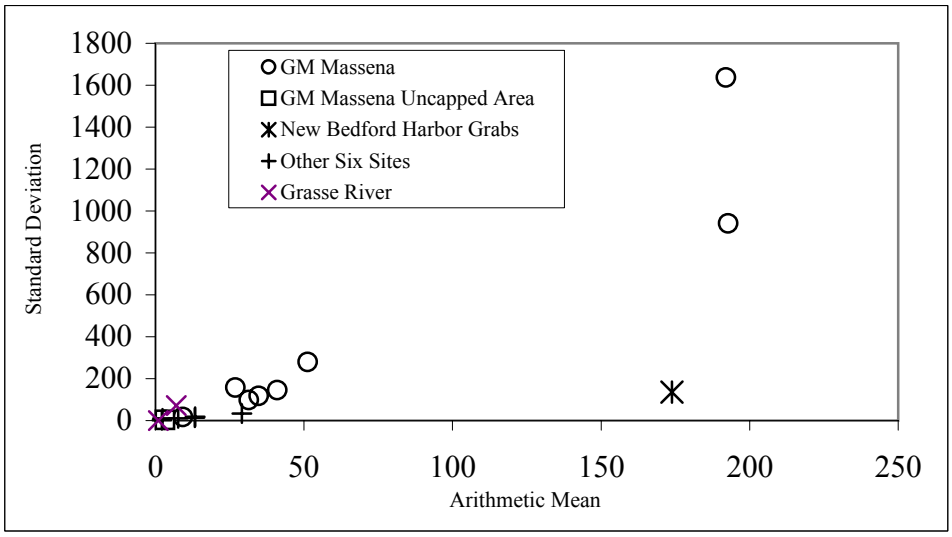


Figure 2-5
Mean vs. Standard Deviation for the Case Study Sites



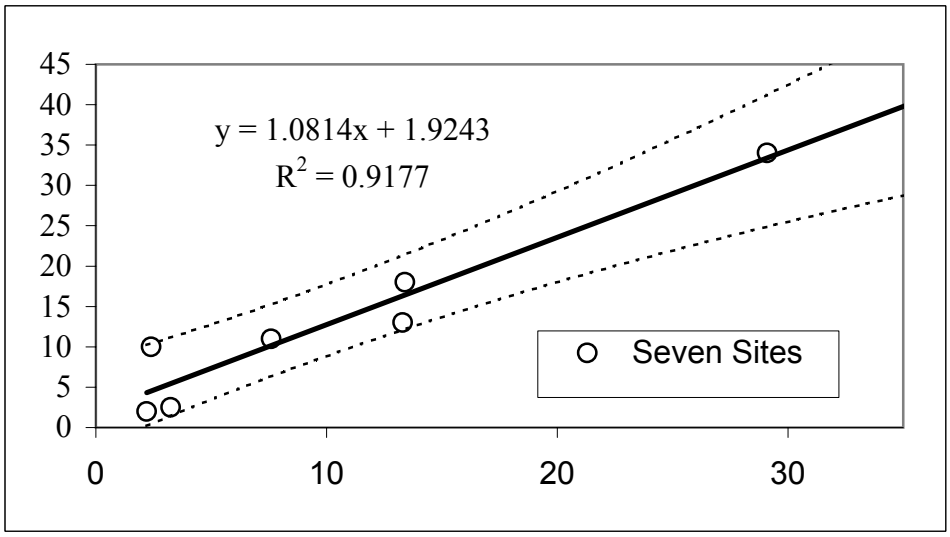
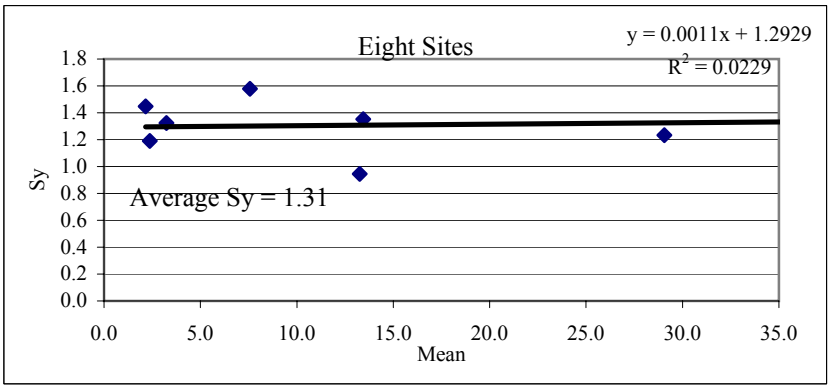


Figure 2-6
Mean vs. Standard Deviation of the Logs for the Case Study Sites



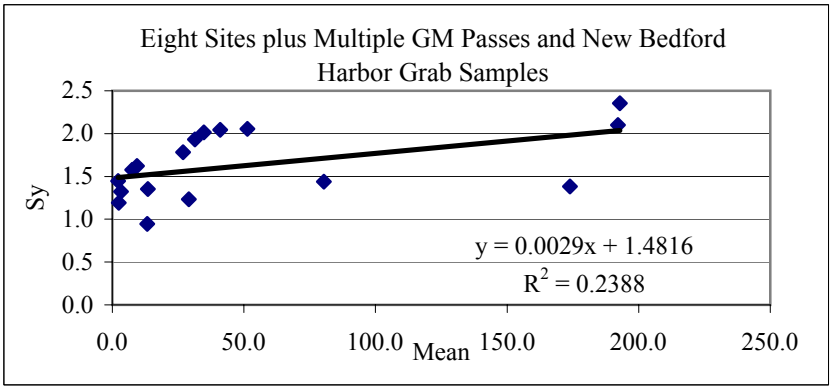


Figure 2-7
Estimated Tri+ PCB Concentrations in the Residual Layer
(Assuming 1% of the Inventory Remains after the Initial Dredging Attempt)

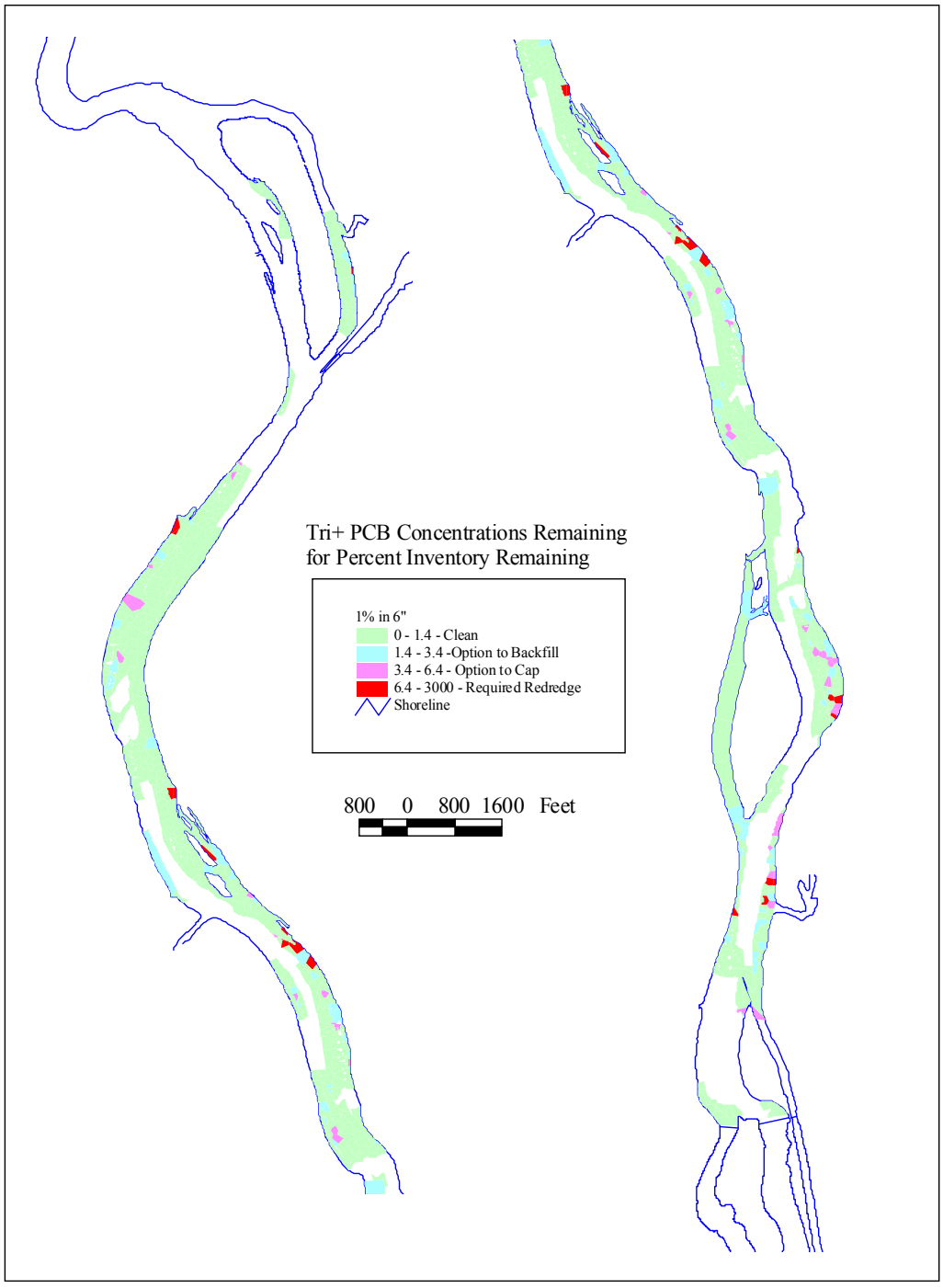


Figure 2-7
Estimated Tri+ PCB Concentrations in the Residual Layer
(Assuming 5% of the Inventory Remains after the Initial Dredging Attempt)

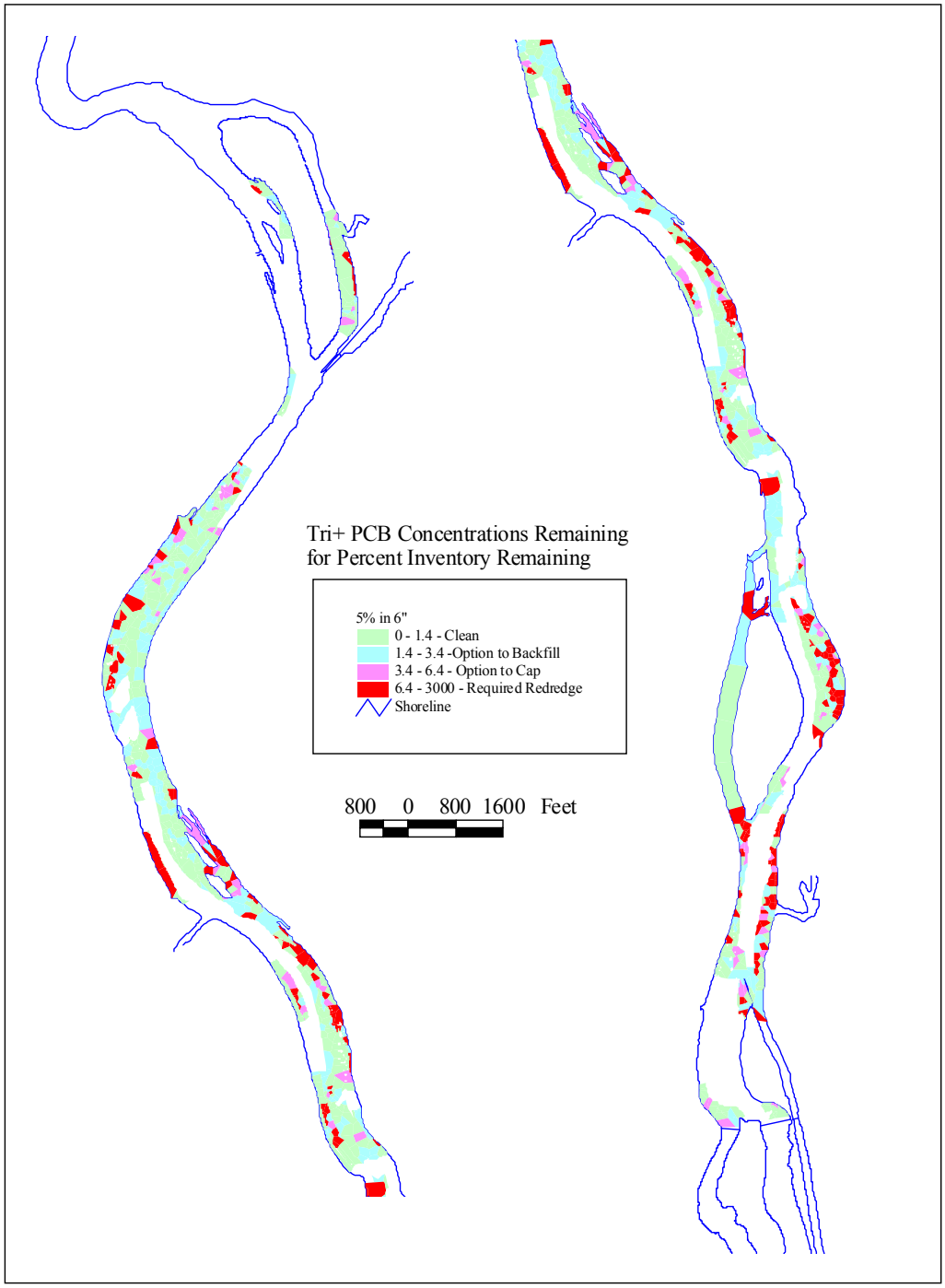


Figure 2-7
Estimated Tri+ PCB Concentrations in the Residual Layer
(Assuming 10% of the Inventory Remains after the Initial Dredging Attempt)

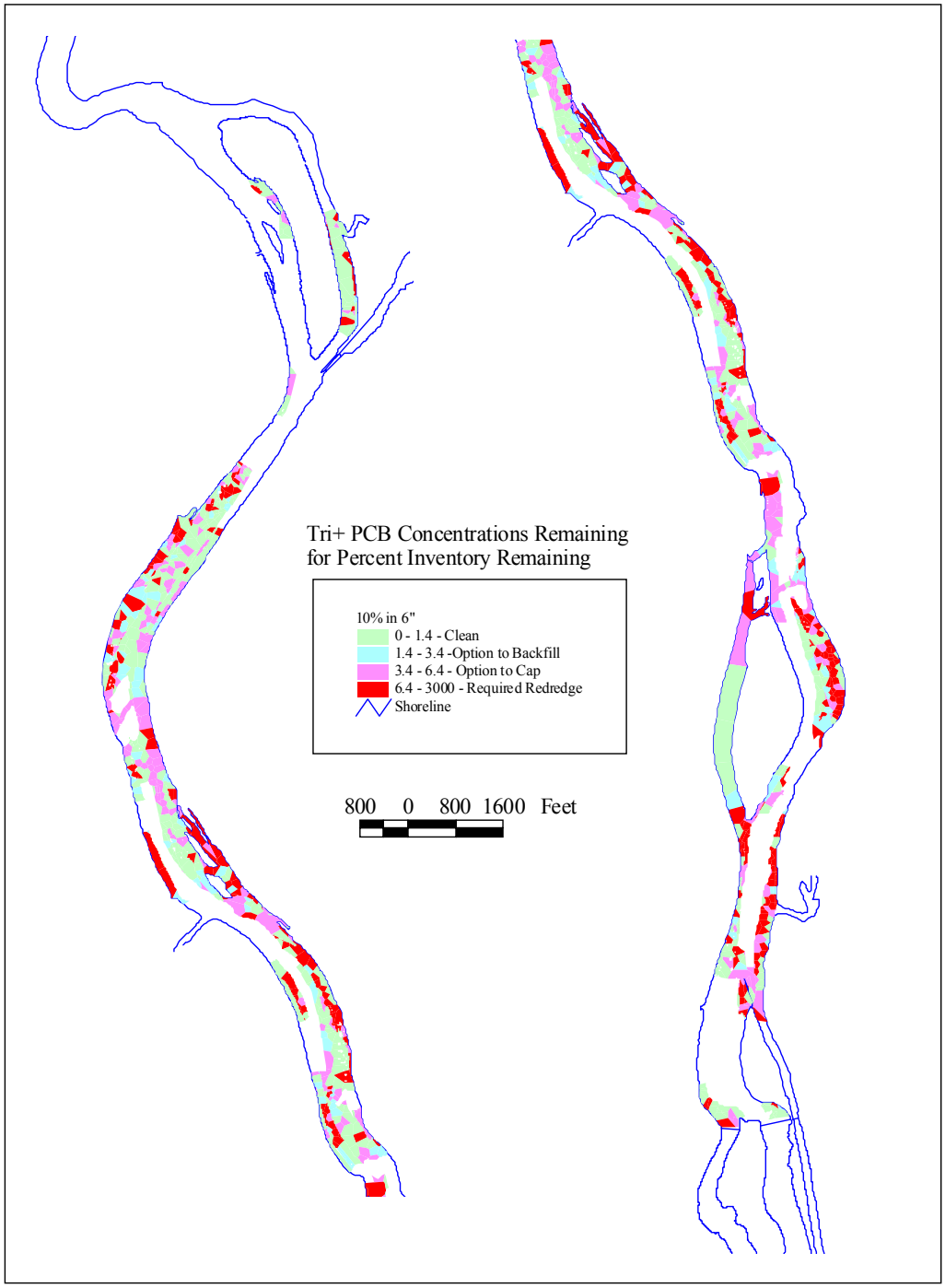
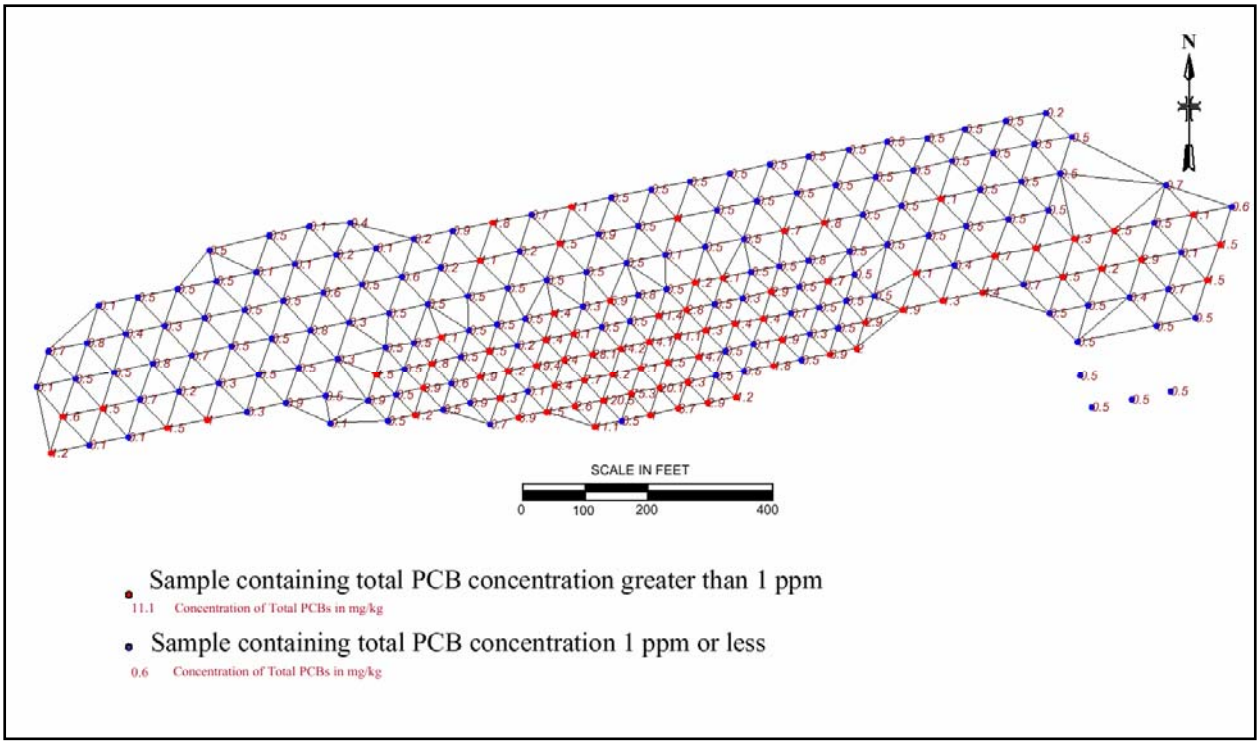


Figure 2-8
Reynolds Post-Dredging PCB Data Semi-Variogram Analysis 70' x 70' and 50' x 50' Triangular Grid Spacing



Final Dredging Program Design Report for the River Remediation Project at the Reynolds Metals Company, St. Lawrence Reduction Plant, Massena, New York, Revision 3. Prepared for Reynolds Metals Company. May 2000.

From Bechtel Environmental, Inc./Metcalf & Eddy, Inc. 2000.

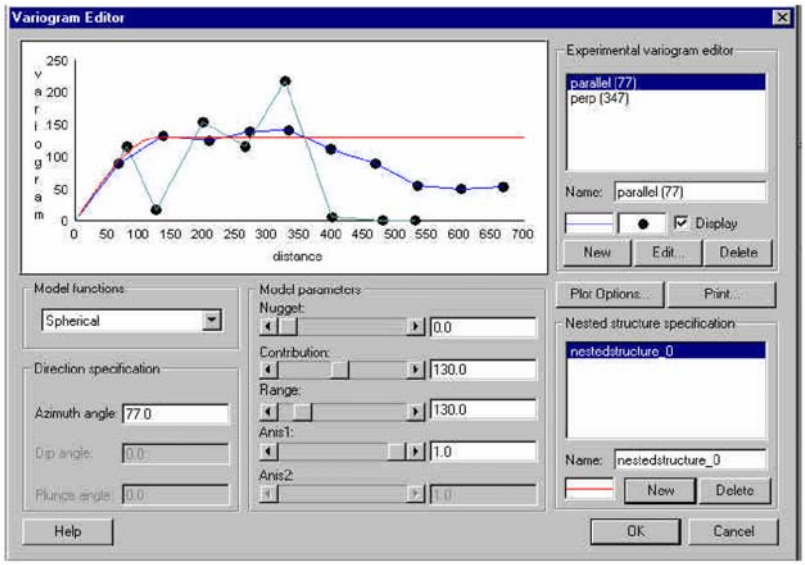
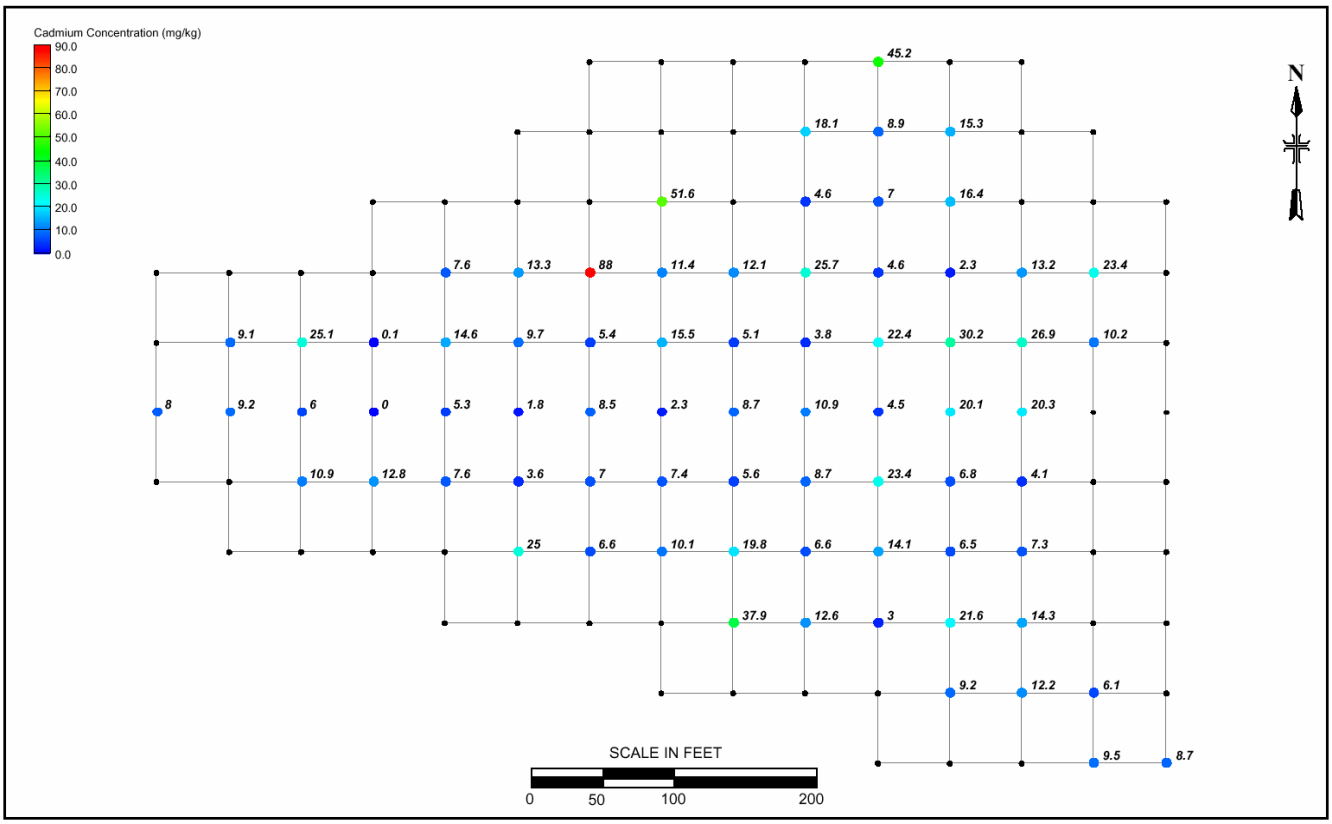


Figure 2-9
Marathon Battery Post-Dredging Cadmium Data Semi-Variogram Analysis 50' x 50' Sampling Grid



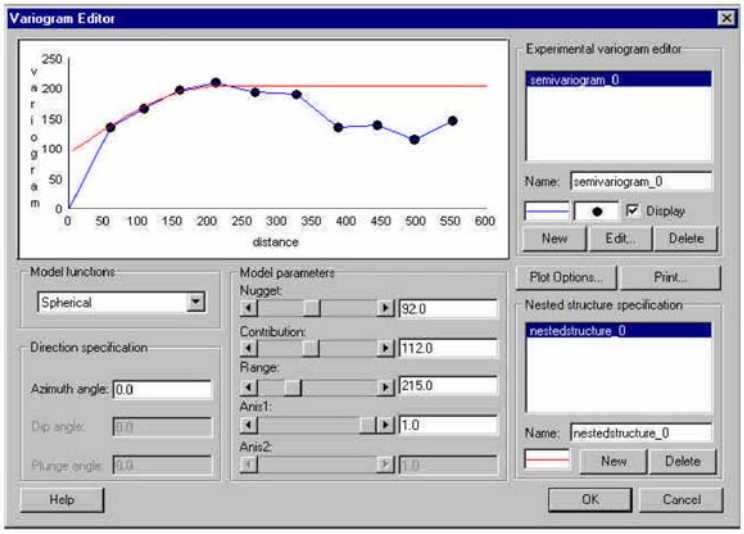
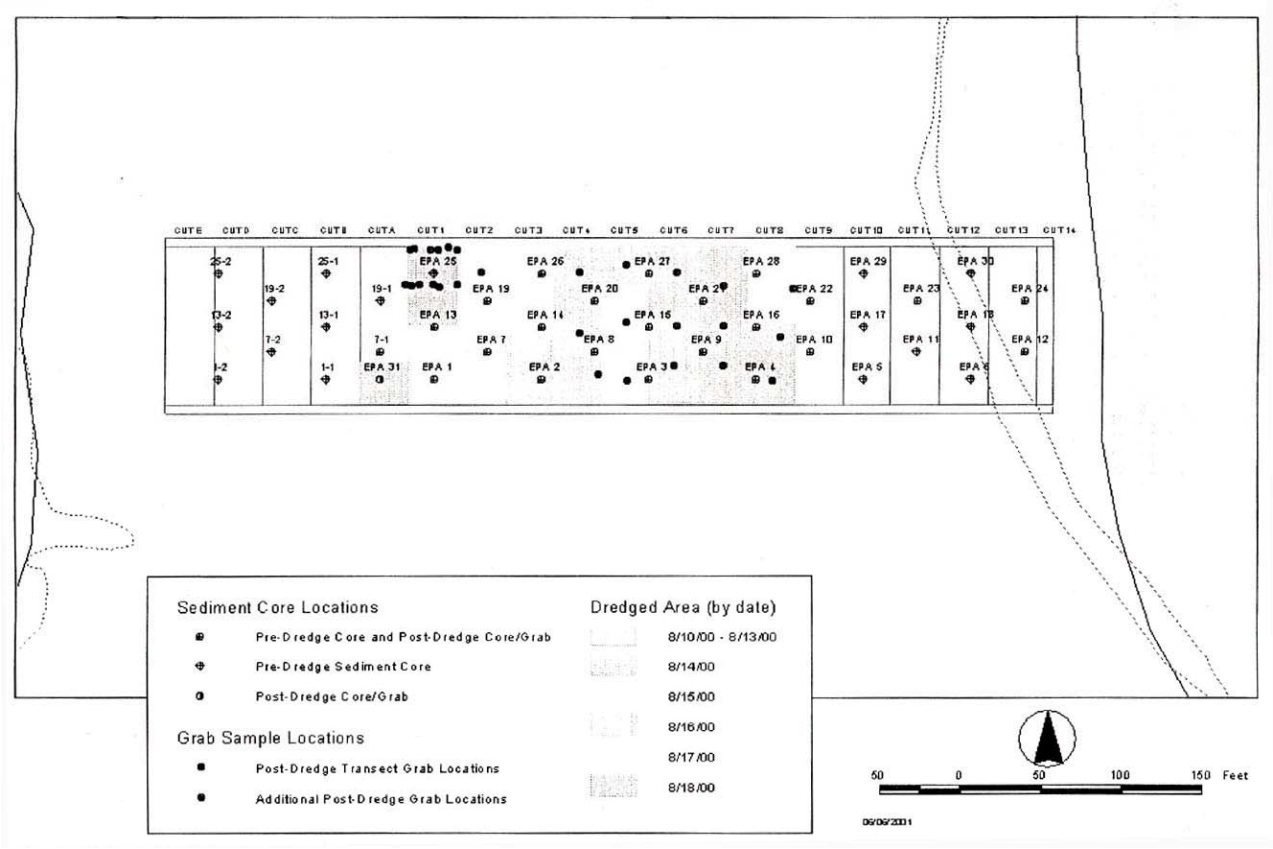


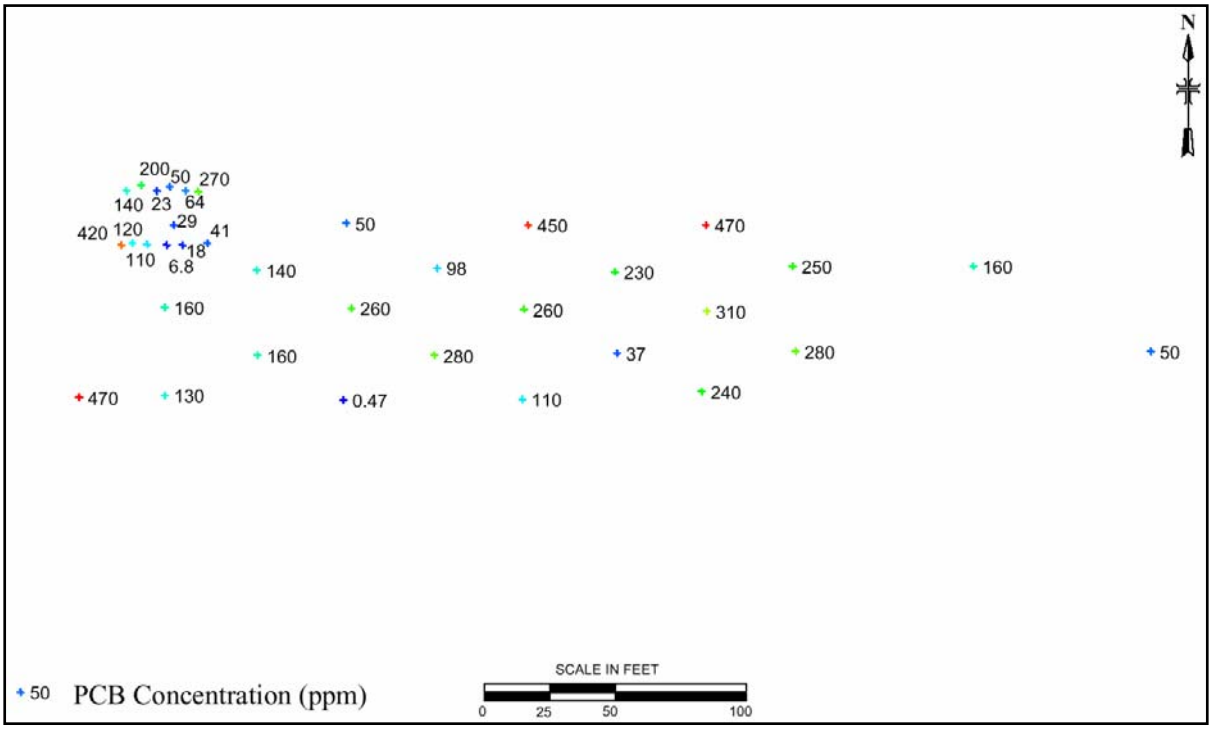
Figure 2-10
New Bedford Harbor Core and Grab Sample Locations



Final Pre-Design Field Test Dredge Technology Evaluation Report, New Bedford Harbor Superfund Site, New Bedford, Massachusetts.
Prepared by Foster Wheeler Environmental Corporation, Boston, Massachusetts. August 2001.

From U. S. Army Corps of Engineers (USACE). 2001.

Figure 2-11
New Bedford Harbor (Grab Sample Locations) Semi-Variogram Analysis Variable Grid Spacing



Final Pre-Design Field Test Dredge Technology Evaluation Report, New Bedford Harbor Superfund Site, New Bedford, Massachusetts.
Prepared by Foster Wheeler Environmental Corporation, Boston, Massachusetts. August 2001.

From U. S. Army Corps of Engineers (USACE). 2001.

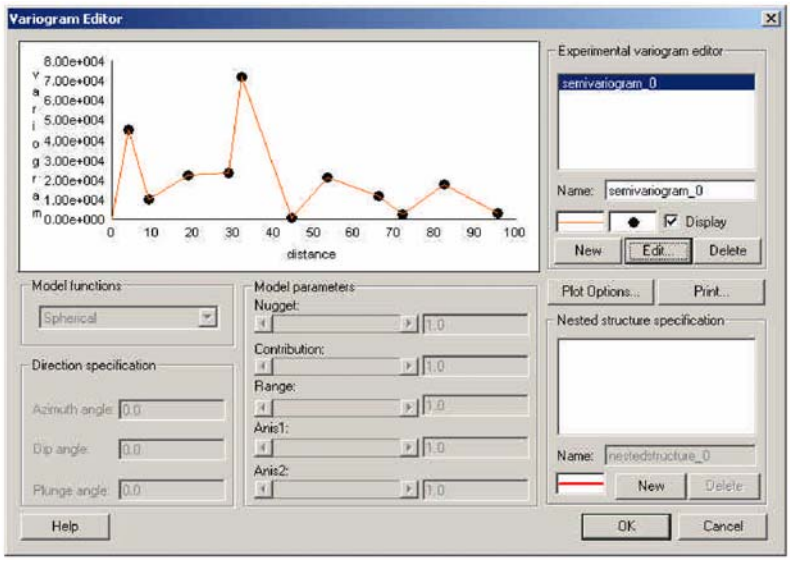
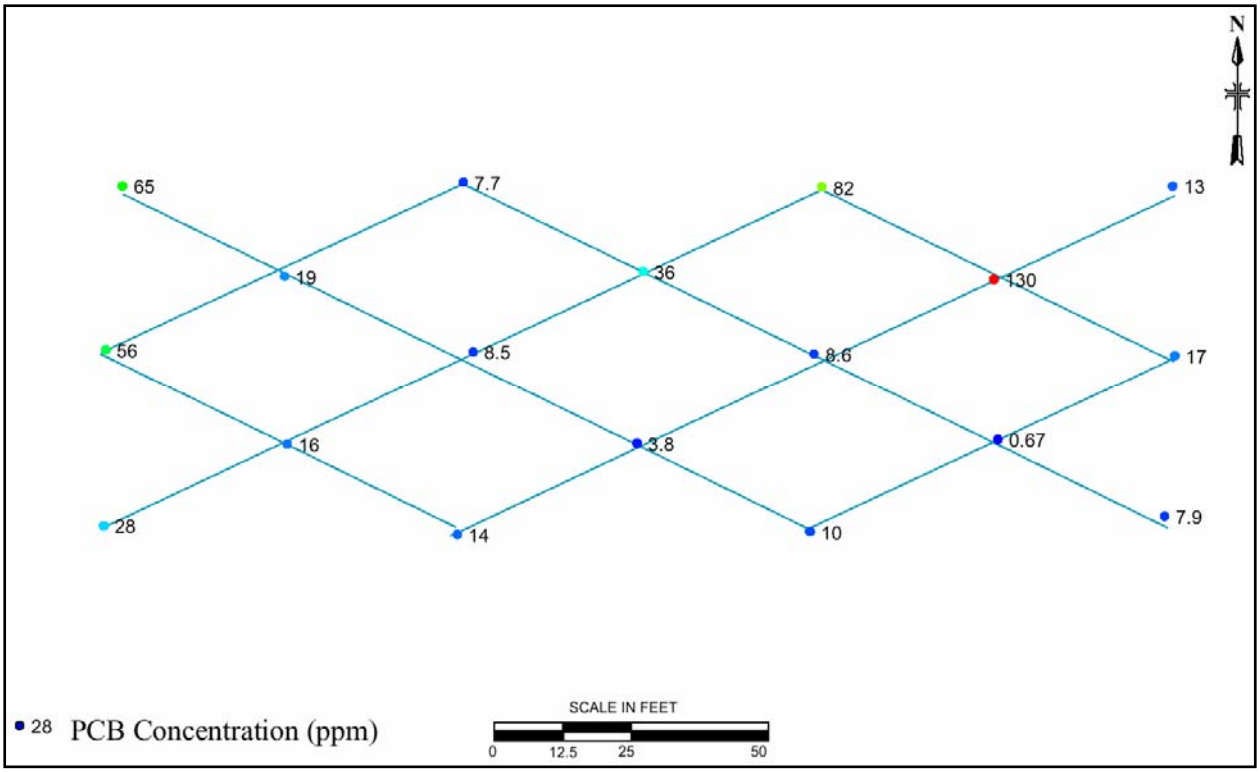


Figure 2-12
New Bedford Harbor Core Sample Semi-Variogram Analysis 40' Triangular Grid Spacing



Final Pre-Design Field Test Dredge
Technology Evaluation Report, New Bedford Harbor Superfund Site, New Bedford, Massachusetts.
Prepared by Foster Wheeler Environmental Corporation, Boston, Massachusetts. August 2001.

From U. S. Army Corps of Engineers (USACE). 2001.

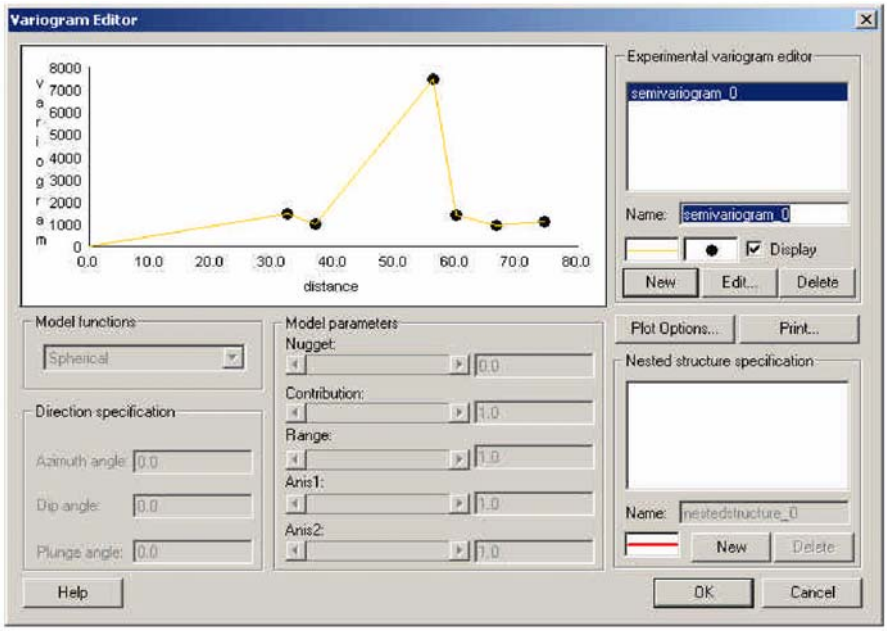
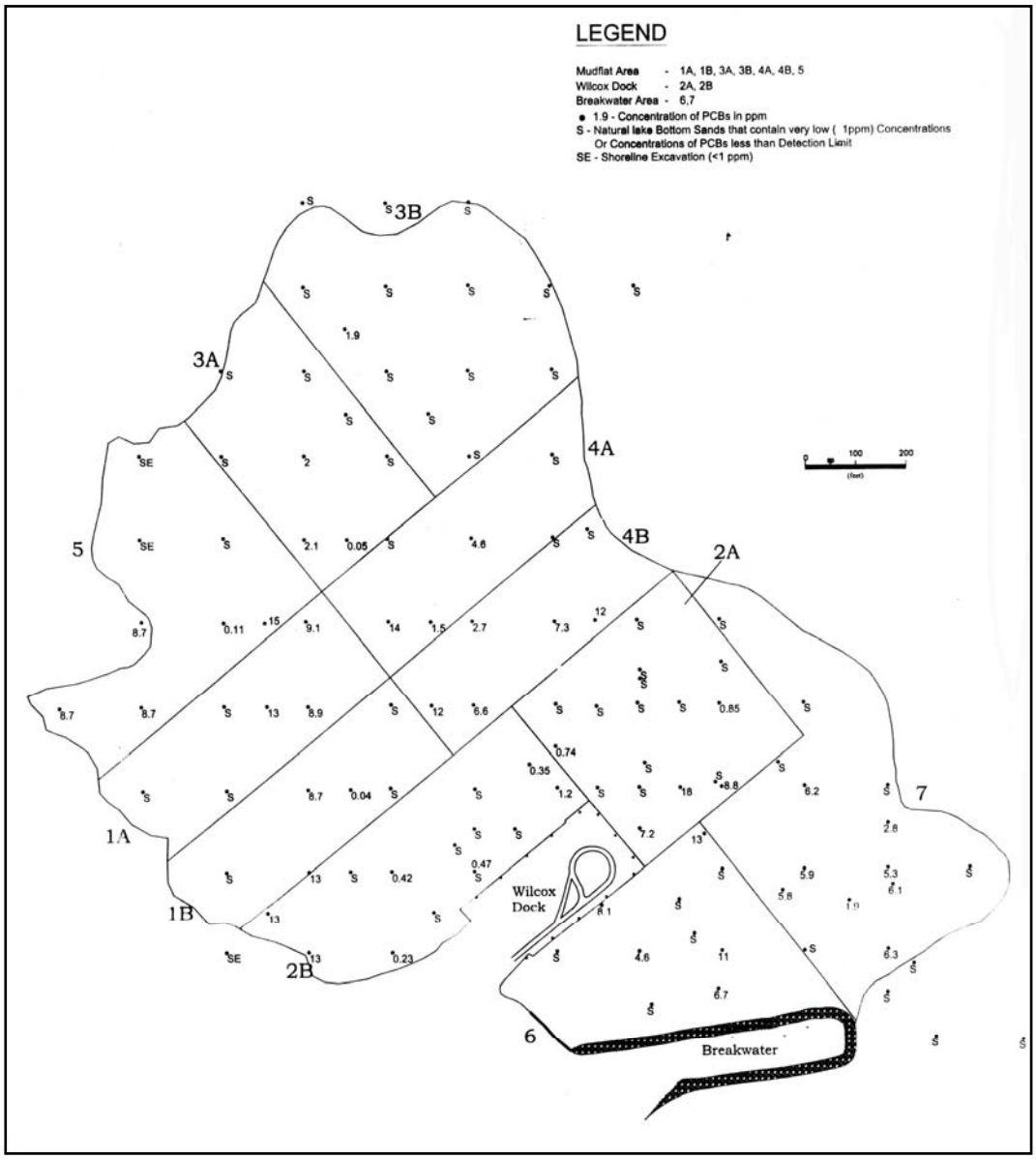


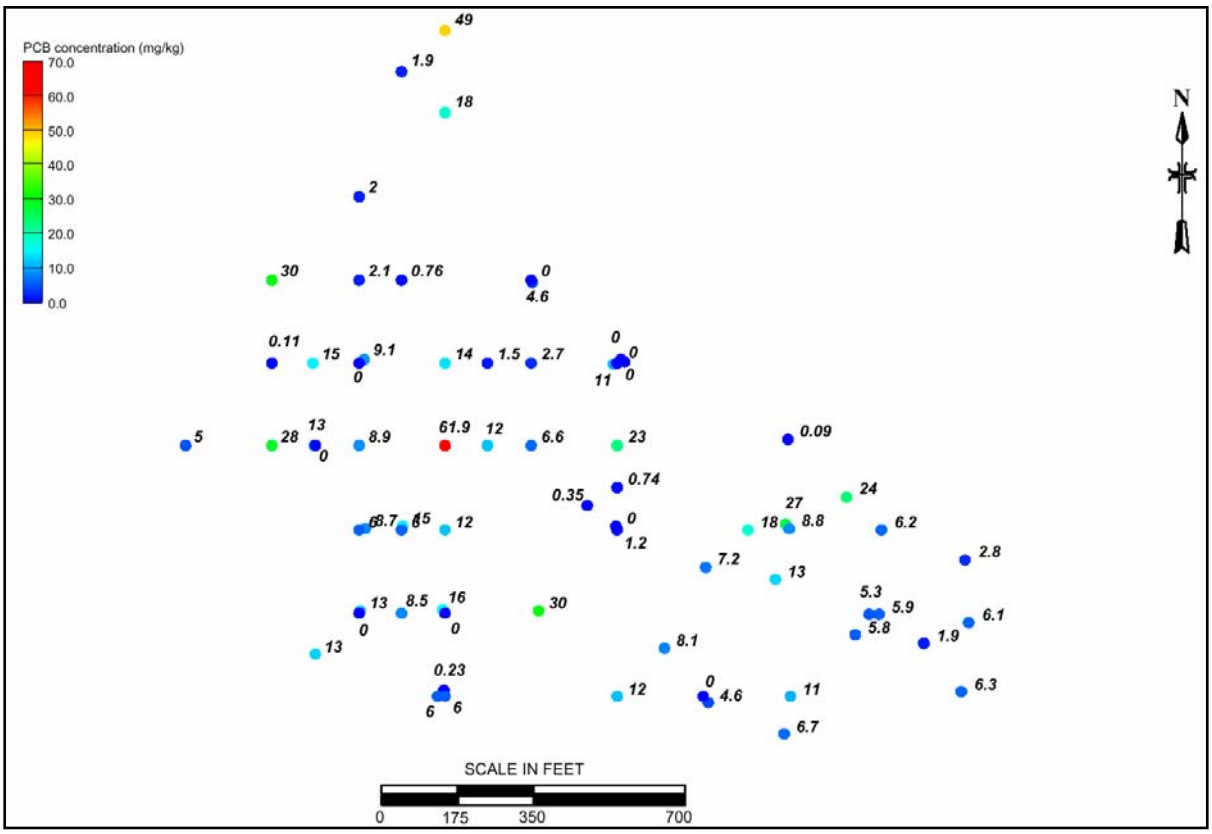
Figure 2-13
Cumberland Bay Semi-Variogram Analysis Variable Sample Spacing



Draft Final Construction Certification Report, Cumberland Bay Sludge Bed Removal and Disposal Contract (OU1), April 1999 – July 2001. Prepared by Earth Tech, Latham, New York. April 2002

From the New York State Department of Environmental Conservation (NYSDEC). 2002.

Figure 2-13
Cumberland Bay Semi-Variogram Analysis Variable Sample Spacing



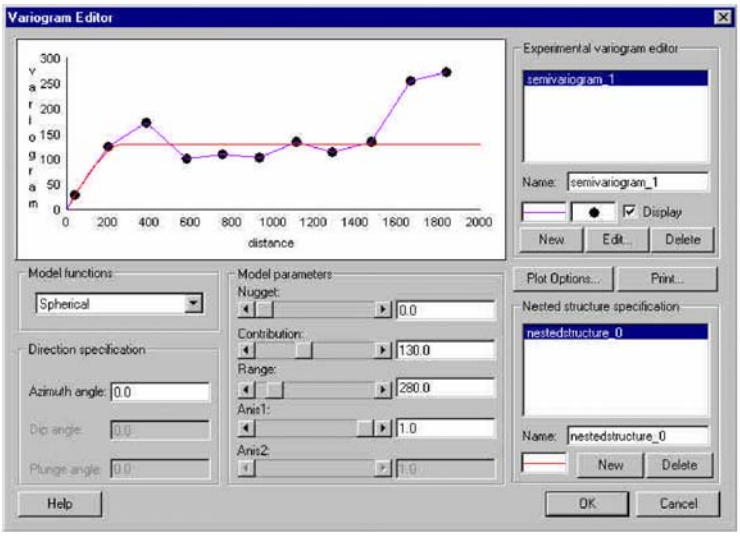
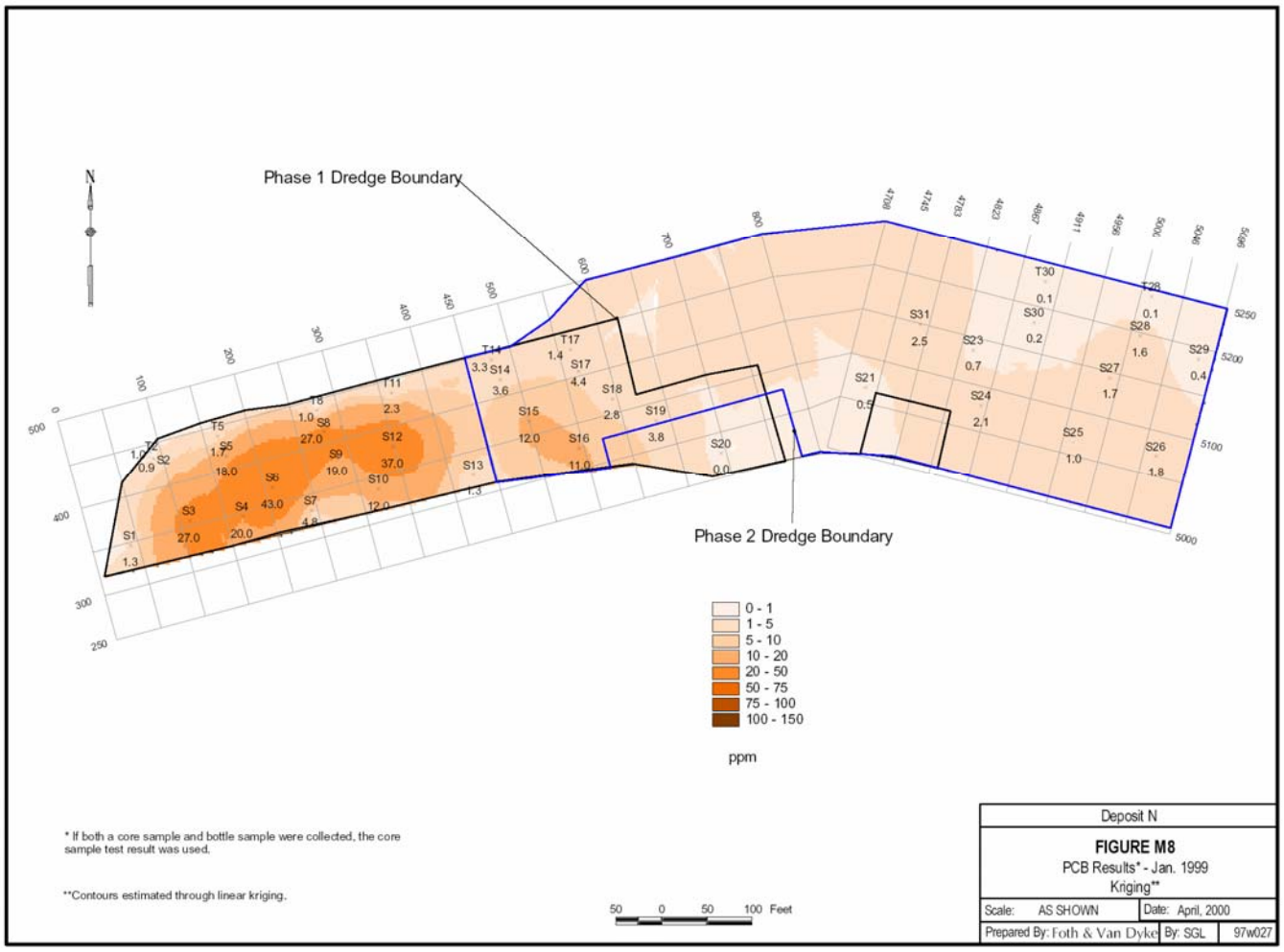


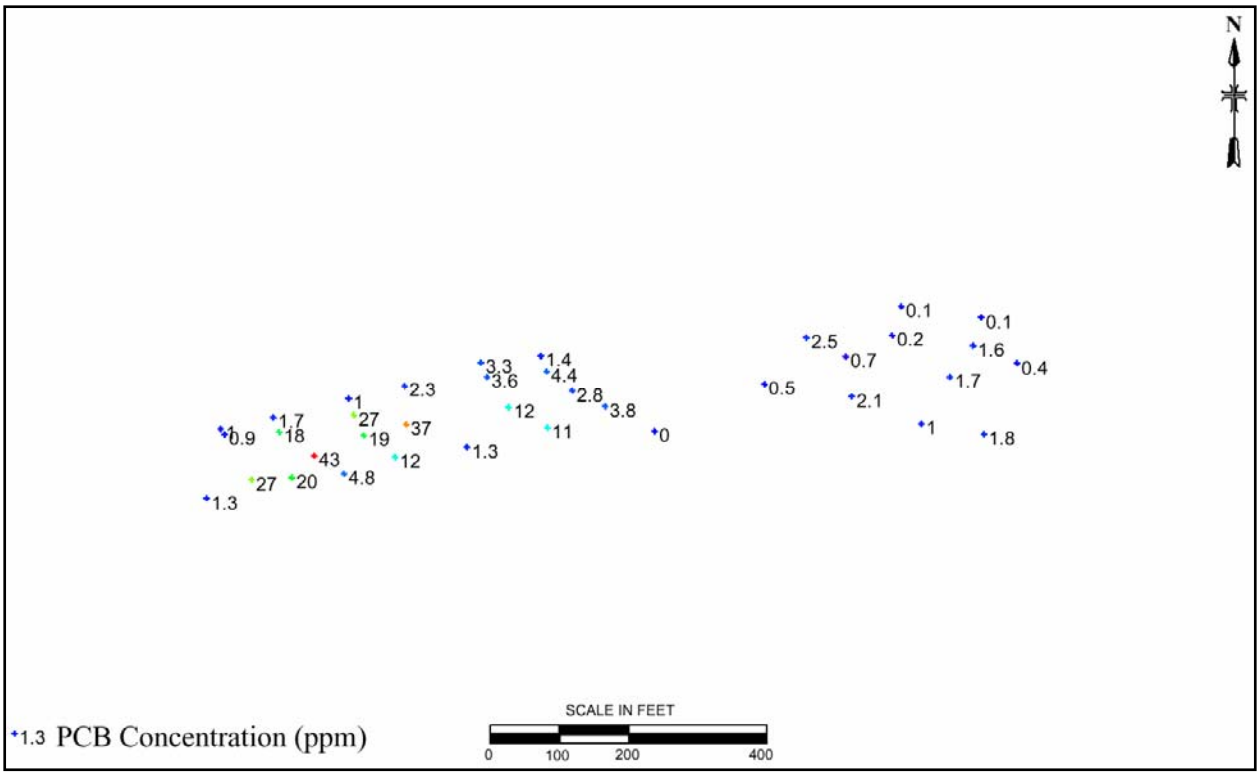
Figure 2-14
Fox River Deposit N Semi-Variogram Analysis Variable Sample Spacing



Summary Report Fox River Deposit N. Prepared by Foth and Van Dyke. April 2000.

From Wisconsin Department of Natural Resources, 2000.

Figure 2-14
Fox River Deposit N Semi-Variogram Analysis Variable Sample Spacing



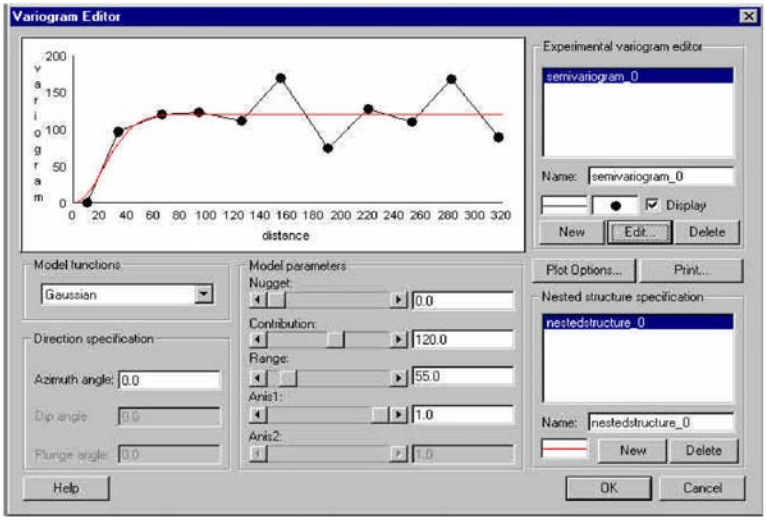
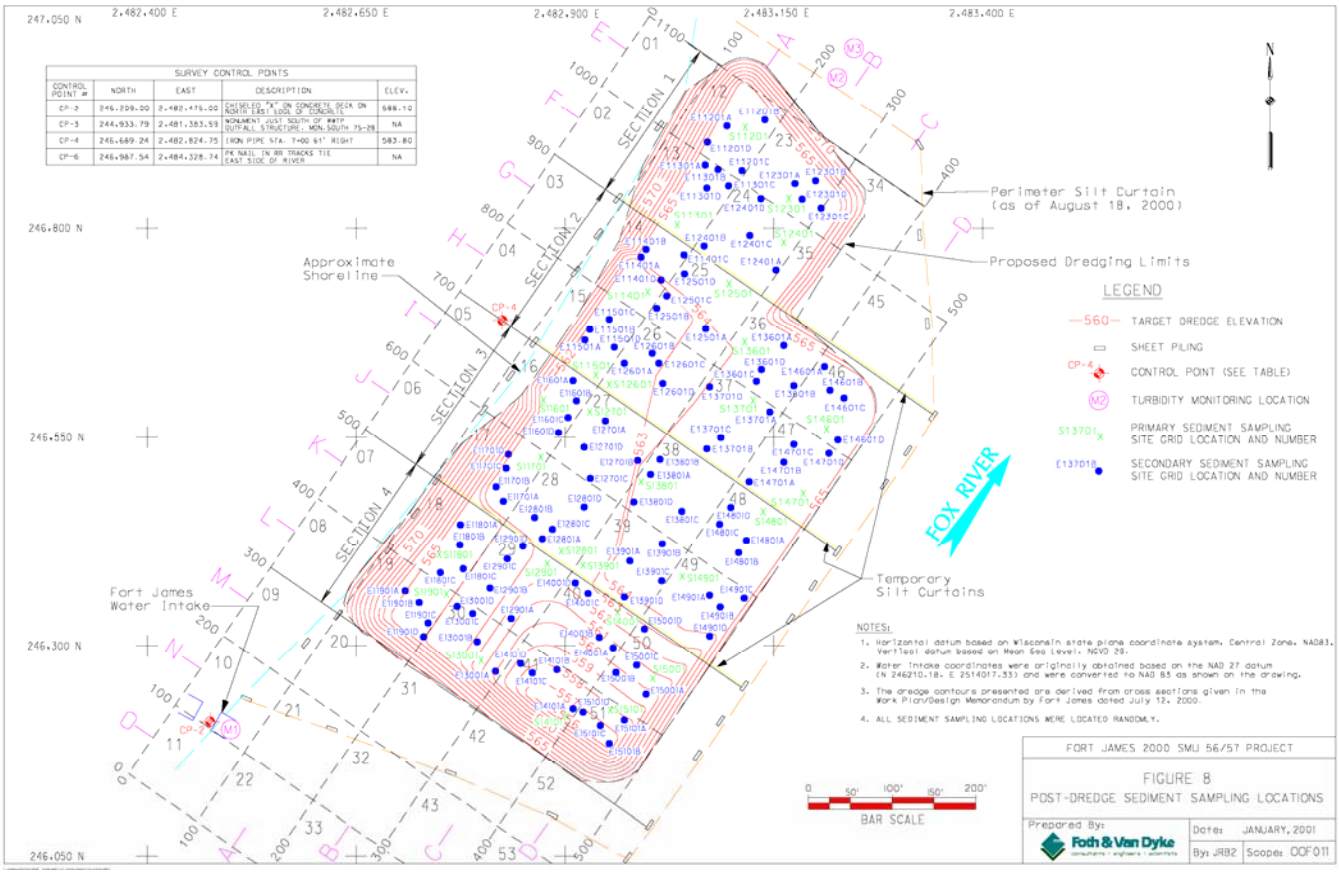


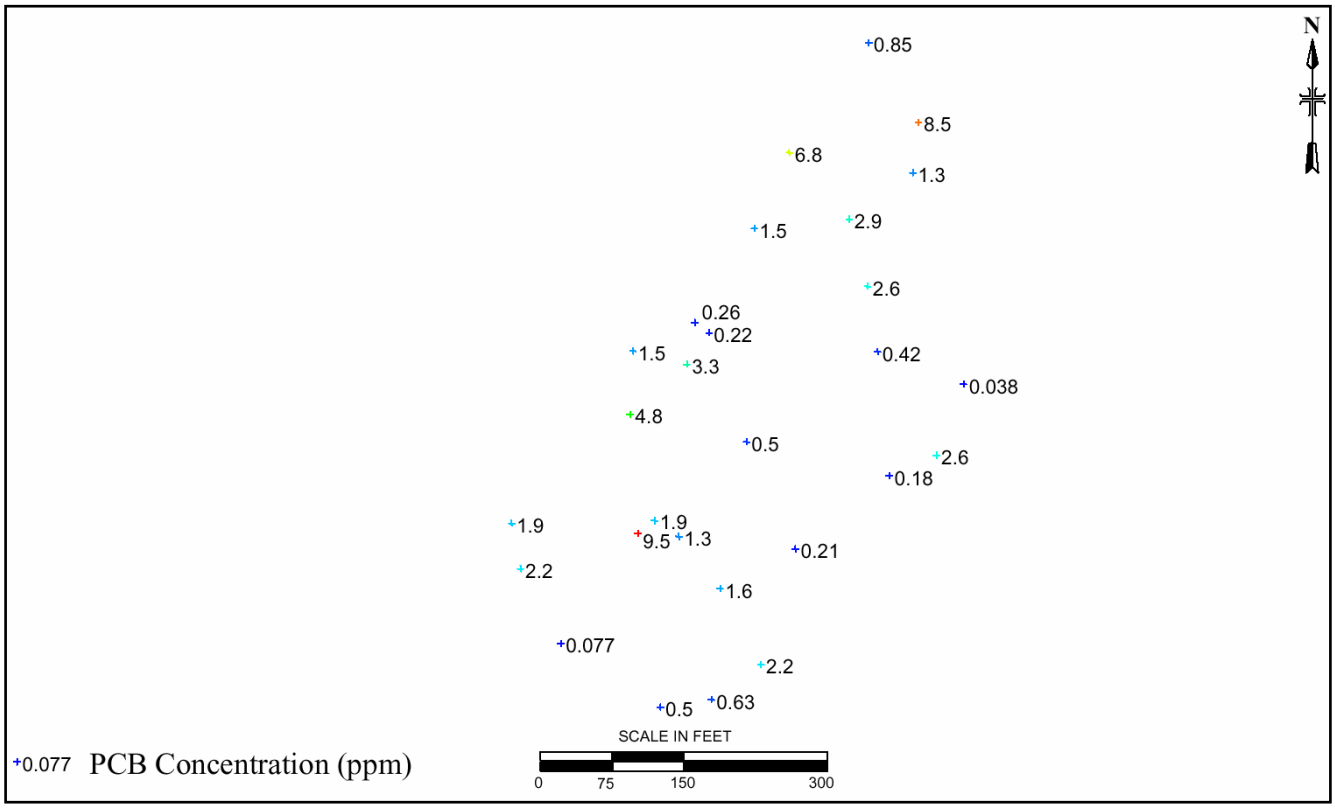
Figure 2-15
Fox River SMUs 56/57 Semi-Variogram Analysis Variable Sample Spacing



Final Report 2000 Sediment Management Unit 56/57 Project Lower Fox River, Green Bay, Wisconsin. Prepared by Fort James Corporation, Foth & Van Dyke and Hart Crowser, Inc. January 2001.

From Wisconsin Department of Natural Resources and United States Environmental Protection Agency, 2001.

Figure 2-15
Fox River SMUs 56/57 Semi-Variogram Analysis Variable Sample Spacing



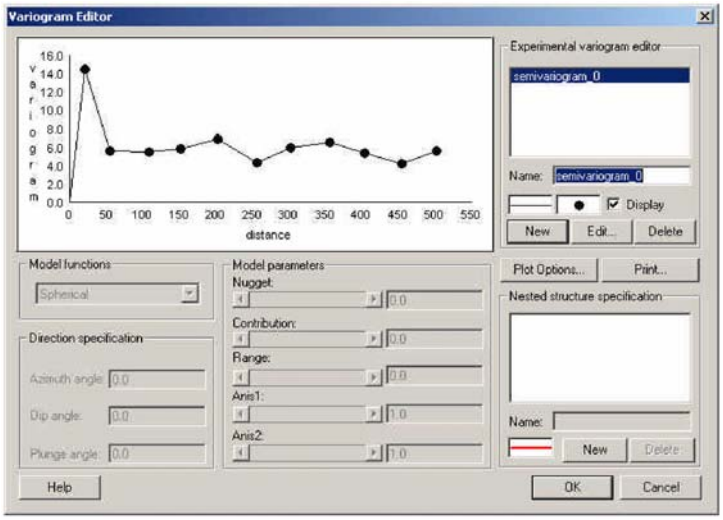
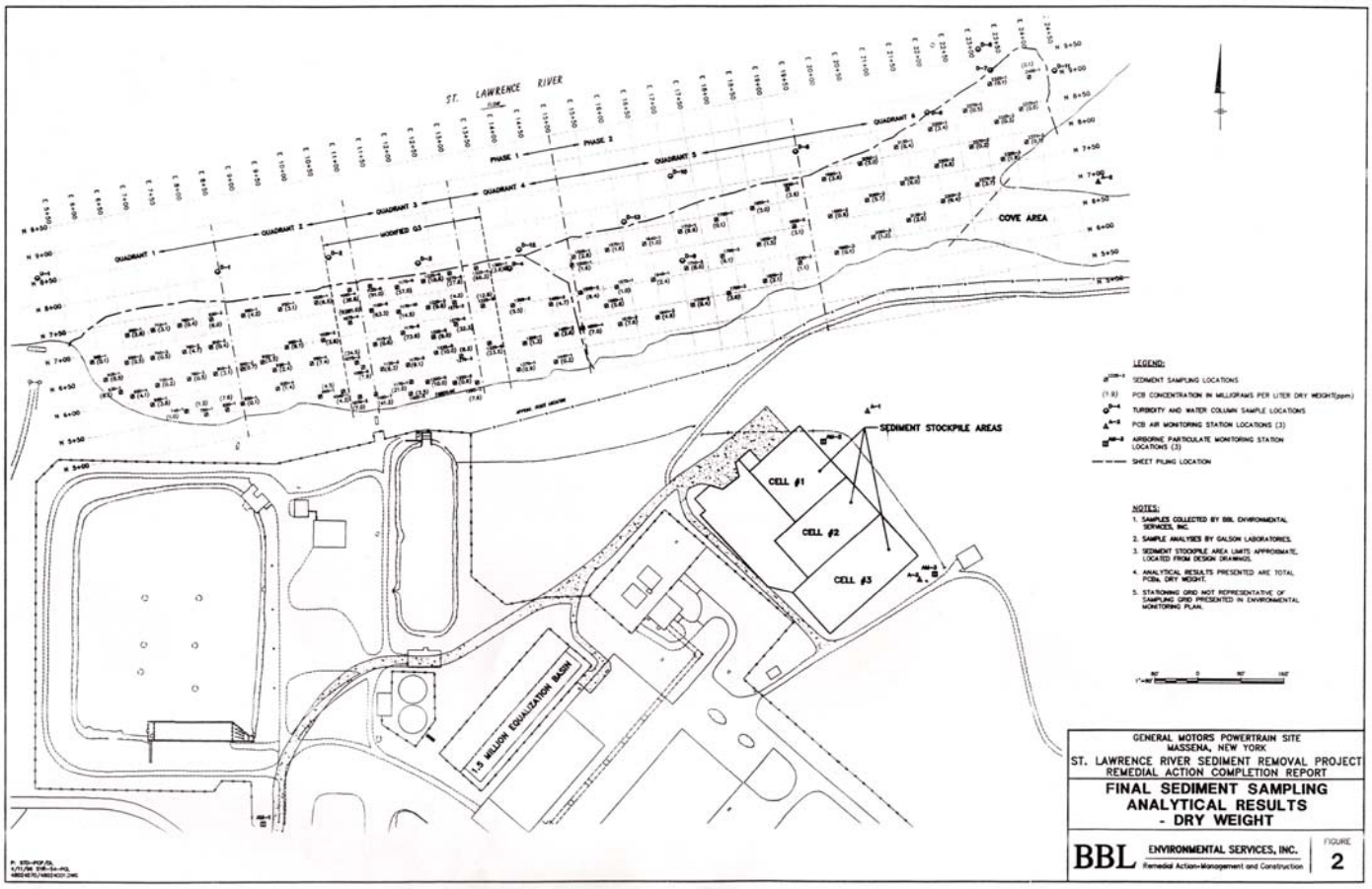


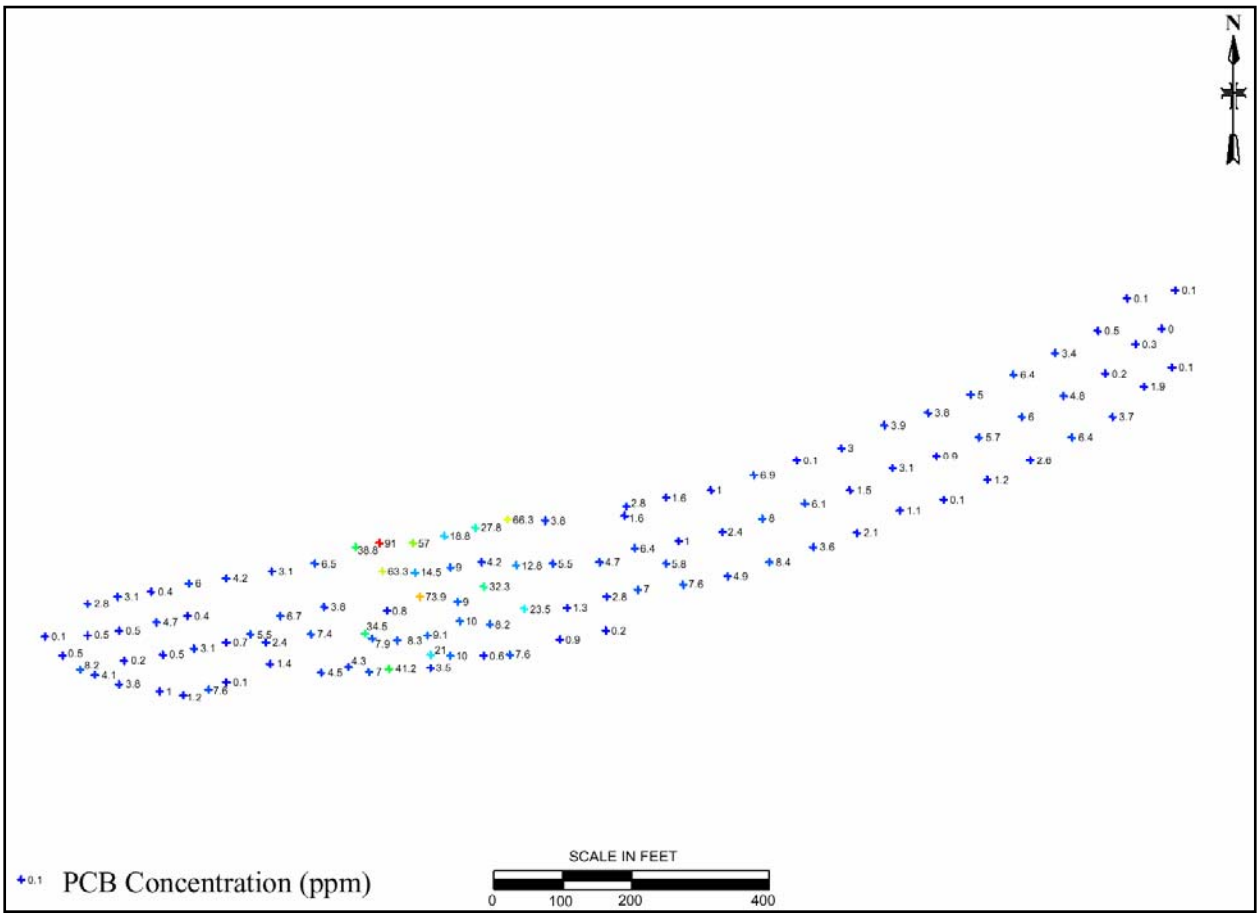
Figure 2-16
GM Massena Semi-Variogram Analysis Variable Sample Spacing



St. Lawrence River Sediment Removal Project Remedial Action Completion Report, General Motors Powertrain, Massena, New York. Prepared for General Motors Powertrain. June 1996.

From BBL Environmental Services, Inc.1996.

Figure 2-16
GM Massena Semi-Variogram Analysis Variable Sample Spacing



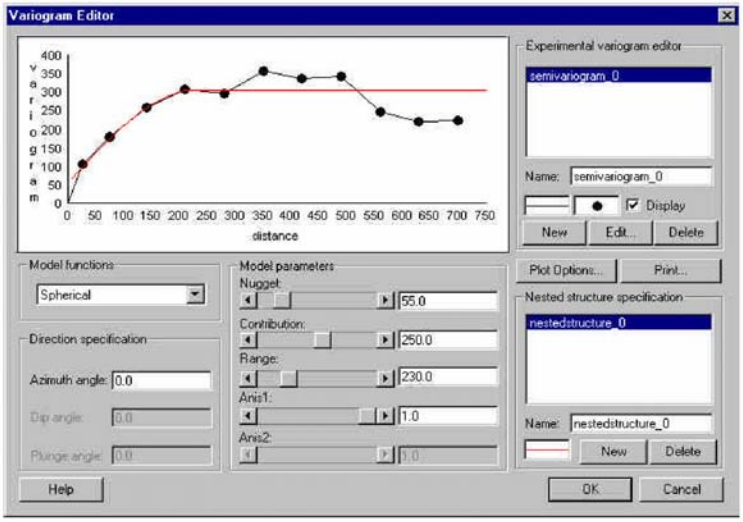


Figure 3-1

Residual Evaluation Flow Chart

START HERE [a]

Review sediment sample Tri+ PCB concentration results and calculate mean Tri+ PCB concentration for certification unit

Dredge to design depth and collect and analyze sediment samples per Residuals Standard

Notes
a) Shaded figures represent primary certification path.
b) Areas can be redredged if no delay to the project schedule will be incurred.
c) Subaqueous caps will not be placed in areas of shallow bedrock located in the navigation channel or in areas with shallow water.
d) Placement of additional backfill is contingent on sufficient water depth.

All samples within a certification unit ≤1 mg/kg Tri+ PCBs?

Yes

No

Is 0-6" certification unit median < 99% UCL ?

Yes

No

Is 0-6" certification unit mean < 99% UCL?

Yes

No

Individual sample concentration < 99% PL and no more than one sample ≥ 97.5% PL?

Yes

No

Is 0-6" certification unit mean < 95% UCL?

Yes

No

Is 0-6" certification unit mean ≤ 1 mg/kg?

Yes

No

Backfill where appropriate

Certification unit completed

END

Select the entire certification unit as affected area

Select the nodes of concern including nodes with concentrations ≥ 97.5% PL, such that the anticipated average after redredging is ≤1 mg/kg.

Calculate mean Tri+ PCB concentration for 20-acre area

Is 20-acre mean ≤ 1 ppm?

Yes

No

Backfill and sample

Backfill 0-6 inch mean concentration ≤ 0.25 mg/kg Tri+ PCB?

Yes

No

Dredge and replace non-compliant backfill nodes and/or place additional backfill [d]

Option 1

Select the nodes of concern including nodes with concentrations ≥ 97.5% PL, such that the anticipated average after redredging is ≤1 mg/kg.

Have 2 redredging attempts been conducted?

Yes

No

Option 2

Select the area for capping, such that the mean of the uncapped area alone is ≤ 1 mg/kg Tri+ PCB, and no sample ≥ 97.5% PL.

Is inventory removal necessary?

Yes or Unknown

No

Has one inventory removal attempt been conducted?

Yes

No

Characterize the depth of contamination in the affected area and set a new cut line to remove all PCB-contaminated sediments

Have 2 redredging attempts been conducted?

Yes

No

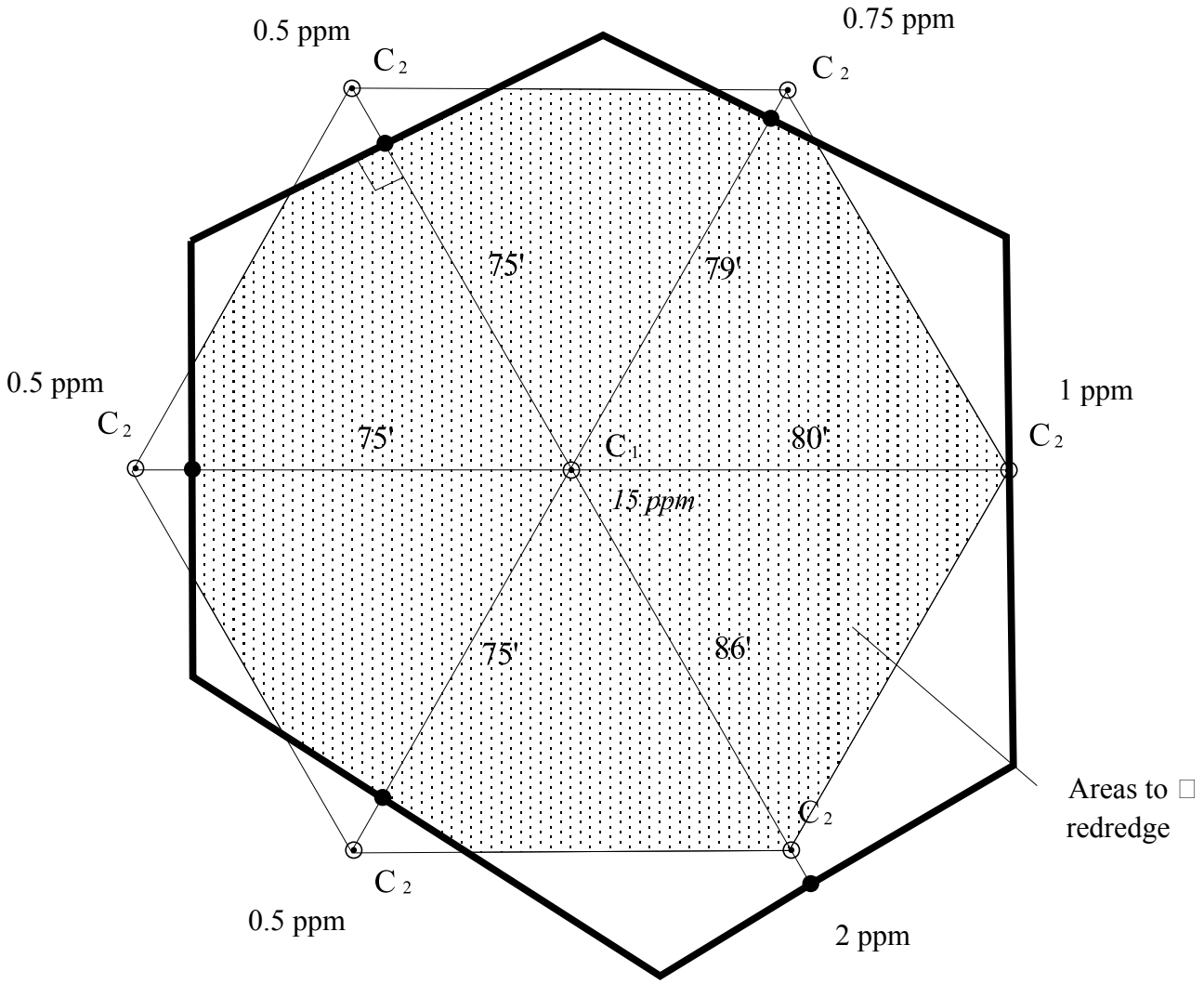
Redredge and resample the 0 to 6 inch interval

Cap -Construct subaqueous cap over noncompliant area. When possible, dredge additional depth to accommodate cap thickness. Backfill the remaining area. [c]

[Additional dredging attempts may be made at the contractor's discretion. [b]]

Optional

Figure 4-1
Example of Determining the Extent of Re-Dredging



Notes:

- The distance (d) between the notes is 80'.
- Each side of the boundary is perpendicular to the axis between the nodes.
- The non-compliant area will not extend beyond the hexagon formed by connecting the 6 surrounding nodes.
- The drawing is conceptual and not to scale.