APPENDIX G

ILWD REMOVAL APPROACH SUPPORTING INFORMATION

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Sediment removal within the ILWD is not required to design a cap that will provide chemical isolation. The Record of Decision (ROD) requires removal of an average 6.6 ft (2 meters) in sediment management unit (SMU) 1, which constitutes the majority of the in-lake waste deposit (ILWD) area, plus up to an additional 3.3 ft (1 meter) in areas defined as hot spots. This same removal approach is required in the portions of the ILWD that extend into SMUs 2 and 7.

A rigorous evaluation of the extensive ILWD sediment and porewater database was completed to develop the removal approach that achieves the two-meter average removal, optimizes contaminant mass removal and reduces sediment and porewater contaminant concentrations underlying the cap. The ILWD was divided into four sub-areas based on chemical concentrations and distributions. Optimal removal strategies were then developed for each of these sub-areas, as shown in plan view in Figure G-1. The primary removal strategy and basis for the removal in each sub-area is summarized below.

- SMU 1/SMU 7 ILWD Eastern Area: Removal of the top 9.9 ft (three meters) in this area will remove the highest sediment and porewater concentrations of chlorobenzene and dichlorobenzene measured anywhere in the ILWD. This will also lower the concentration for numerous other contaminants in sediment and/or porewater in this area.
- SMU 1 ILWD Center Area: Sufficient dredging will be completed to ensure that the post-capping bathymetry is consistent with current bathymetry in areas where the current water depth is 7 ft. or less. The amended cap thickness in this area is anticipated to be 4.6 ft assuming average over-placement, with a maximum thickness of 5.7 ft assuming maximum over-placement of each layer. Therefore, the removal depth in this area is anticipated to be approximately 5.5 ft out to a water depth of 7 ft.
- SMU 1 ILWD Western Area: Contaminant concentrations were generally lower in this area and patterns of concentration versus depth were less defined. However, removal of the top 9.9 ft (3 meters) in a portion of this area will reduce the concentrations of several contaminants in sediment and/or porewater, including toluene and total semi-volatile organic compounds (SVOCs).
- SMU 2 ILWD Area: Contaminant concentrations are significantly lower in this area than elsewhere within the ILWD. Therefore, habitat considerations were the primary consideration in developing the removal approach in this area. In general, the dredge removal was selected to increase water depth near shore to enhance future shoreline fishing opportunities.

As shown in Figure G-1, there will be a transition zone between the full removal depth and shoreline and approaching the littoral area boundary based on habitat and other considerations. There will also be transition zones between the dredge areas and the edge of the profundal zone, and between the dredge cuts themselves. The details of these transition zones are provided in Appendix F. Additional details regarding the development of the sub-areas and removal strategies are provided below.

Location-specific information within the ILWD from the Remedial Investigation (RI) and all design-related investigations through 2008 was queried from Honeywell's Locus Focus data management system in order to identify spatial contaminant distribution trends and develop the sub-areas and removal depths summarized above. This included identifying and plotting the locations of the highest sediment and porewater concentrations for each contaminant or contaminant group. Sediment data from vibracores collected for porewater analysis were also included in this evaluation. The 90^{th} and 95^{th} percentile concentrations were identified, as shown in the percentile distribution curves in Figure G-2. Percentiles were used to describe characteristics of data distributions. For example, the 90^{th} percentile concentration represents the concentration that is higher than 90 percent of all the concentrations in the data base. The percentile distribution curves as shown in Figure G-2 were developed based on SMU 1 data only. Exceedances of the 90^{th} and 95^{th} percentile concentrations are shown in plan view in Figures G-3 through G-11.The 90^{th} and 95^{th} percentiles are also shown for reference in the scatter plots of contaminant concentration versus depth shown in Figures G-12 through G-23. The plan view figures and scatter plots as shown in Figures G-3 through G-23 were developed based on all data from SMUs 1, 2 and 7 within the ILWD.

The removal approach optimizes removal of the highest sediment and porewater concentrations, and results in decreased sediment and porewater concentrations immediately beneath the cap. Specific benefits of the proposed ILWD removal approach based on consideration of the data presented in Figures G-3 through G-23 are detailed below.

SMU 1/SMU 7 ILWD Eastern Area: Dredging the top 3 meters in portions of the eastern area removes the highest concentrations measured anywhere in ILWD for:

- chlorobenzene in sediment and porewater;
- dichlorobenzene in sediment and porewater; and
- PCBs in sediment (not analyzed for in porewater).

It also reduces the concentration in the eastern area for:

- toluene in porewater;
- xylene in porewater;
- napthalene in porewater;
- benzene in porewater and sediment; and

- phenol in sediment.

SMU 1 ILWD Center Area: Dredging in the center area will not reduce the sediment or porewater concentrations beneath the cap. Therefore, the removal approach in this area is to remove sufficient sediment such that post-capping bathymetry is consistent with current bathymetry in water depths from 0 to 7 ft.

SMU 1 ILWD Western Area: Contaminant concentrations in the western area were generally lower than concentrations in the eastern and center areas. Nevertheless, dredging the top 3 meters in portions of the western area reduces the concentration in the western area for:

- dichlorobenzene in porewater;
- benzene in porewater;
- toluene in porewater and sediment;
- mercury in sediment;
- PAHs in sediment (not analyzed for in porewater); and
- PCBs in sediment (not analyzed for in porewater).

SMU 2 ILWD Area: Contaminant levels within the SMU 2 ILWD were lower than the other ILWD areas. Therefore, habitat considerations were the primary consideration in developing the removal approach in this area. To meet the two meter average removal requirement for the SMU 2 ILWD removal strategy involves increasing water depth near shore along a portion of the shoreline barrier wall to enhance future shoreline fishing opportunities.

Hot Spot Removal: Following development of the removal approach described above, sediment data for the next 3.3 ft (1 meter) down was evaluated to identify exceedances of the hot spot criteria listed in the ROD and the subsequent hot spot removal approach. Details regarding hot spot identification and determination of hot spot removal areas are provided below.

To identify exceedances of hot spot criteria, contaminant concentrations within the 1-meter interval immediately below the post-dredge surface were defined at each core location. Core locations are shown in Figure G-24. Identification of hot spots involved first defining the baseline post-dredging depth at each core location. The concentration within the 1-meter interval immediately underlying the baseline removal depth was then conservatively defined based on the maximum concentration of the core sections within that interval, and this concentration was compared to the hot spot criteria. Samples having at least 50% of their sampling interval within the underlying 1-meter interval were included in the analysis. Chlorobenzene, dichlorobenzene and xylene were the only contaminants that exceeded their hot spot criteria in the depth interval of interest. Core locations that exceeded the hot spot criteria are included in Table G-1 and shown in Figure G-25.

Following this identification of hot spot locations, an interpolation procedure was used for the areal delineation of hot spots. In order to produce acceptable interpolation results, the data set was further processed to remove the effect of non-hot spot locations that are co-located with or are near hot spot exceedances. To remove this proximity effect for each contaminant, all non-hot spot locations that fell within close proximity of a hot spot location were excluded from the interpolation, which resulted in conservatively high interpolated concentrations at such locations.

The remaining sediment surface concentration data for each CPOI were then interpolated over a 10-ft grid within the ILWD using the Inverse Distance Weighted (IDW) method. With the IDW method, the interpolated concentration at a given point was calculated as a weighted average of the nearby measured concentrations, with the weighting factors defined by the distance between the calculation point and each measurement location raised to a power (a power of 2 was used in this case). The resulting interpolated concentrations for chlorobenzene, dichlorobenzene, and xylene are shown in Figures G-26 through G-28. For each of these three contaminants, the individual hot spot areas were defined by the interpolated concentration isopleths corresponding to its hot spot criteria. The final ILWD hot spot areas were then created by merging these three isopleths together, as shown in Figure G-29. Based on this approach, 10 individual hot spot areas were delineated (referred to as Hot Spots A through J), covering a total combined area of 15 acres.

DATA TREATMENT

- Parameters of interest: benzene, chlorobenzene, total dichlorobenzenes, ethylbenzene, naphthalene, mercury, PAHs, PCBs, toluene, phenol, and total xylenes.
- Removed "rejected" data (i.e., query Locus field "USE" = Y only).
- For duplicate results, both concentrations were included.
- Non-detect samples were set to half of their detection limit.
- Sample intervals were determined by the average of the sample start depth and sample end depth.
- Total dichlorobenzene was calculated as the sum of 1,2- 1,3- and 1,4-dichlorobenzene using half the detection limit for non-detects.
- Total xylene was calculated as the sum of m-, p-, and o-xylene using half the detection limit for non-detects.
- Total PAHs were calculated as the sum of individual PAH compounds using half the detection limit for non-detects.
- Total PCBs were calculated as the sum of individual aroclors using half the detection limit for non-detects.

Table G-1
ILWD Sample Locations with Hot Spot Criteria Exceedances

Sediment Sample Locations
OL-STA-10008-VC
OL-STA-10010-VC
OL-STA-10013-VC
OL-STA-10020-PW
OL-VC-10040
OL-VC-10042
OL-VC-10048
OL-VC-10050
OL-VC-10052
OL-VC-10053
OL-VC-10054
OL-VC-10055
OL-VC-10057A
OL-VC-10059
OL-VC-10065
OL-VC-10090
OL-VC-10091
OL-VC-10096
OL-VC-10096A
OL-VC-10097A
OL-VC-10098
OL-VC-10102
OL-VC-10103
OL-VC-10140
OL-VC-10155
OL-VC-10157
P22
S312
S341
S342

FIGURES

SMU2 ILWD AREA

SMU1 ILWD WESTERN AREA

SMU1 ILWD CENTER AREA

SMU1 / 7 ILWD EASTERN AREA

No Removal

Hot Spot A

No Removal

Hot Spot B

Hot Spot E

Hot Spot D

Hot Spot F

Hot Spot G

Hot Spot C

Hot Spot H

Hot Spot I

Hot Spot J

LEGEND:

- 2M REMOVAL DEPTH
- 3M REMOVAL DEPTH
- 5.5' REMOVAL DEPTH
- TRANSITION ZONE
- HOT SPOT

NOTES:

1. Areas designated as hot spots will be dredged one additional meter.

FIGURE G-1

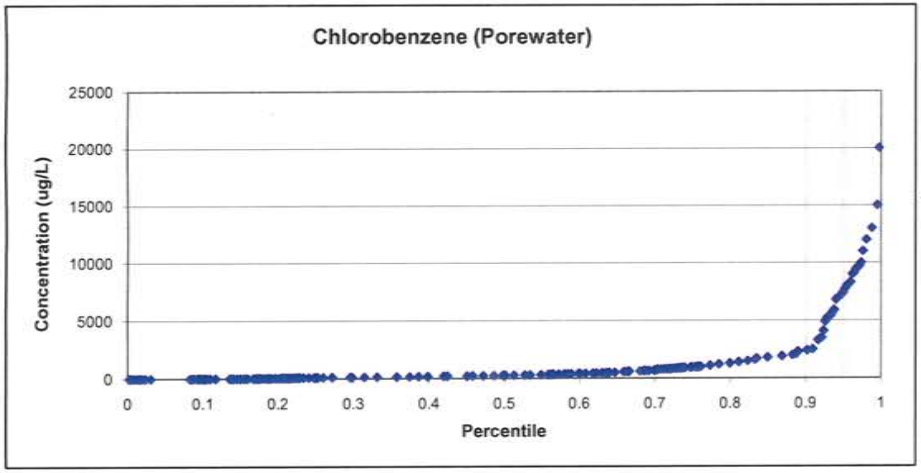
ONONDAGA LAKE
SYRACUSE, NEW YORK

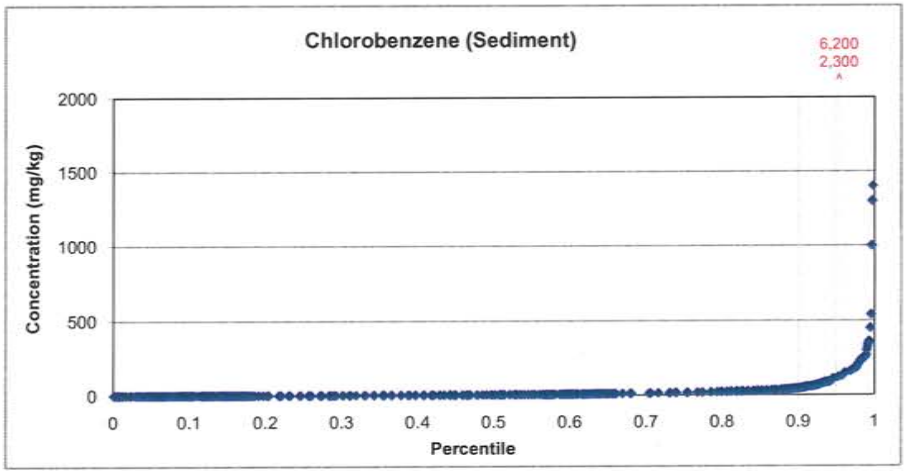
ILWD Removal Depths – 2 Meter Average Removal Plus Hot Spots

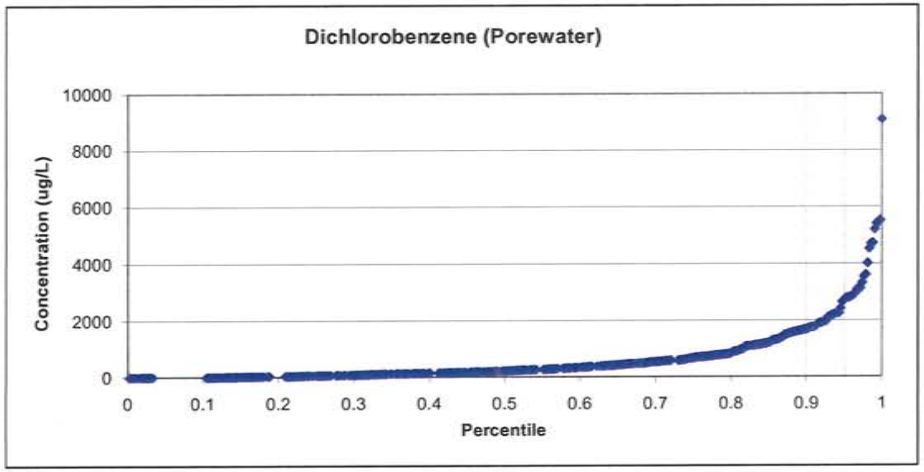
Scale 1"=300'

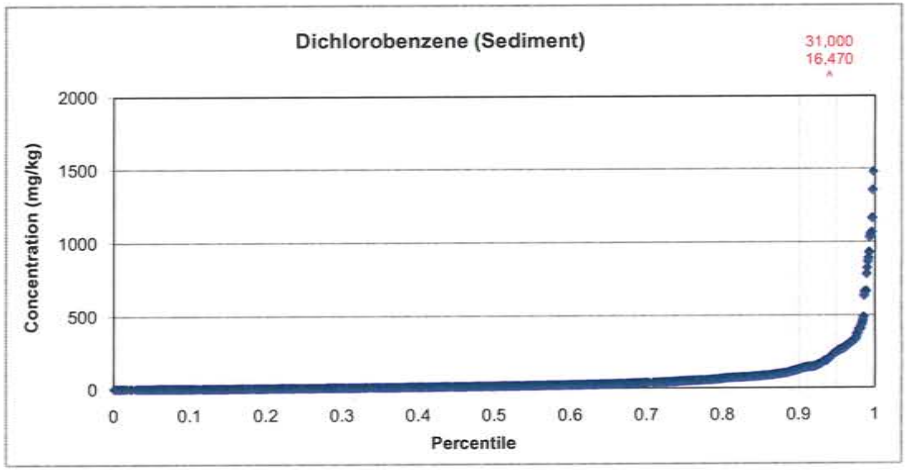
FILE NAME: P:\HONEYWELL -SYR\443582 - CAPPING\10 TECHNICAL CATEGORIES\10.1 CAD\ANCHOR\01013902-RP-02-12-4-09\FIGURE 5.1.DWG
PLOT DATE: 12/8/2009 1:45 PM PLOTTED BY: RUSSO, JILL

Figure G-2. Percentile Distributions Used to Develop Optimal ILWD Removal Depths









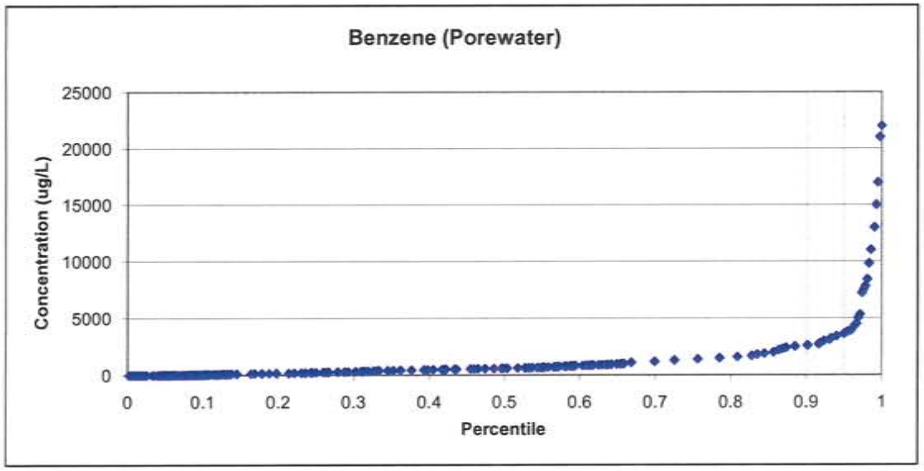
	Percentile	Porewater
Chloro-benzene	90th	2300
	95th	7000
Dichloro-benzene	90th	1633
	95th	2542

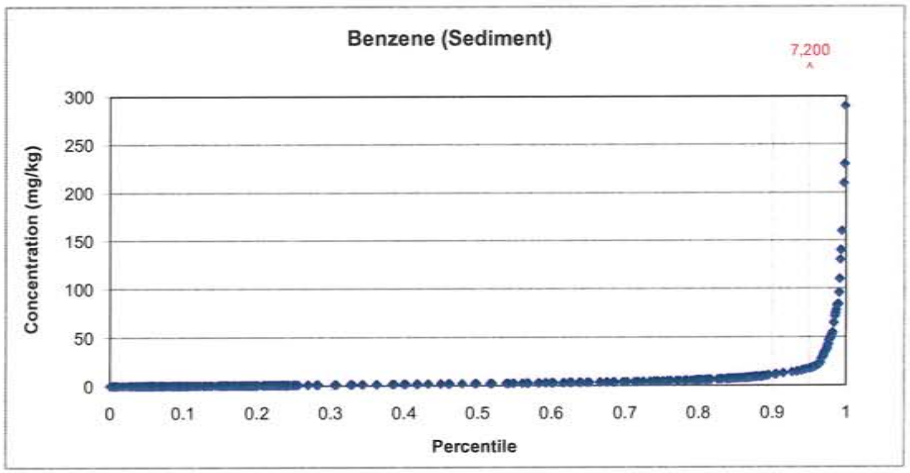
	Percentile	Sediment
Chloro-benzene	90th	44
	95th	110
Dichloro-benzene	90th	128
	95th	250

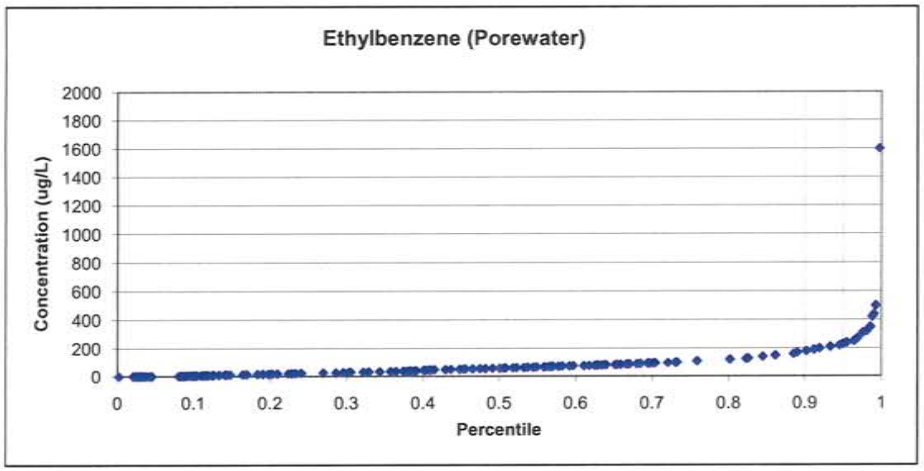
Note: Numbers in red denote concentrations beyond the range of the plots.

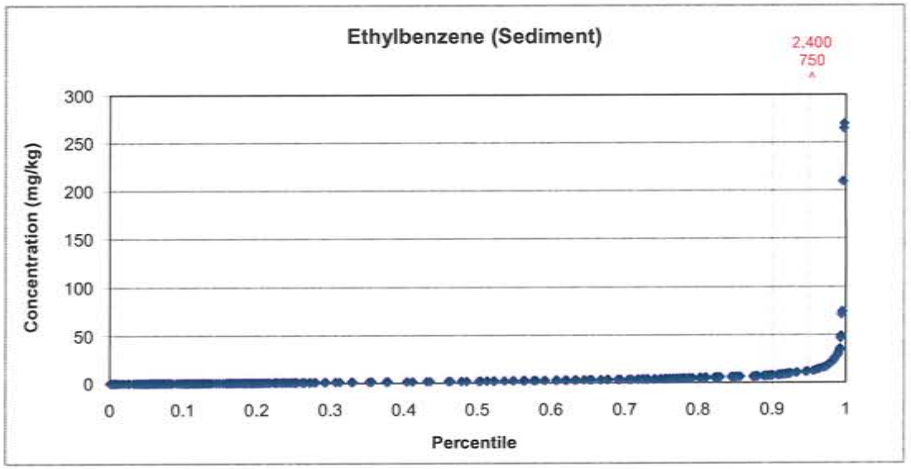
Note: Data from ILWD SMUs 1 and 7 were used.

Figure G-2. Percentile Distributions Used to Develop Optimal ILWD Removal Depths (continued)









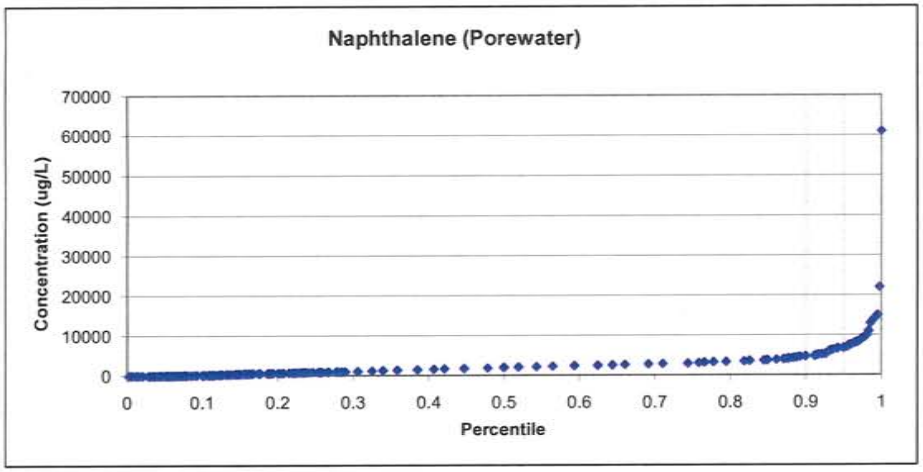
	Percentile	Porewater
Benzene	90th	2500
	95th	3400
Ethyl-benzene	90th	170
	95th	220

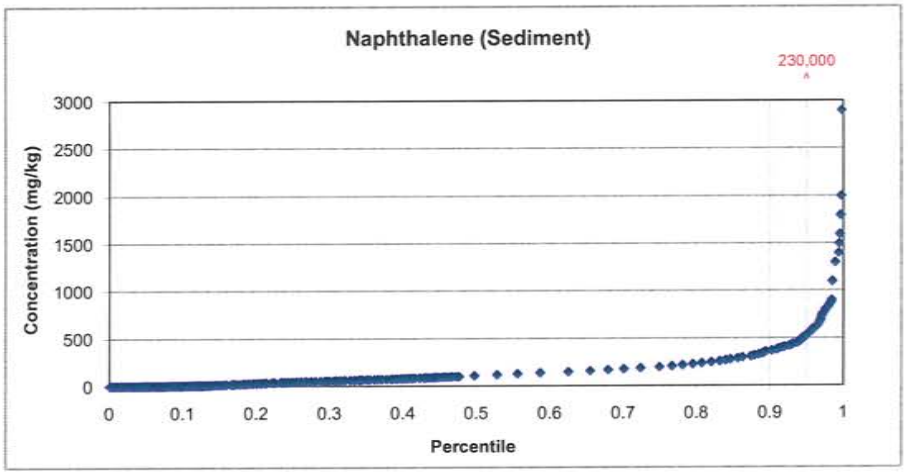
	Percentile	Sediment
Benzene	90th	11
	95th	17
Ethyl-benzene	90th	8
	95th	12

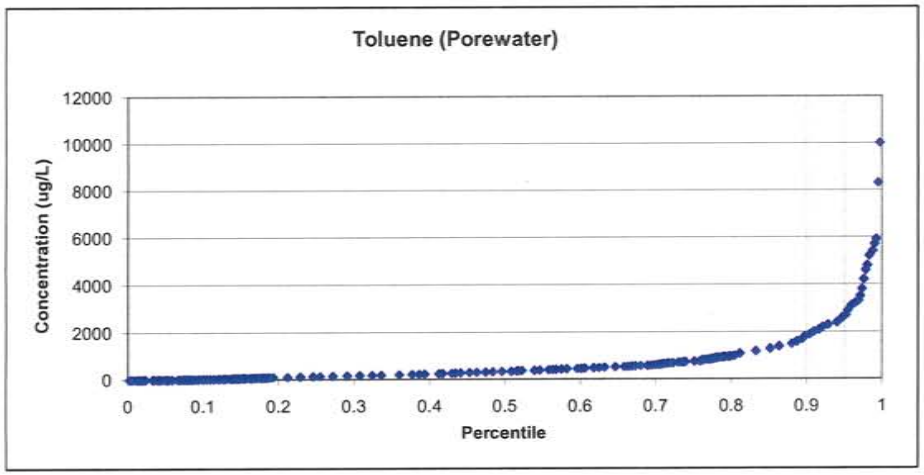
Note: Numbers in red denote concentrations beyond the range of the plots.

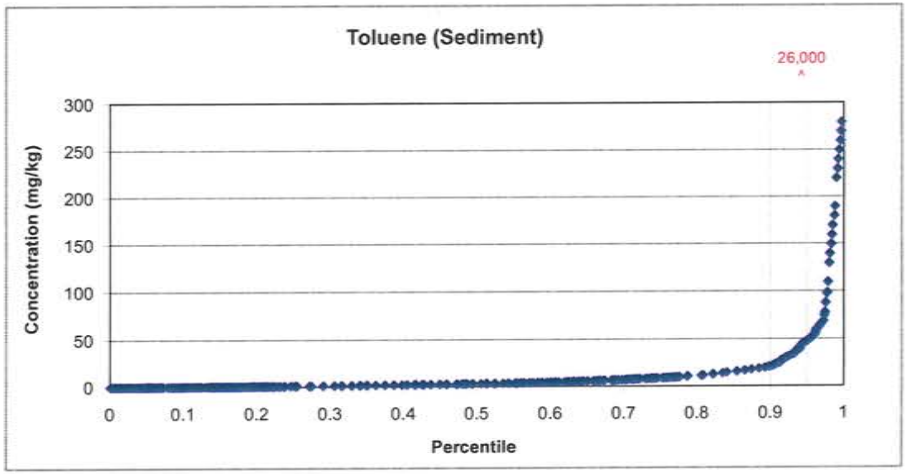
Note: Data from ILWD SMUs 1 and 7 were used.

Figure G-2. Percentile Distributions Used to Develop Optimal ILWD Removal Depths (continued)







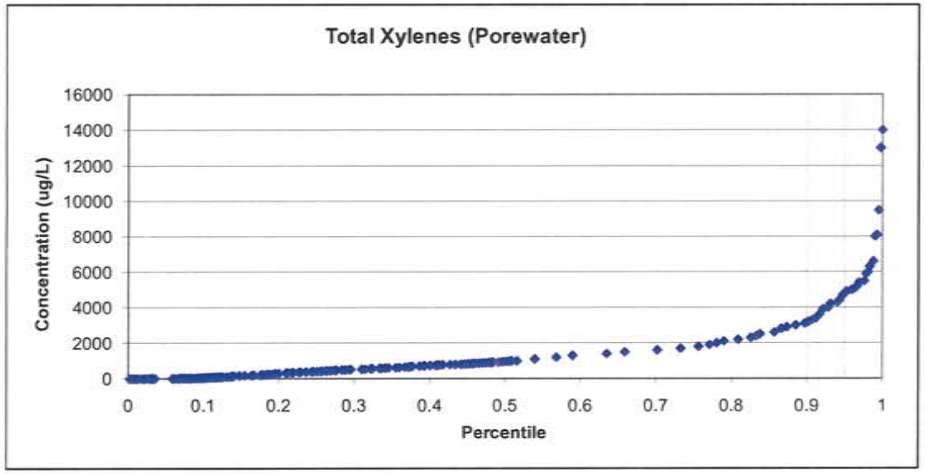


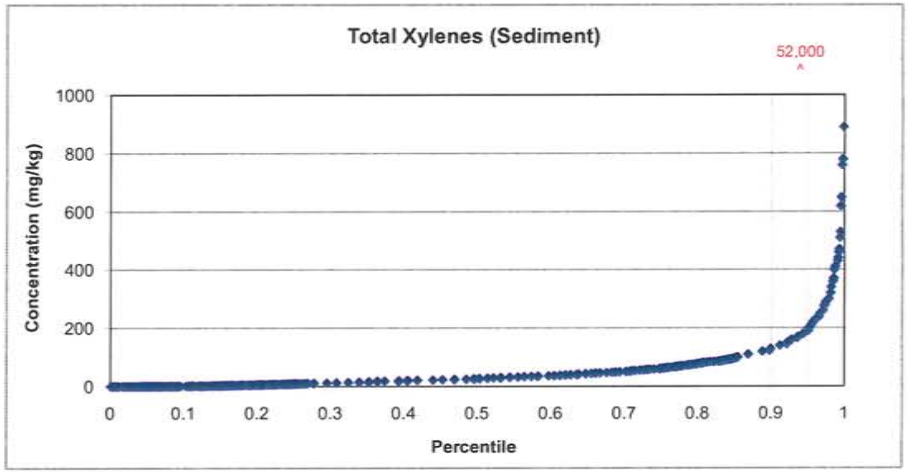
	Percentile	Porewater
Naphtha-lene	90th	4610
	95th	6700
Toluene	90th	1600
	95th	2500

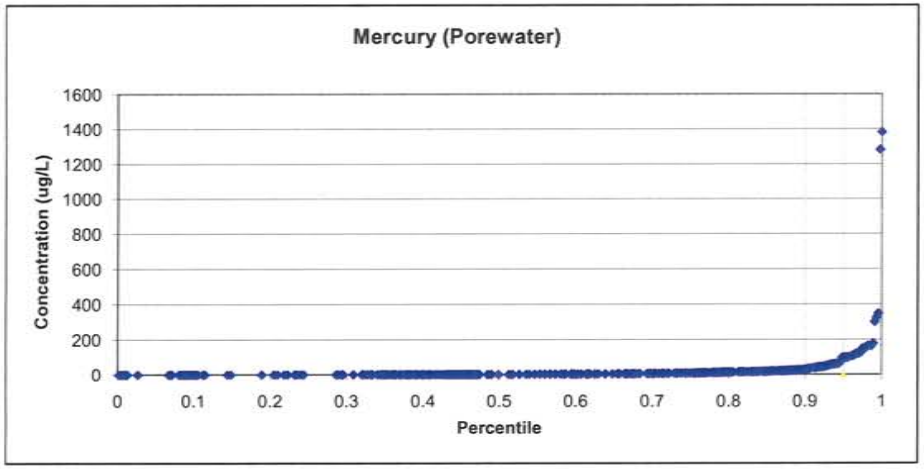
	Percentile	Sediment
Naphtha-lene	90th	360
	95th	526
Toluene	90th	21
	95th	47

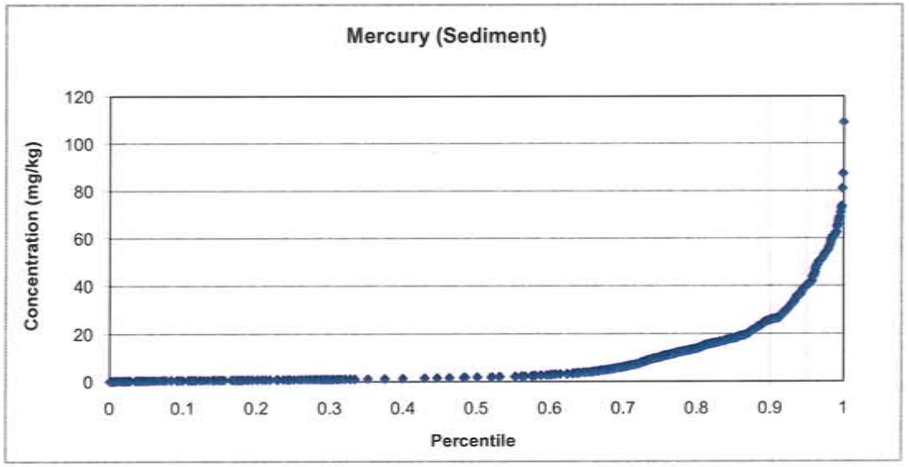
Note: Numbers in red denote concentrations beyond the range of the plots.

Figure G-2. Percentile Distributions Used to Develop Optimal ILWD Removal Depths (continued)









	Percentile	Porewater
Total Xylenes	90th	3000
	95th	4550
Mercury	90th	26
	95th	79

	Percentile	Sediment
Total Xylenes	90th	127
	95th	180
Mercury	90th	26
	95th	40

Note: Numbers in red denote concentrations beyond the range of the plots.

Note: Data from ILWD SMUs 1 and 7 were used.
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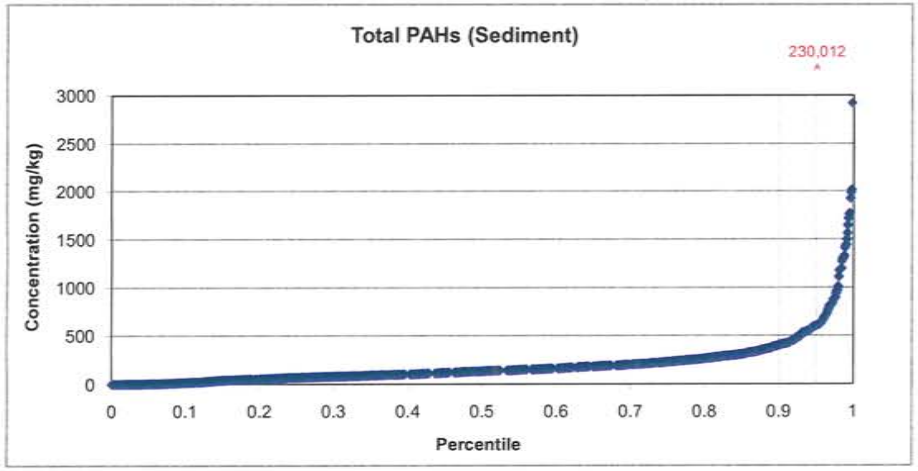
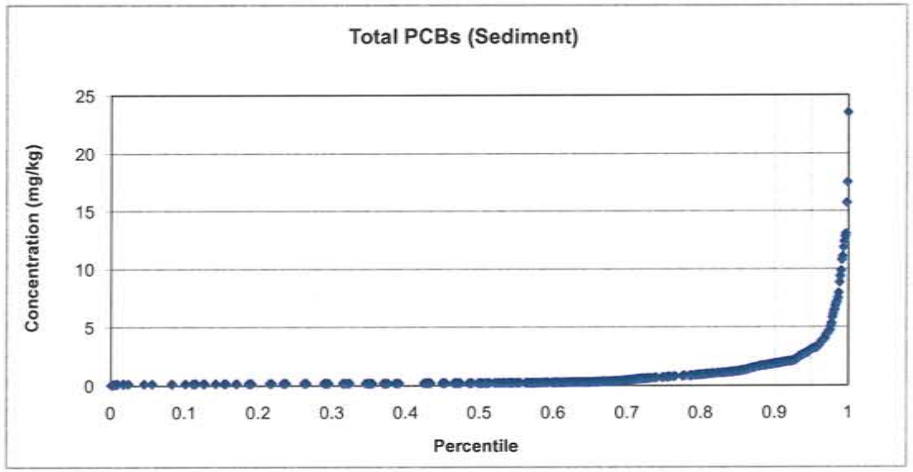
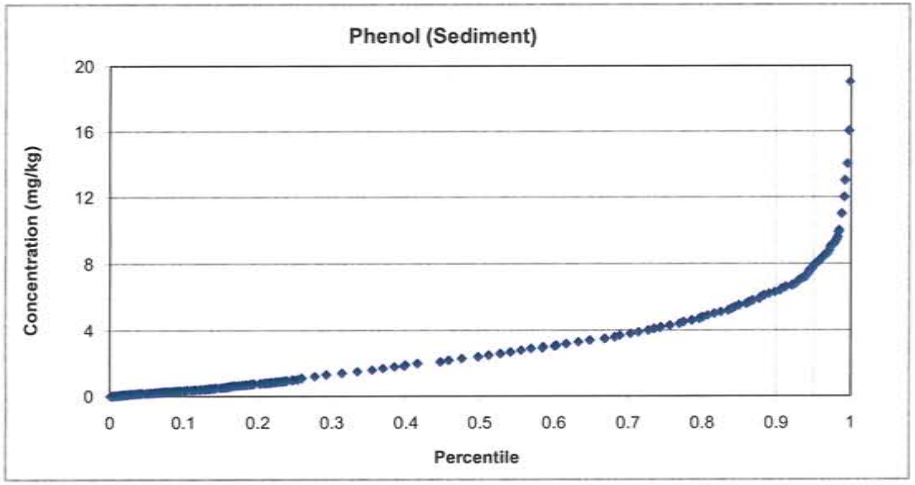
Figure G-2. Percentile Distributions Used to Develop Optimal ILWD Removal Depths (continued)



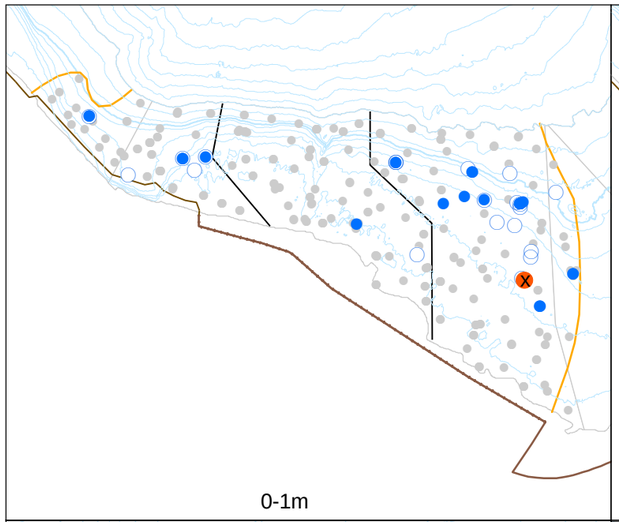


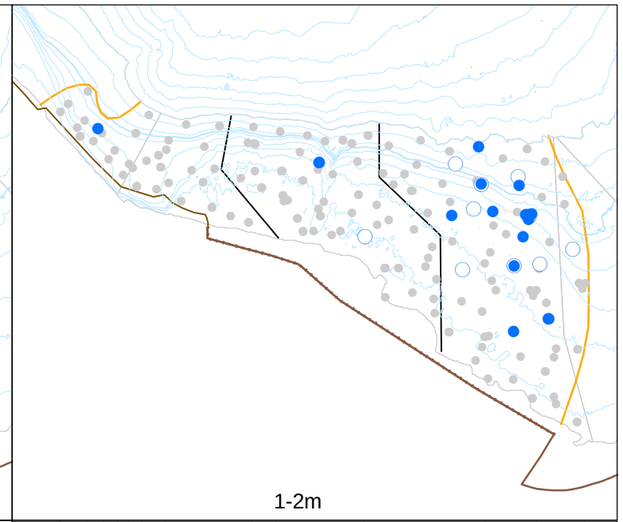


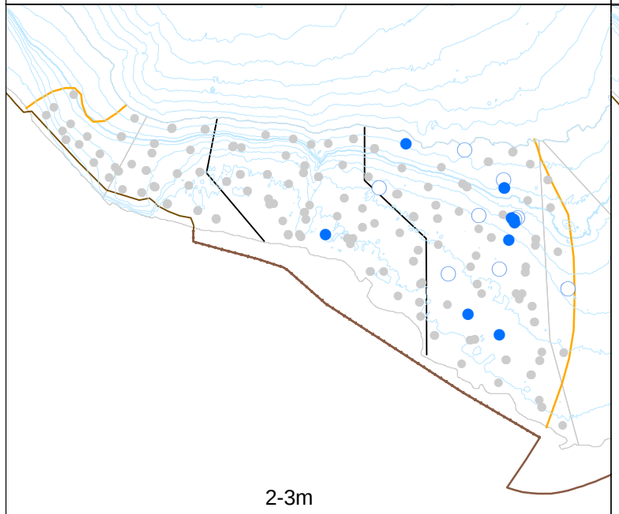
	Percentile	Sediment
Total PAHs	90th	401
	95th	600
Total PCBs	90th	2
	95th	3
Phenol	90th	6
	95th	8

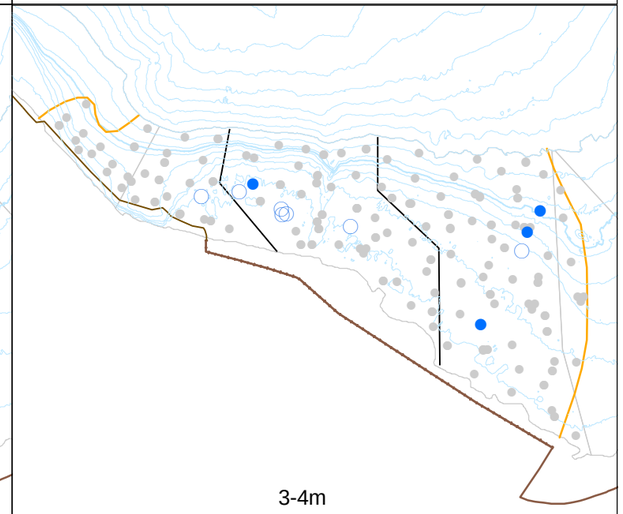
Note: Numbers in red denote concentrations beyond the range of the plots.

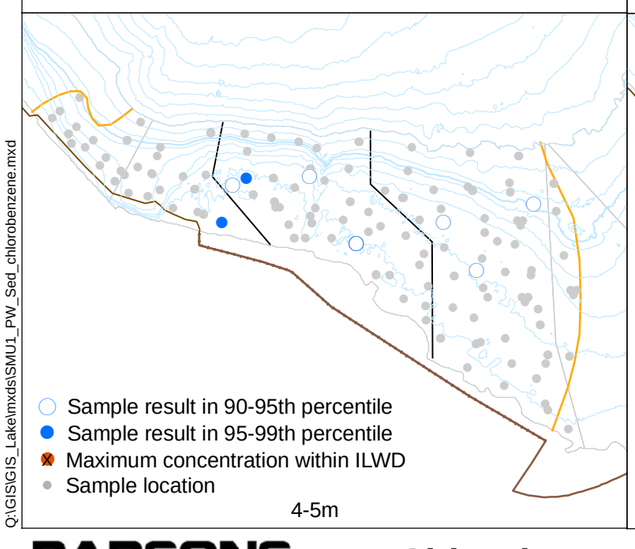
Note: Data from ILWD SMUs 1 and 7 were used.

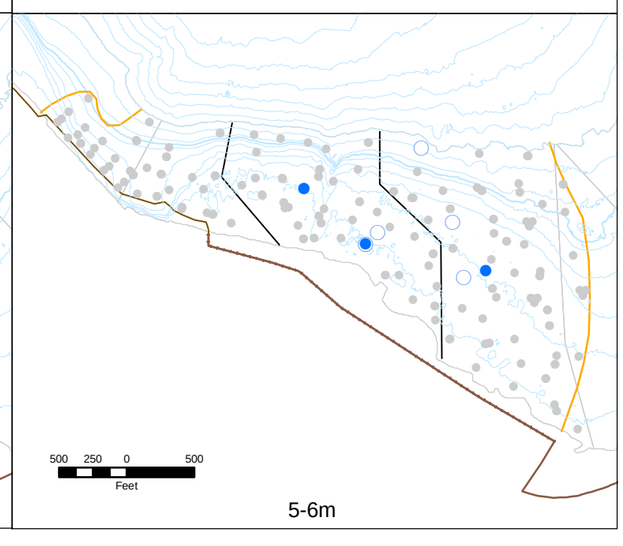


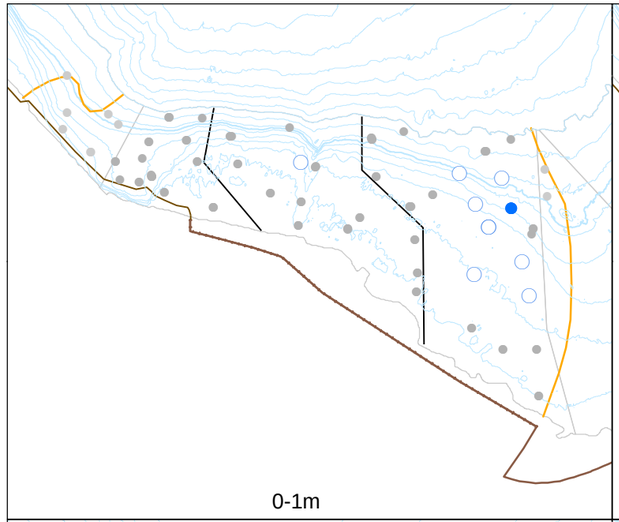


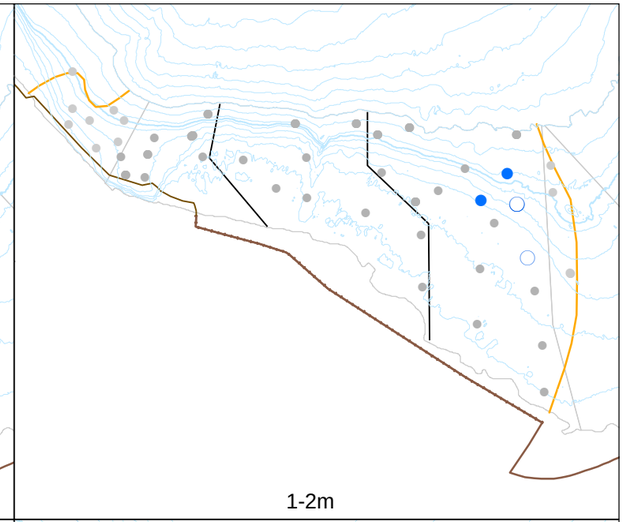


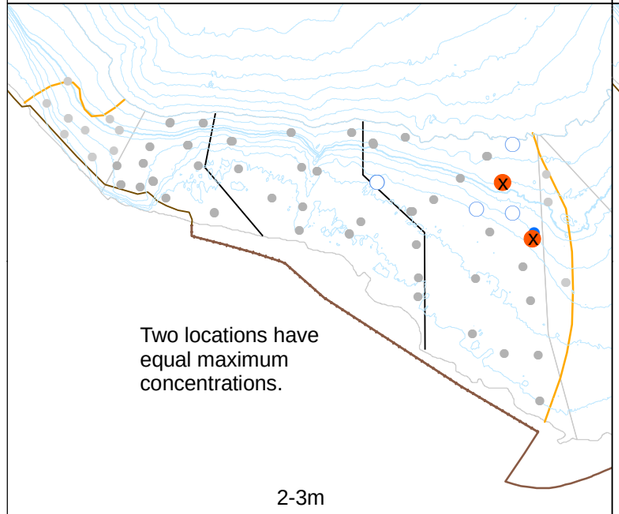


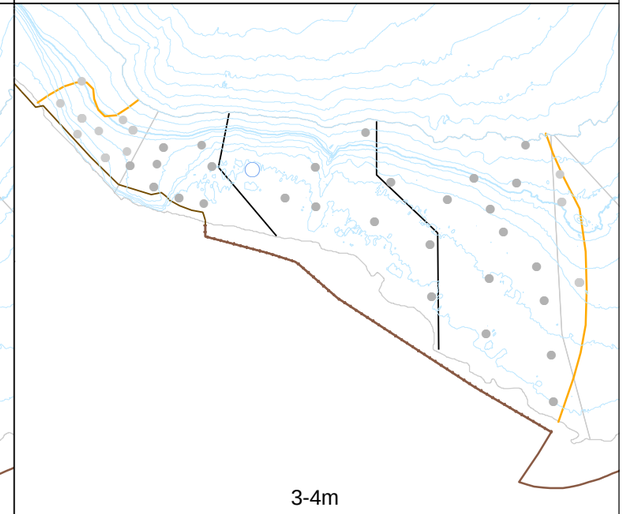


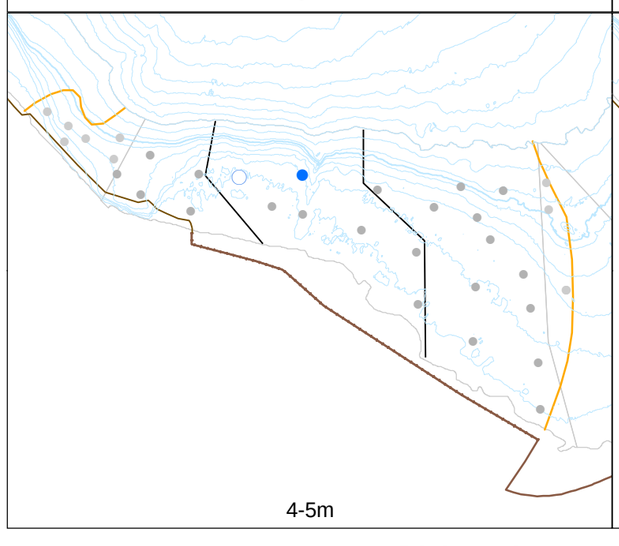


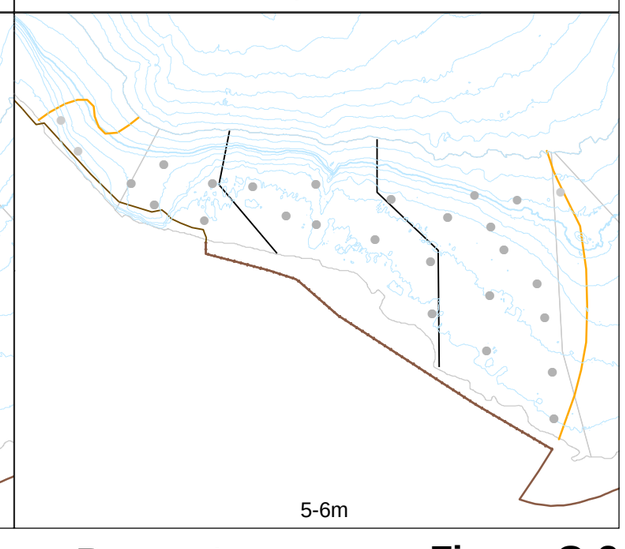












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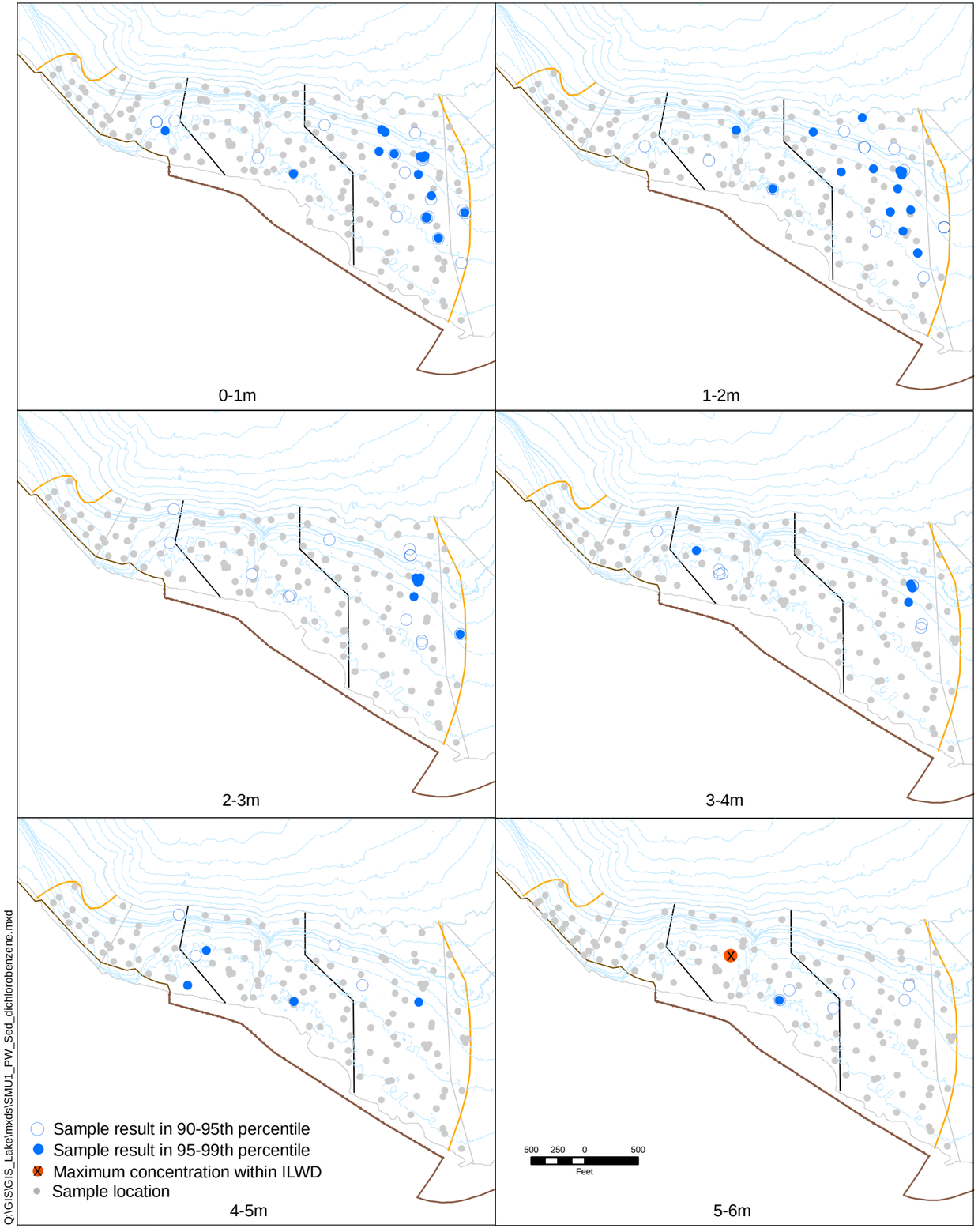
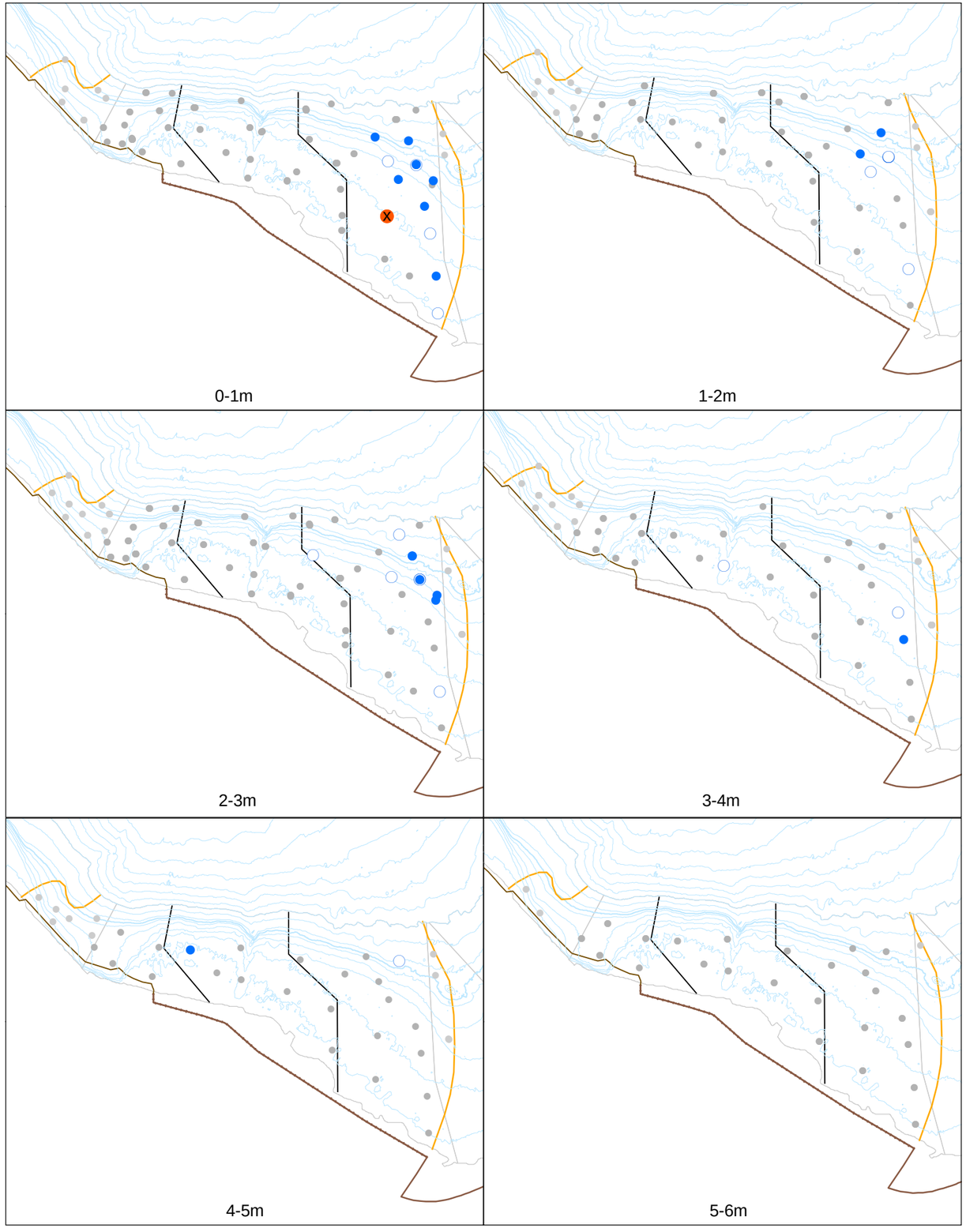
Chlorobenzene Sediment

Chlorobenzene Porewater

Figure G-3





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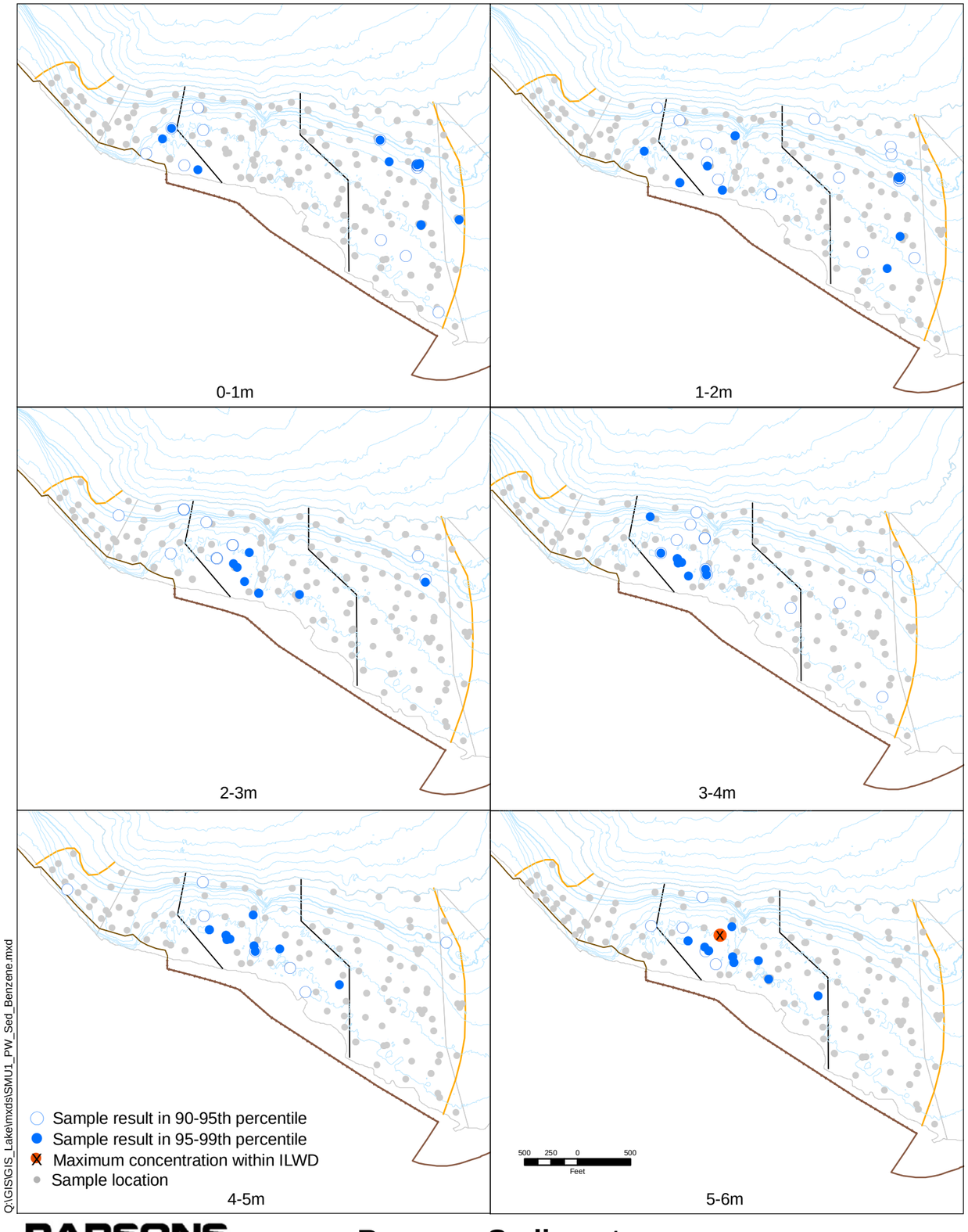
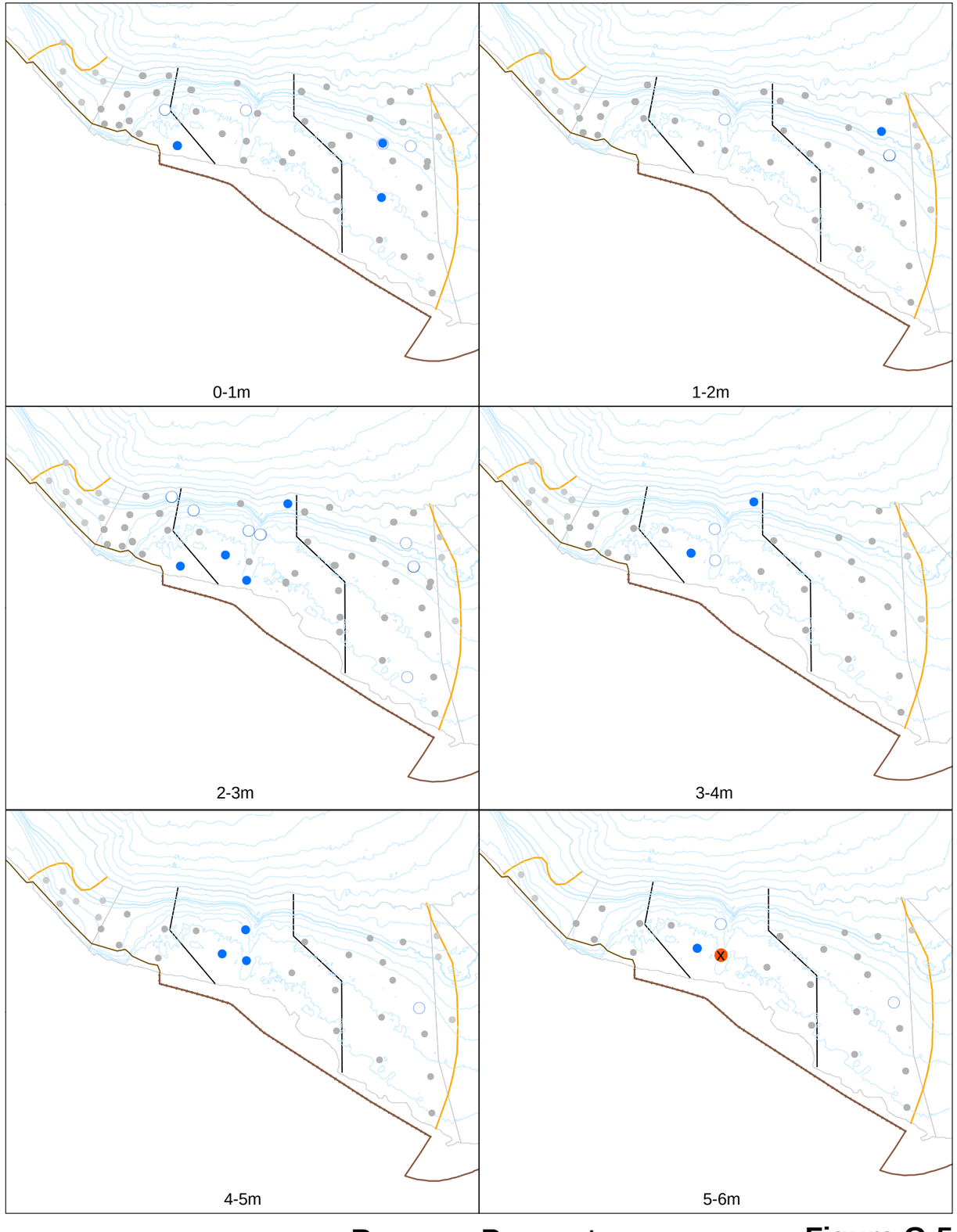
PARSONS

Dichlorobenzene Sediment

Dichlorobenzene Porewater

Figure G-4





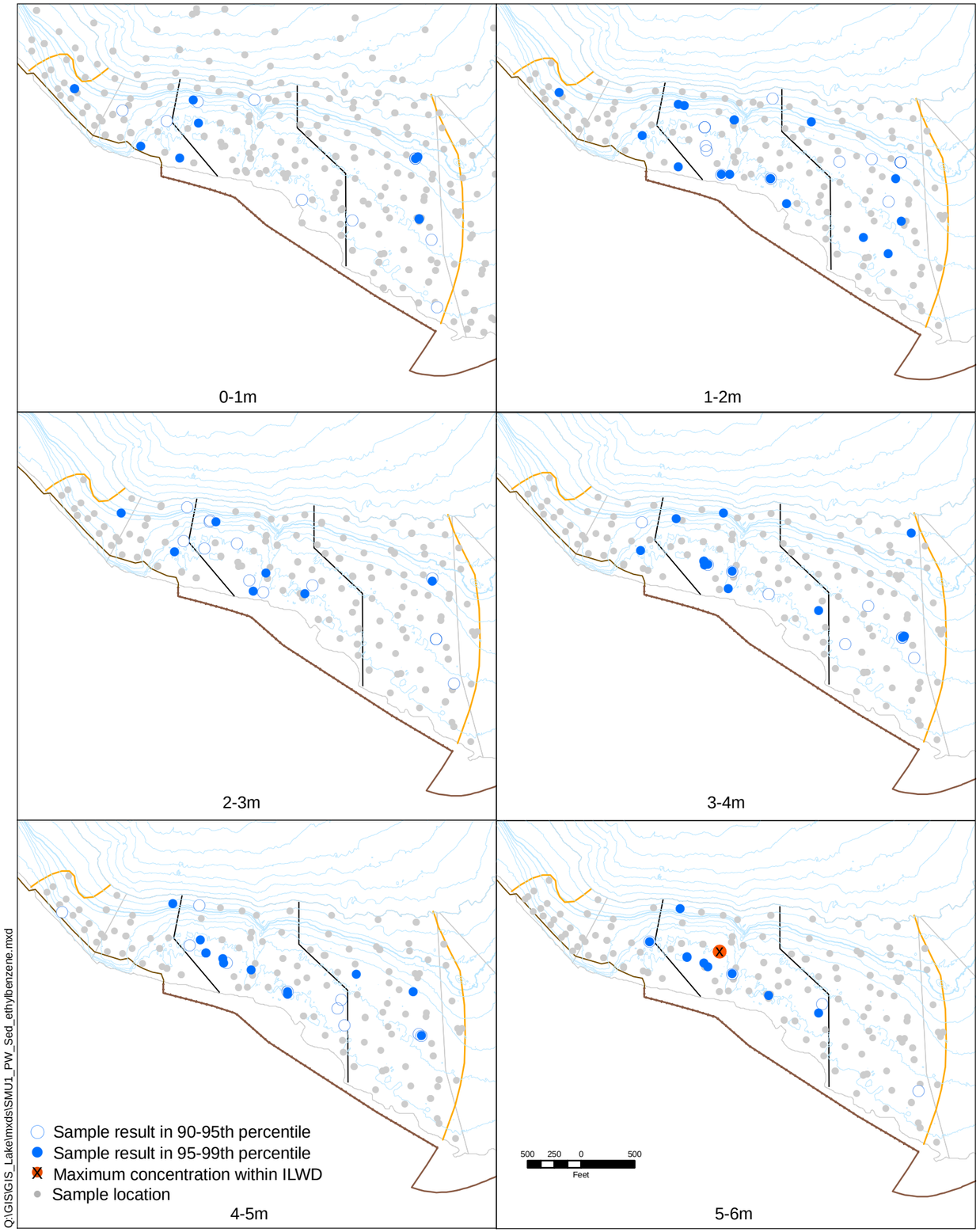
Q:\GIS\GIS_Lake\mxds\SMU1_PW_Sed_Benzene.mxd

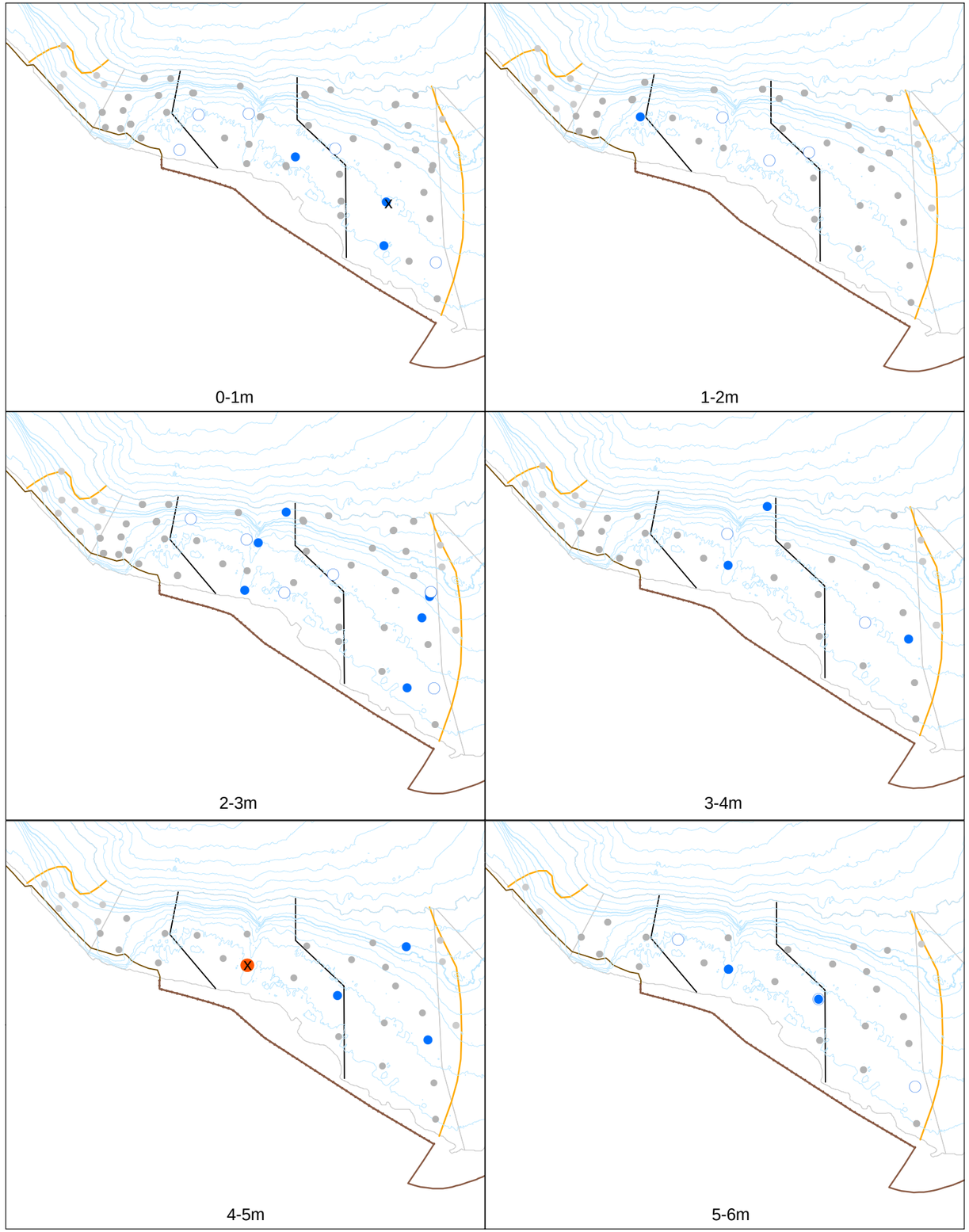
PARSONS

Benzene Sediment

Benzene Porewater

Figure G-5





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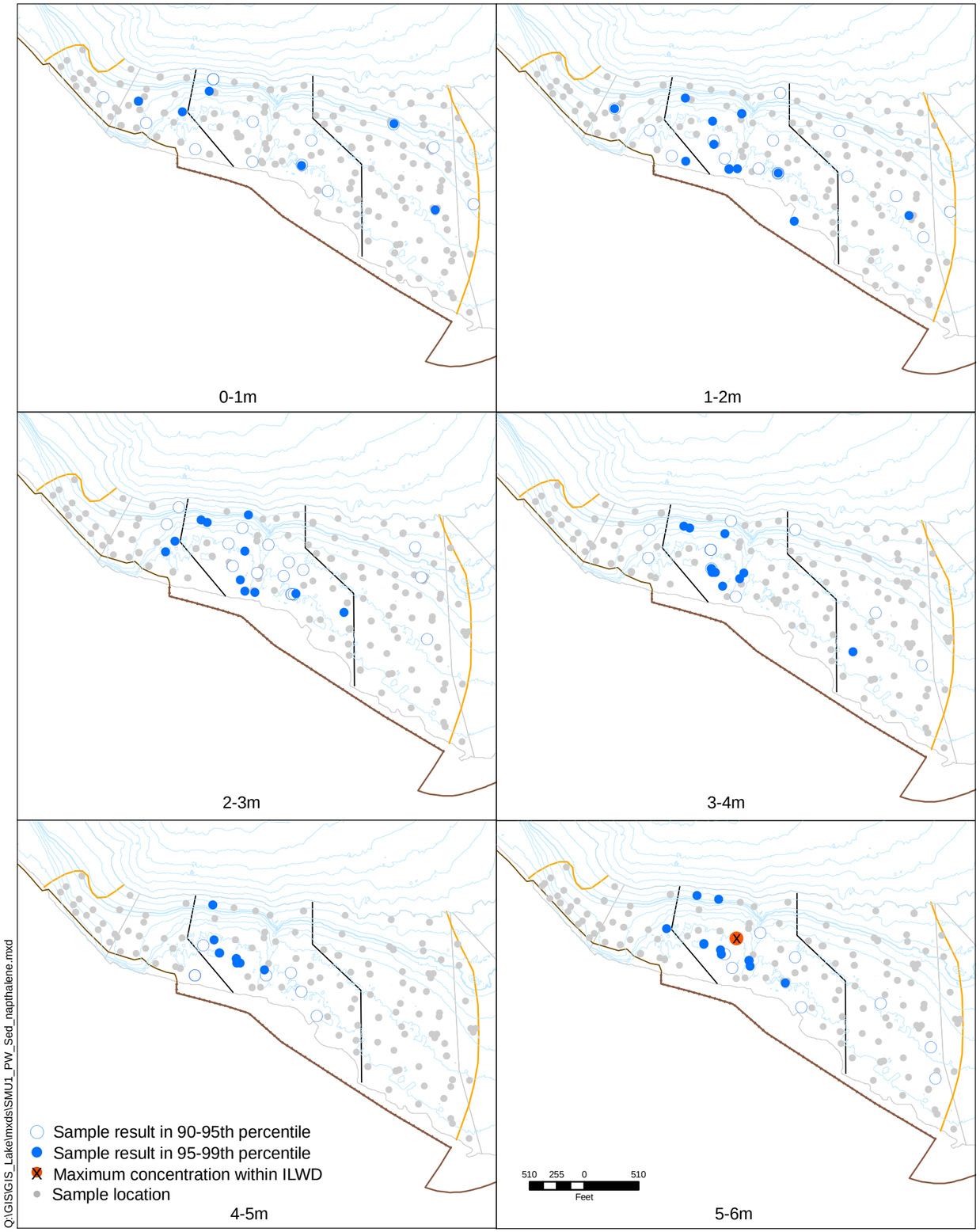
PARSONS

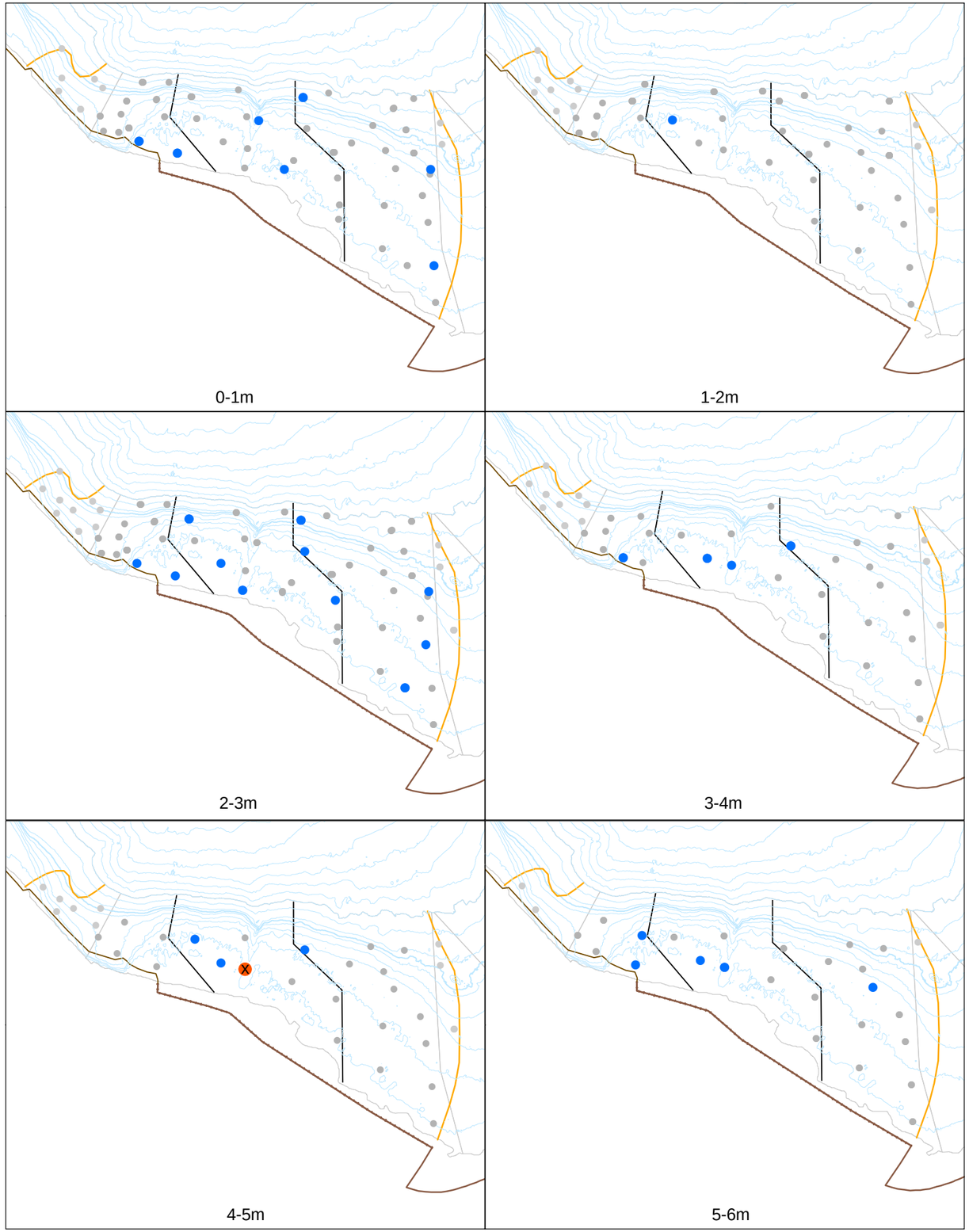
Ethylbenzene Sediment

Ethylbenzene Porewater

Figure G-6



Napthalene Sediment

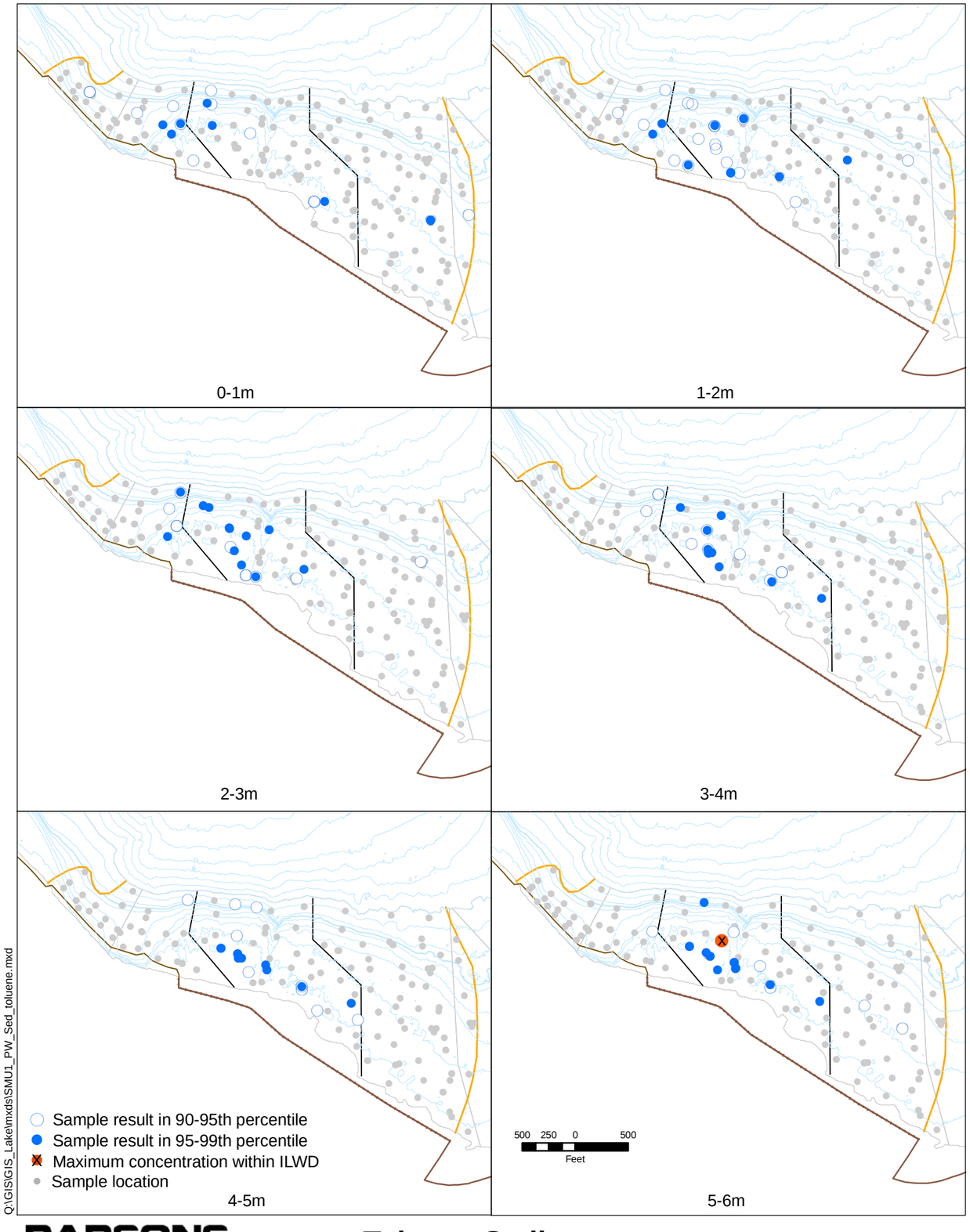


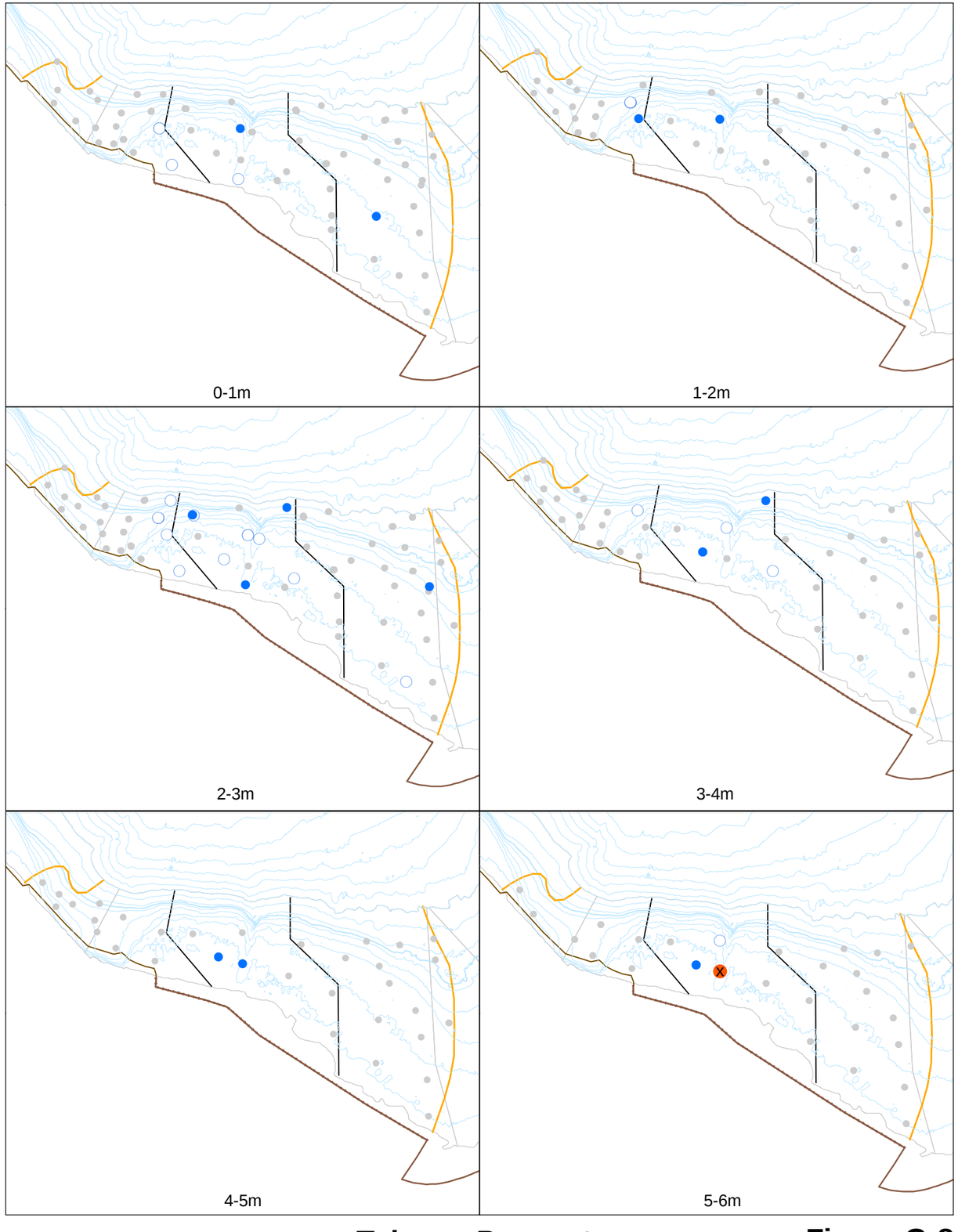
Napthalene Porewater

Figure G-7

PARSONS

Q:\GIS\GIS_Lake\mxds\SMU1_PW_Sed_napthalene.mxd





Q:\GIS\GIS_Lake\mxds\SMU1_PW_Sed_toluene.mxd

PARSONS

Toluene Sediment

Toluene Porewater

Figure G-8

0-1m

1-2m

2-3m

3-4m

4-5m

5-6m

Sample result in 90-95th percentile
Sample result in 95-99th percentile
Maximum concentration within ILWD
Sample location

500 250 0 500
Feet

Q:\GIS\GIS_Lake\mxds\SMU1_PW_Sed_XYLENE.mxd

PARSONS

Xylene Sediment

Xylene Porewater

Figure G-9

0-1m

1-2m

2-3m

3-4m

4-5m

5-6m

Sample result in 90-95th percentile
Sample result in 95-99th percentile
Maximum concentration within ILWD
Sample location

500 250 0 500
Feet

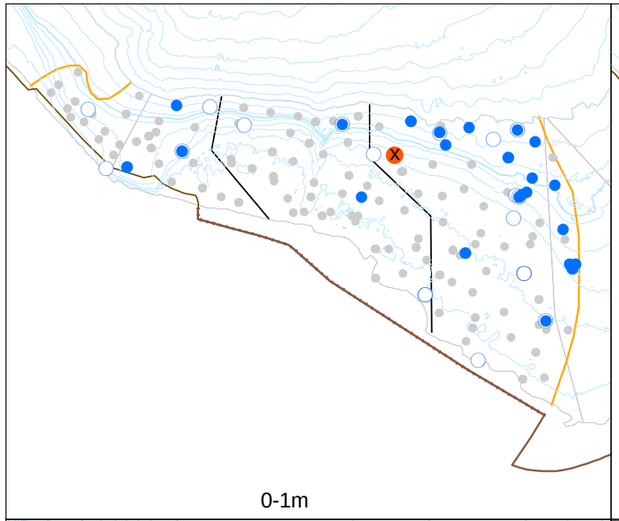
Q:\GIS\GIS_Lake\mxds\SMU1_PW_Sed_MERCURY.mxd

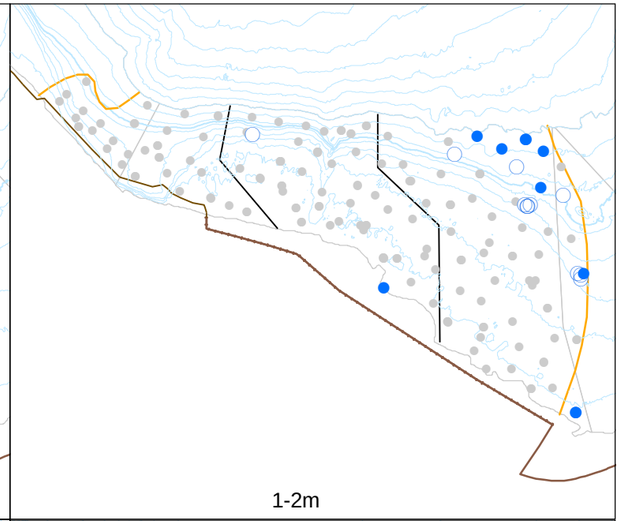
PARSONS

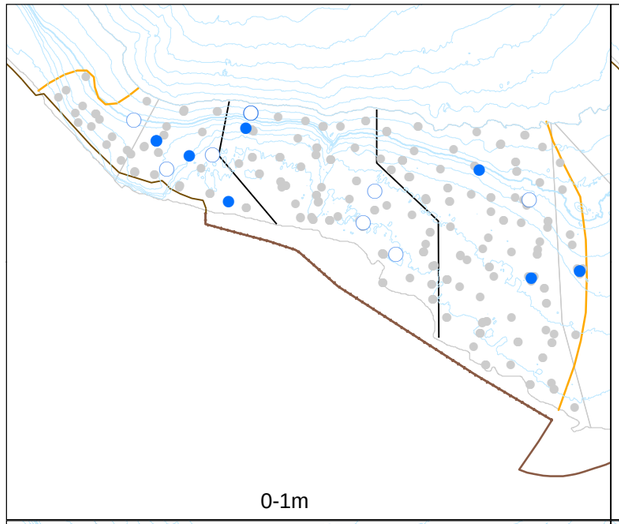
Mercury Sediment

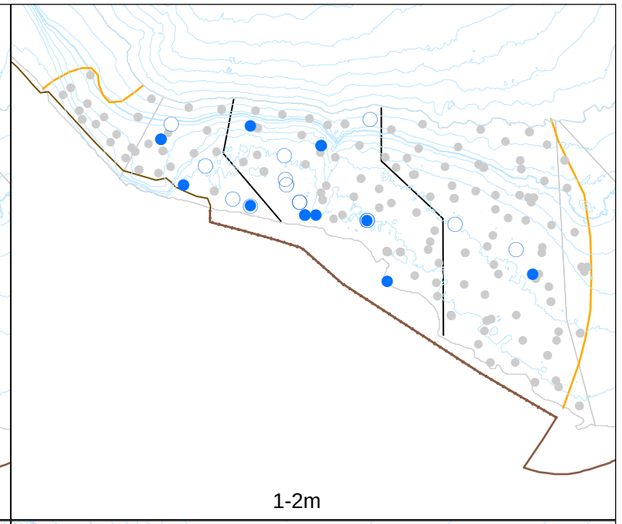
Mercury Porewater

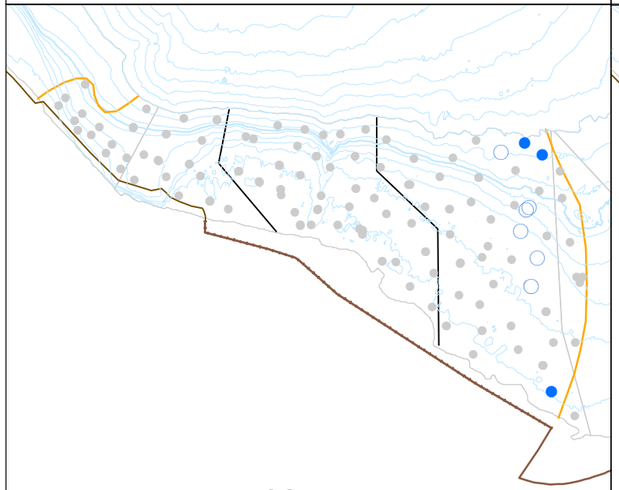
Figure G-10

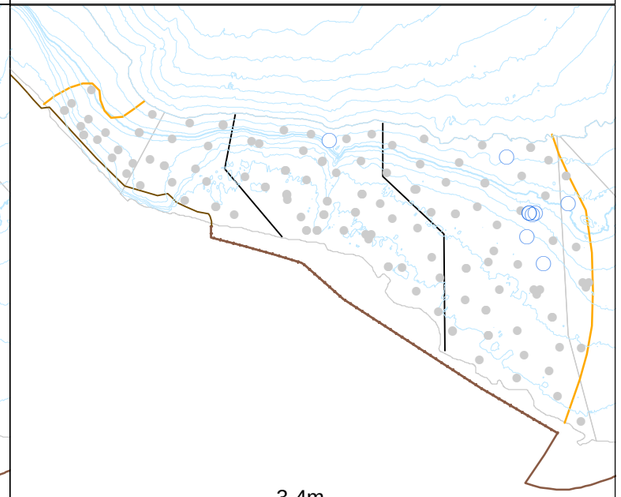


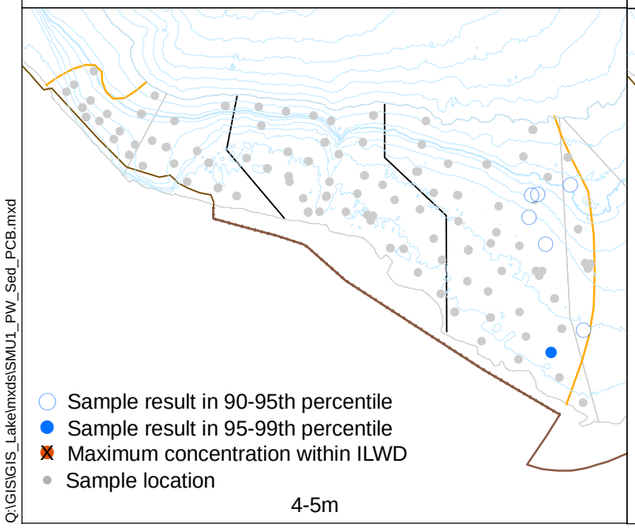


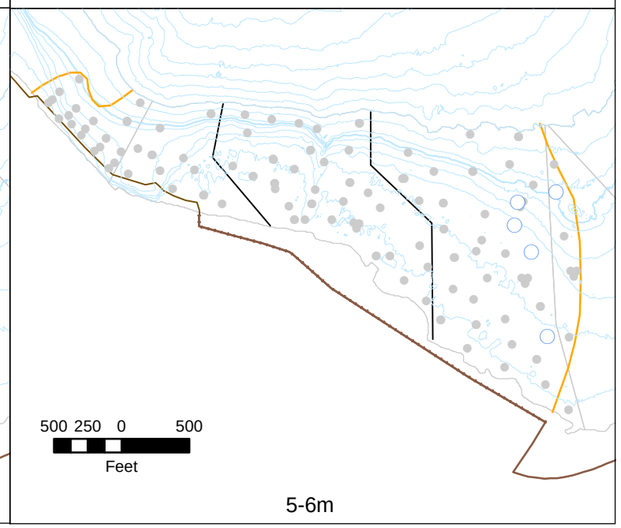


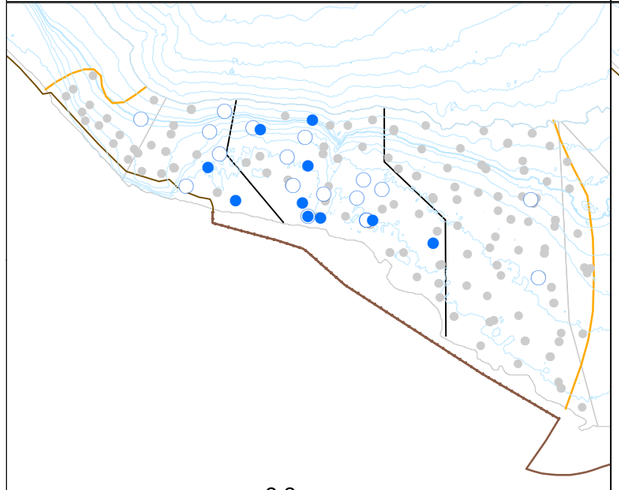


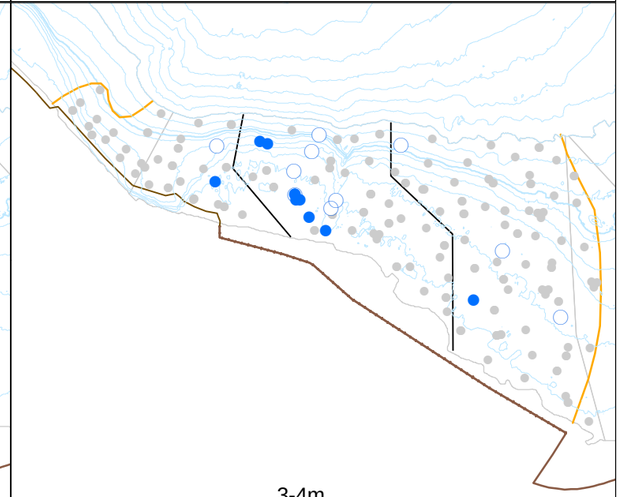


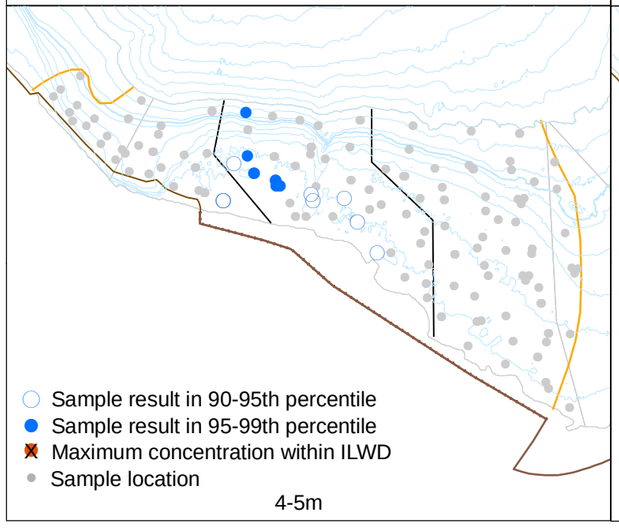


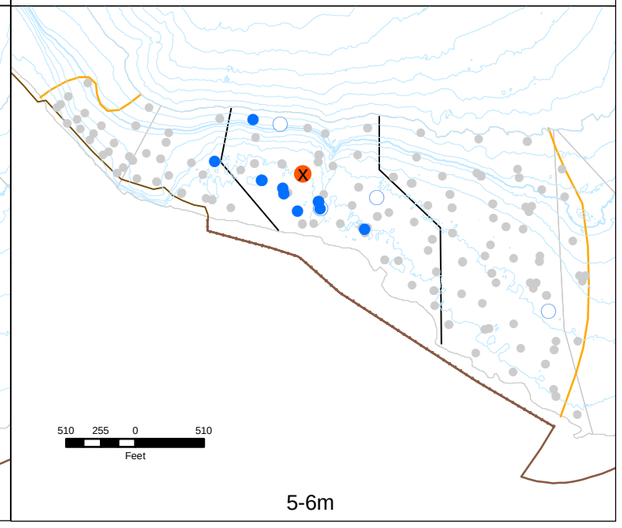












Q:\GIS\GIS_Lake\mxds\SMU1_PW_Sed_PCB.mxd

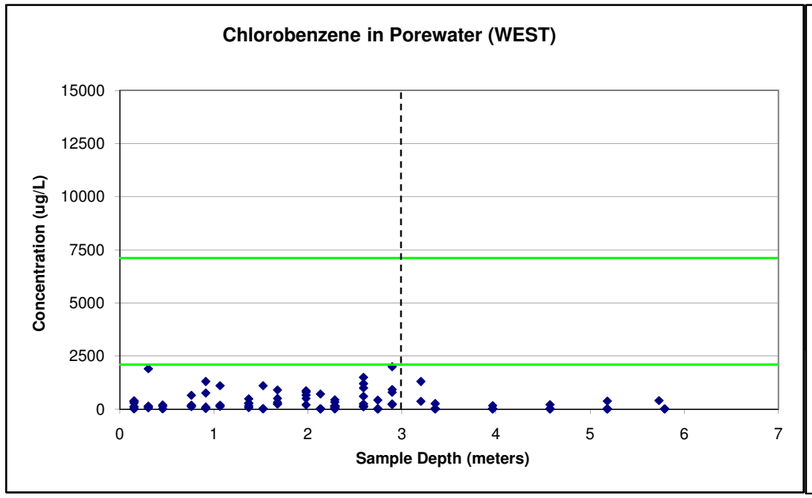
PARSONS

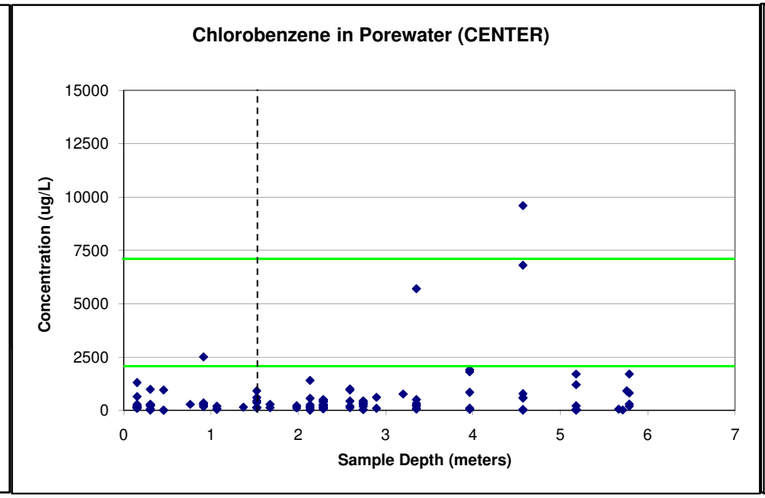
PCBs Sediment

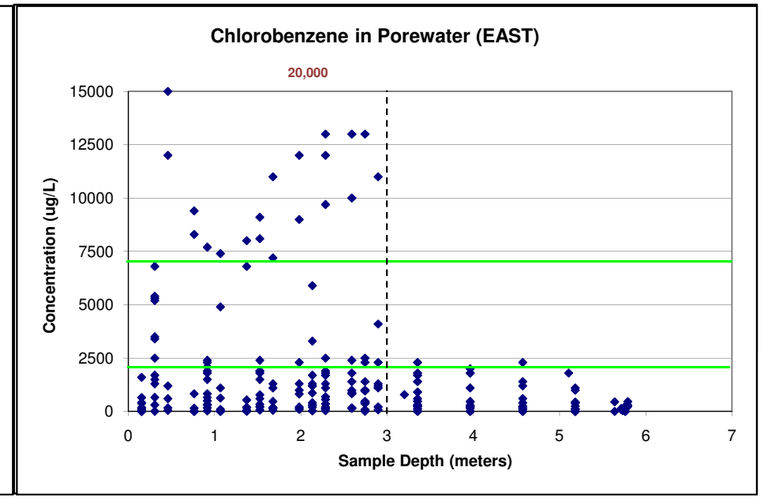
PAHs Sediment

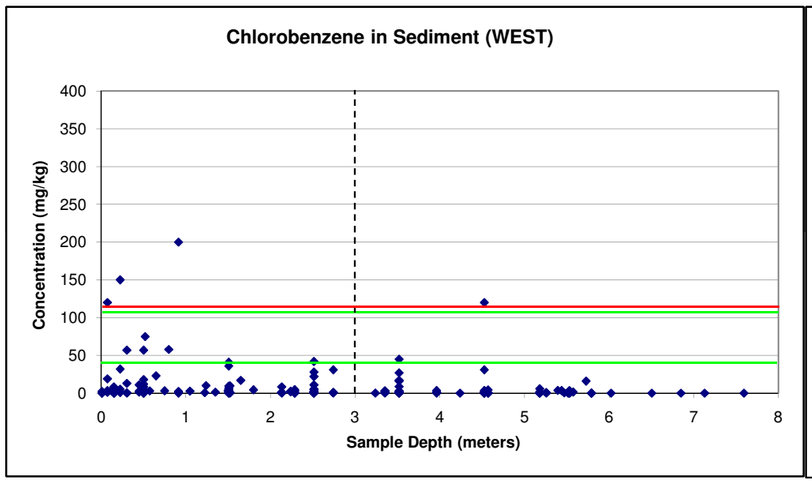
Figure G-11

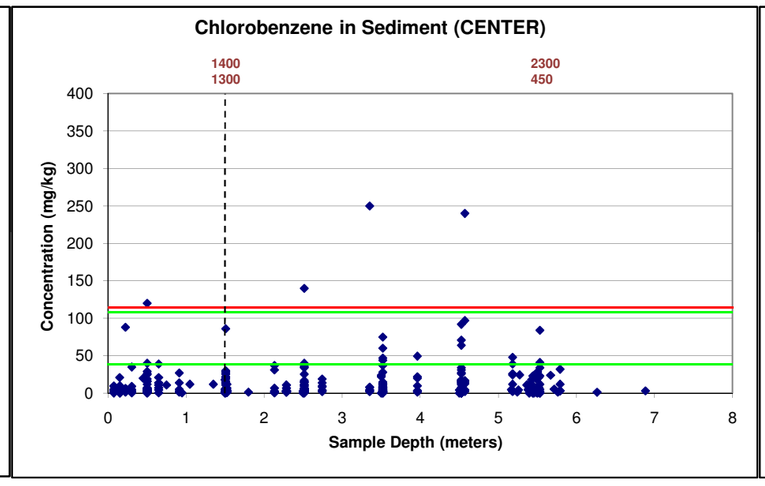
Figure G - 12. Summary of Porewater and Sediment Data for Chlorobenzene within ILWD SMUs 1 & 7

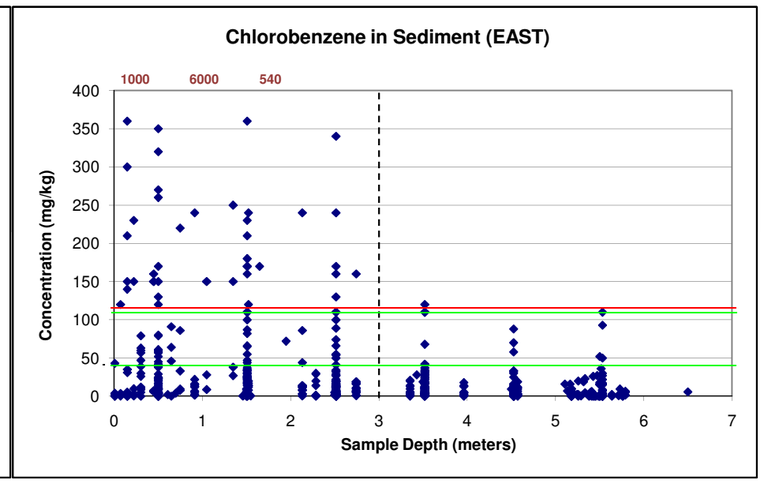












Percentile	Porewater
90th	2300
95th	7000
Percentile	Sediment
90th	44
95th	110

Hotspot Criterion	114

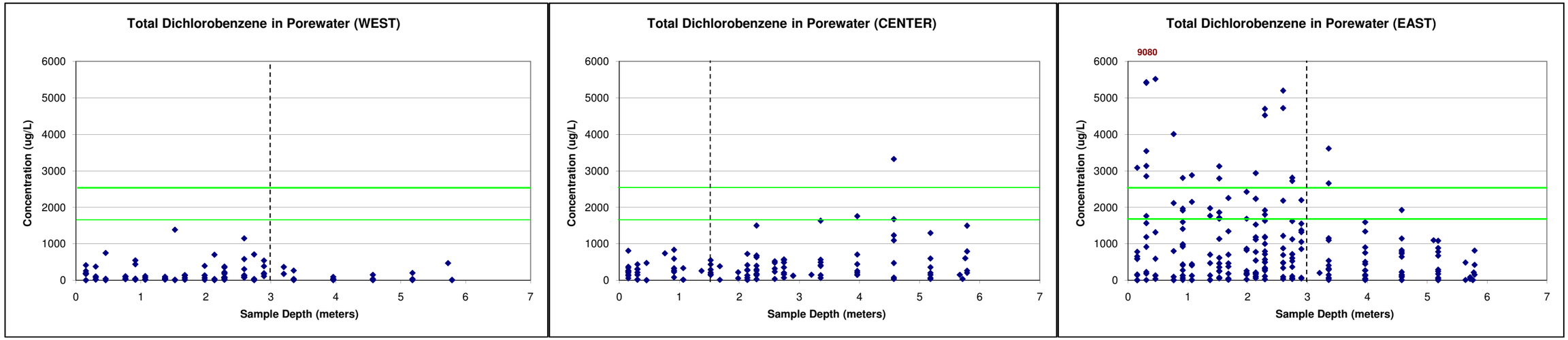
Data Presentation:

Red lines indicate hot spot criteria for sediment as listed in the ROD.
Dashed lines represent the target removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.

Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

Figure G - 13. Summary of Porewater and Sediment Data for Dichlorobenzene within ILWD SMUs 1 & 7



Percentile	Porewater
90th	1633
95th	2542
Percentile	Sediment
90th	128
95th	250

Hotspot Criterion	90

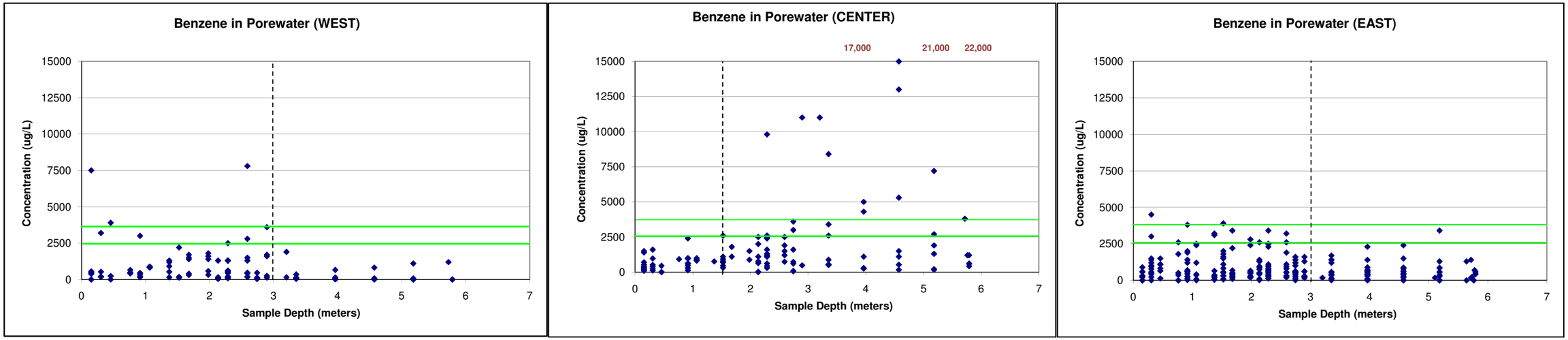
Data Presentation:

Red lines indicate hot spot criteria for sediment as listed in the ROD.
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.

Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

Figure G - 14. Summary of Porewater and Sediment Data for Benzene within ILWD SMUs 1 & 7



Percentile	Porewater
90th	2500
95th	3400
Percentile	Sediment
90th	11
95th	17

Hotspot Criterion	208

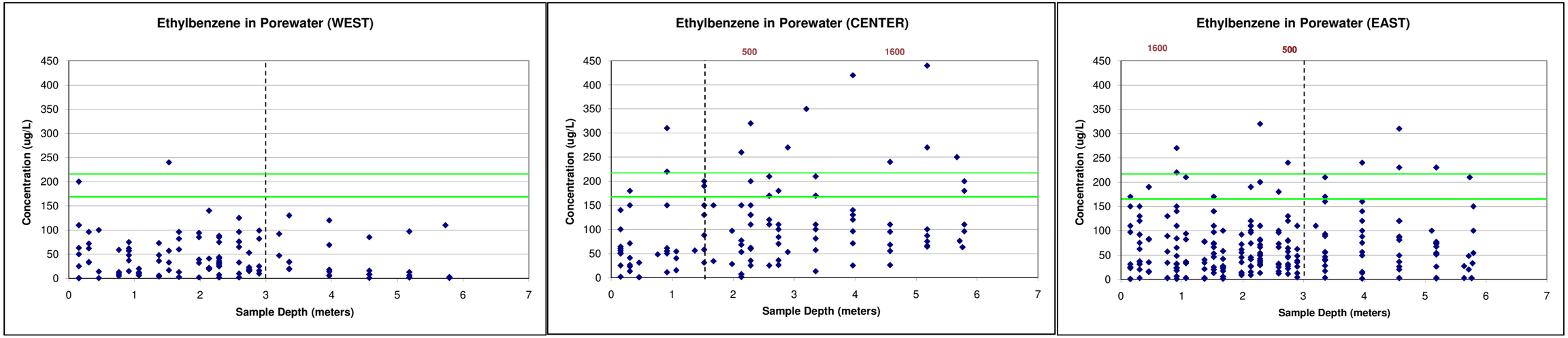
Data Presentation:

Red lines indicate hot spot criteria for sediment as listed in the ROD.
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.

Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths. These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone. Therefore, some data points shown above the target removal depth may remain following dredging.

Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

Figure G - 15. Summary of Porewater and Sediment Data for Ethylbenzene within ILWD SMUs 1 & 7



Percentile	Porewater
90th	170
95th	220
Percentile	Sediment
90th	8
95th	12

Hotspot Criterion	1,655

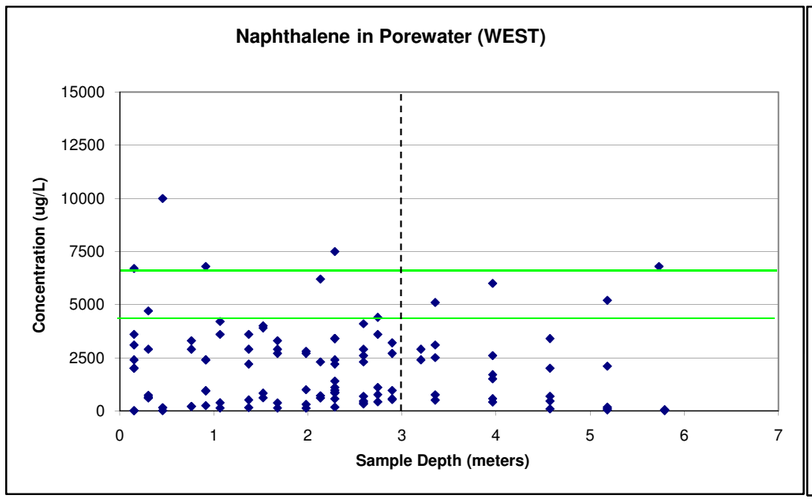
Data Presentation:

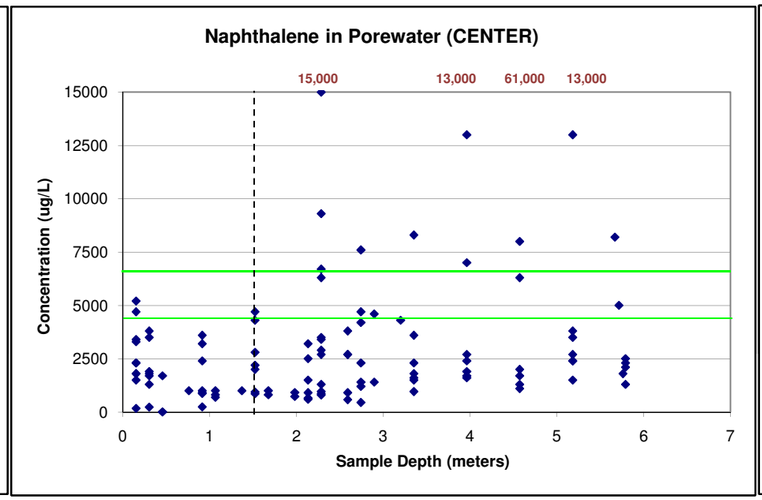
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.
Notes: (1) Hot spot criteria for sediment above the range of plots.

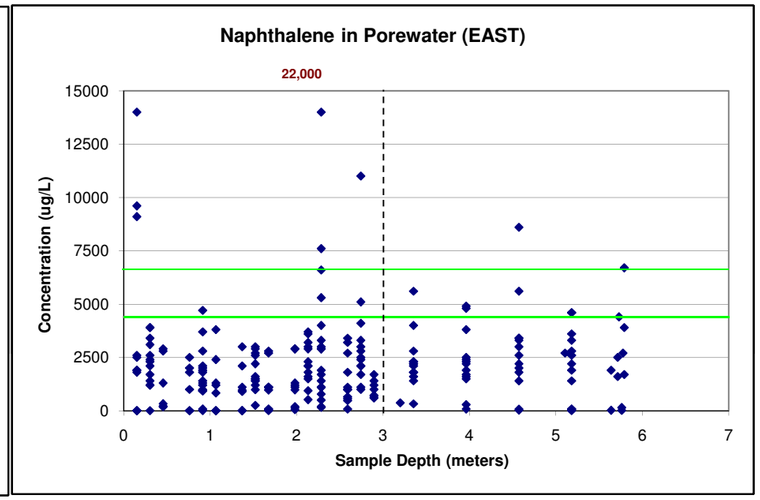
Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

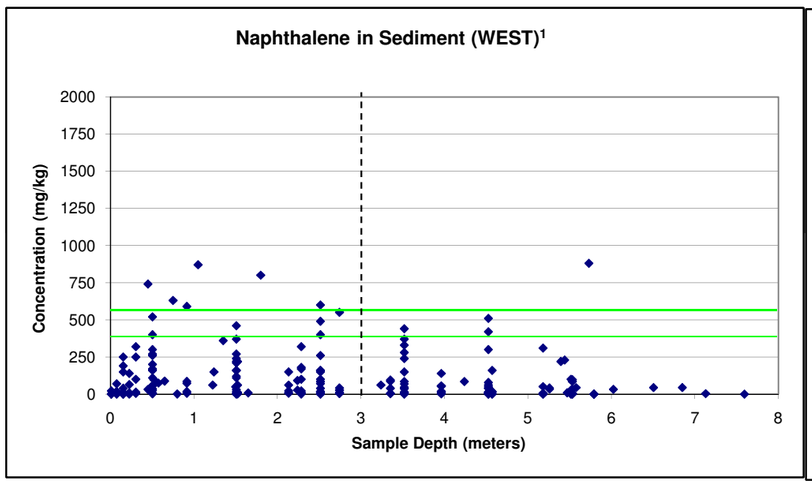
Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

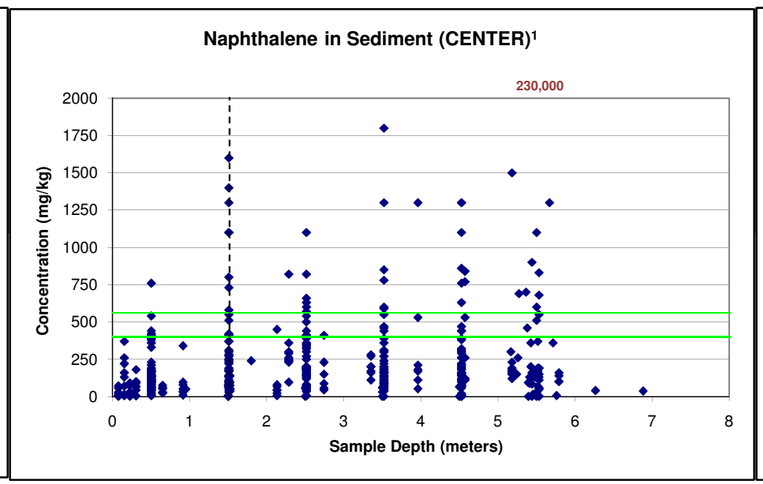
Figure G - 16. Summary of Porewater and Sediment Data for Naphthalene within ILWD SMUs 1 & 7

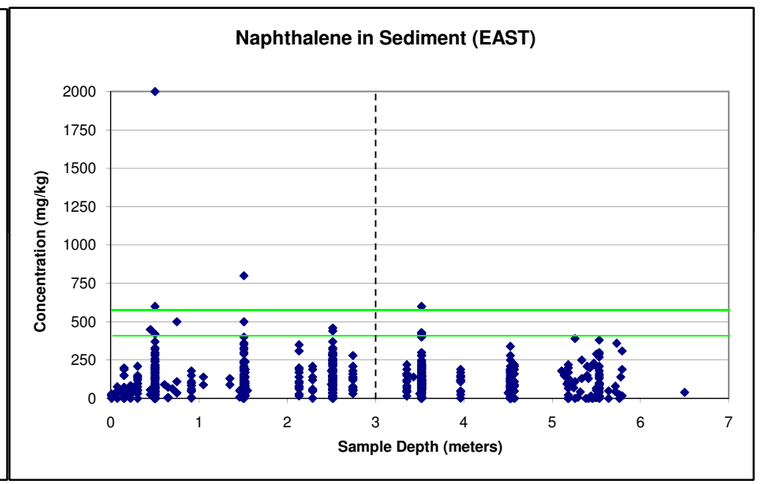












Percentile	Porewater
90th	4610
95th	6700
Percentile	Sediment
90th	360
95th	526

Hotspot Criterion	20,573

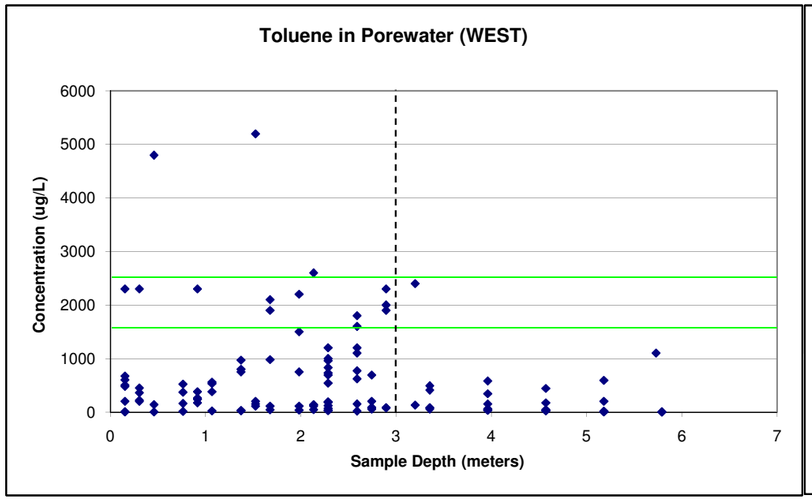
Data Presentation:

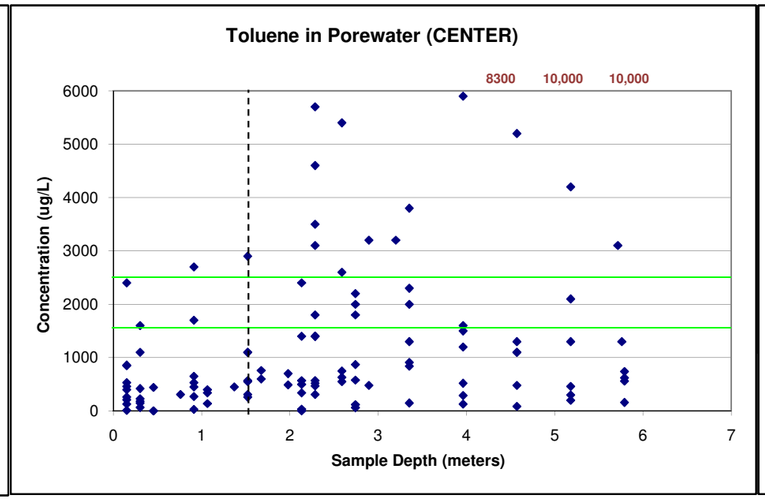
Red lines indicate hot spot criteria for sediment as listed in the ROD.
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.
Notes: (1) Hot spot criteria for sediment above the range of plots.

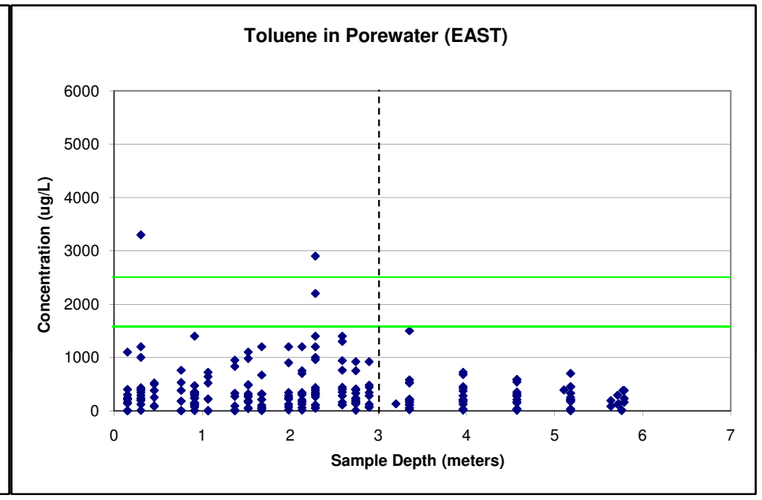
Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

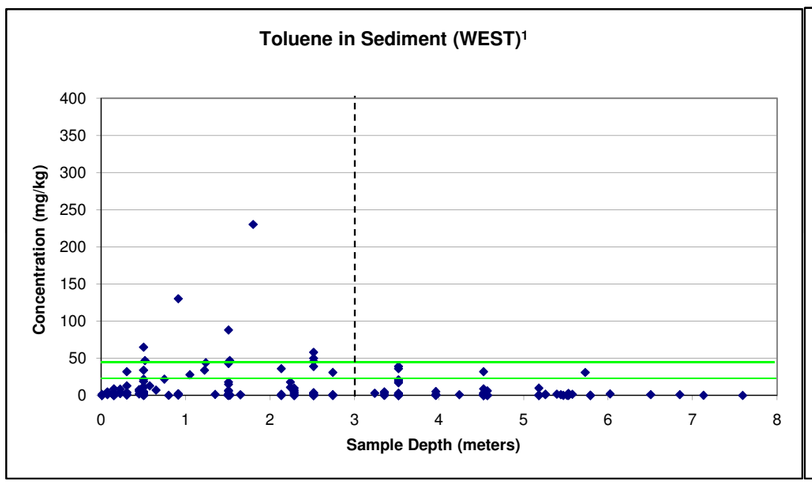
Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

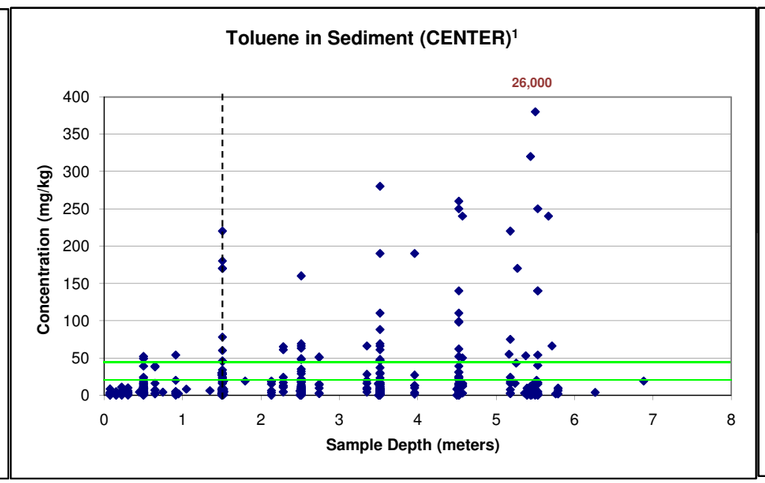
Figure G - 17. Summary of Porewater and Sediment Data for Toluene within ILWD SMUs 1 & 7

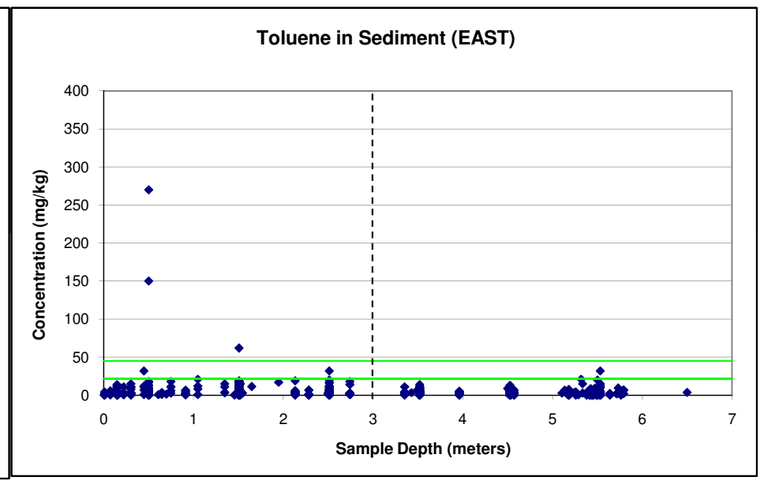












Percentile	Porewater
90th	1600
95th	2500
Percentile	Sediment
90th	21
95th	47

Hotspot Criterion	2,626

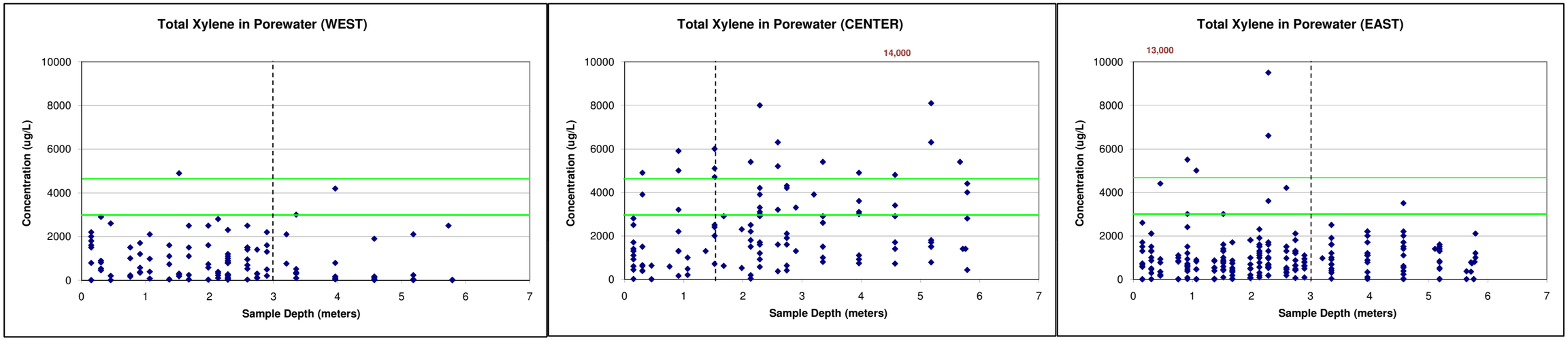
Data Presentation:

Red lines indicate hot spot criteria for sediment as listed in the ROD.
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.
Notes: (1) Hot spot criteria for sediment above the range of plots.

Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

Figure G - 18. Summary of Porewater and Sediment Data for Xylene within ILWD SMUs 1 & 7



Percentile	Porewater
90th	3000
95th	4550
Percentile	Sediment
90th	127
95th	180

Hotspot Criterion	142

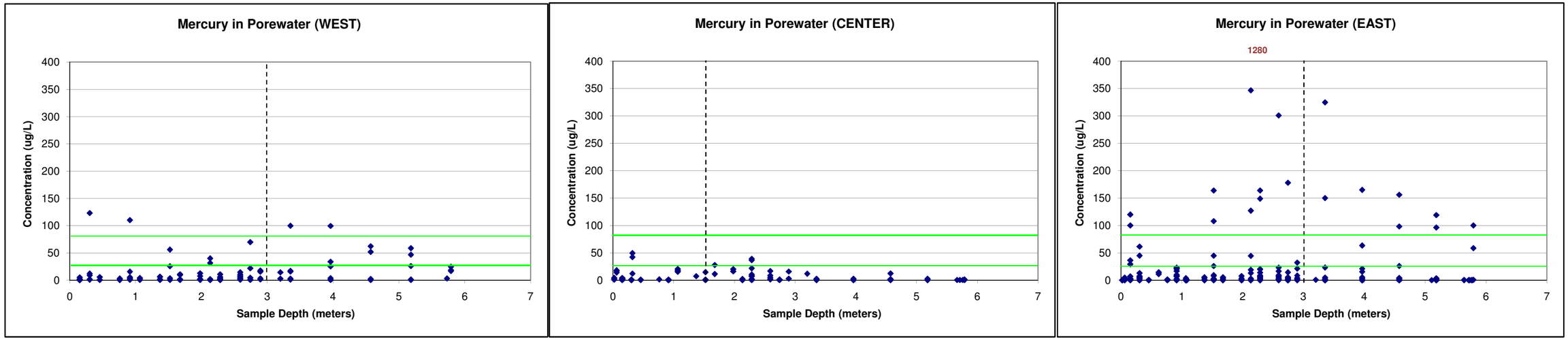
Data Presentation:

Red lines indicate hot spot criteria for sediment as listed in the ROD.
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.

Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

Figure G - 19. Summary of Porewater and Sediment Data for Mercury within ILWD SMUs 1 & 7



Percentile	Porewater
90th	26
95th	79
Percentile	Sediment
90th	26
95th	40

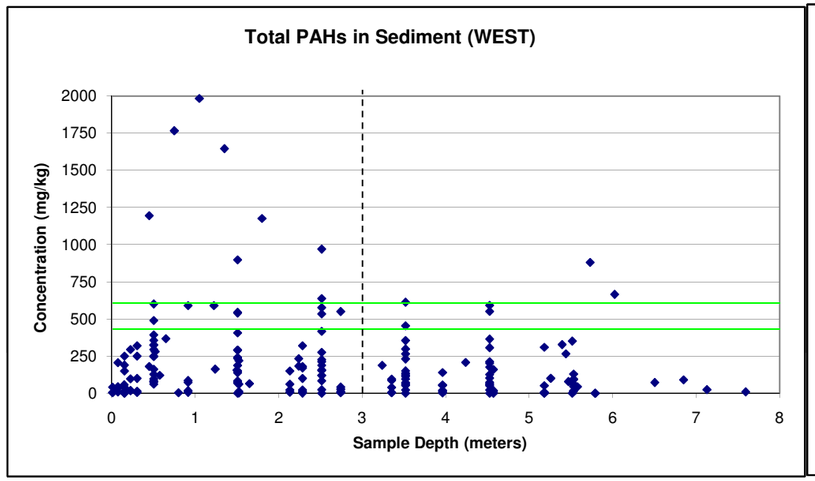
Hotspot Criterion	2,924

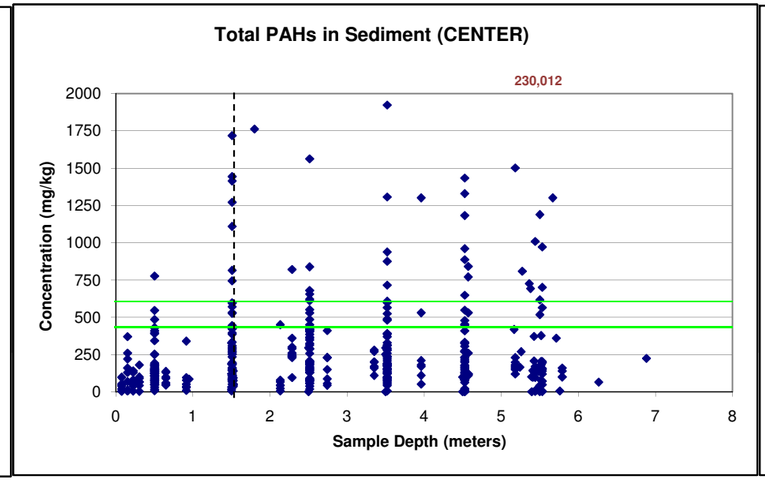
Data Presentation:
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.
Notes: (1) Hot spot criteria for sediment above the range of plots.

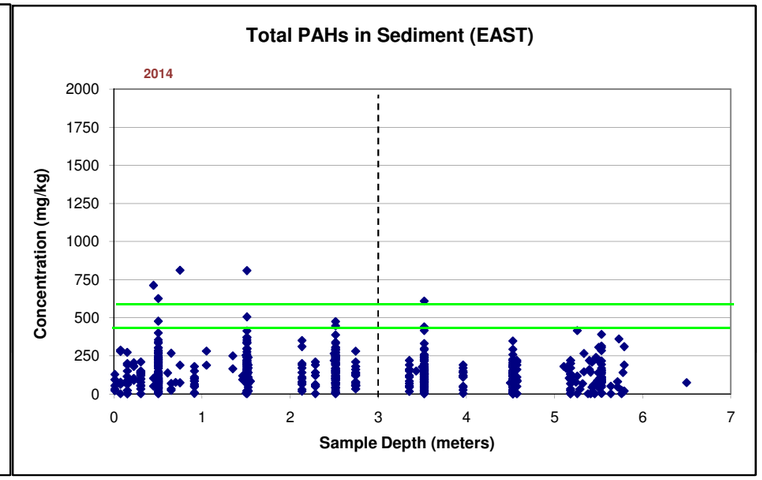
Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

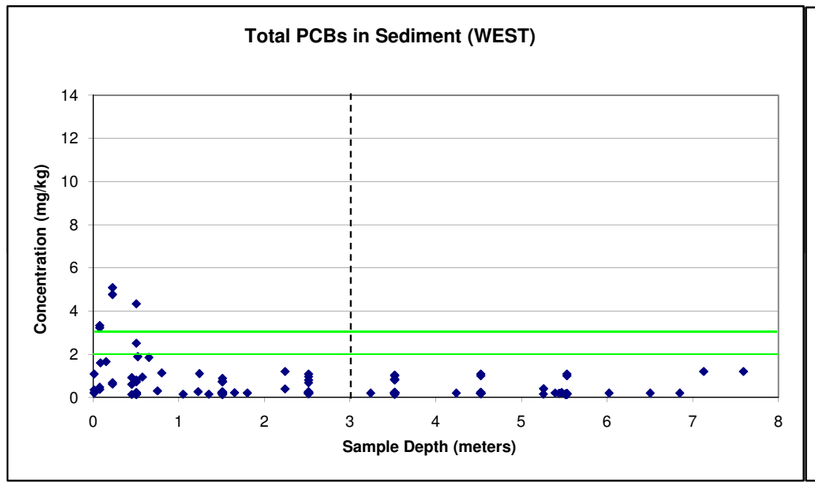
Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

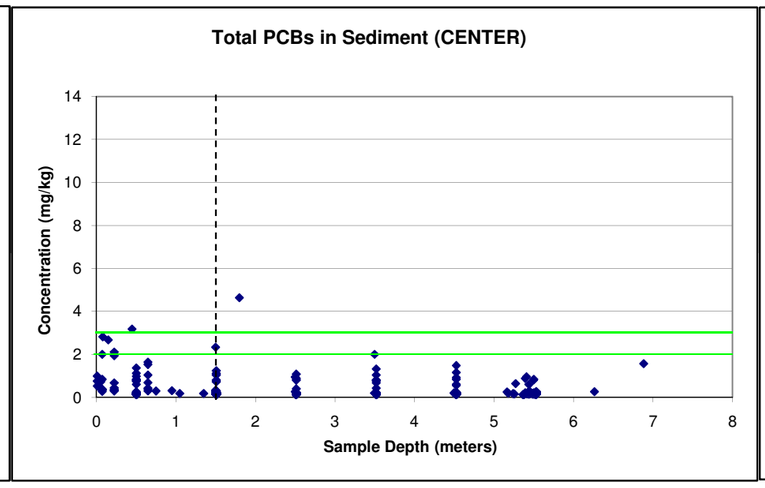
Figure G - 20. Summary of Sediment Data for PAHs and PCBs within ILWD SMUs 1 & 7

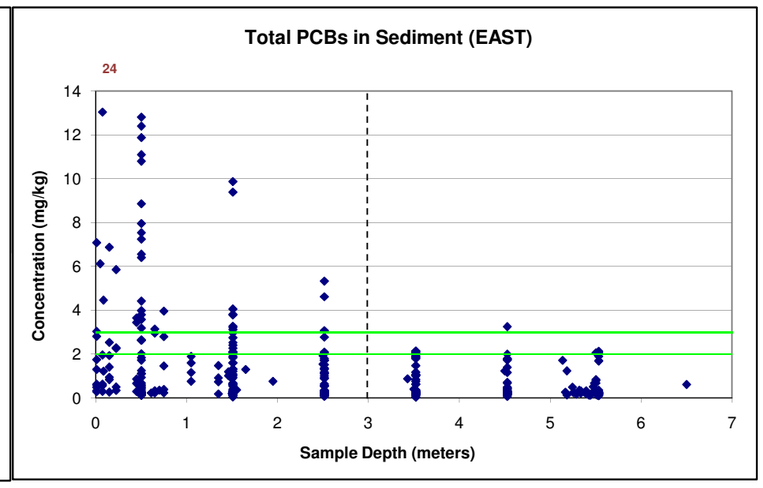












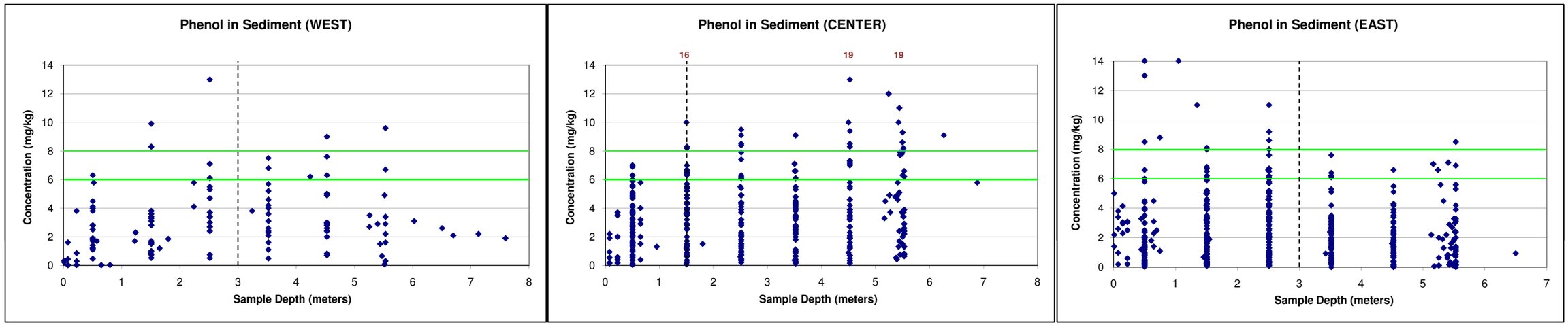
Percentile	Total PAHs
90th	401
95th	600
Percentile	Total PCBs
90th	2
95th	3

Data Presentation:
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.

Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

Figure G - 21. Summary of Sediment Data for Phenol within ILWD SMUs 1 & 7



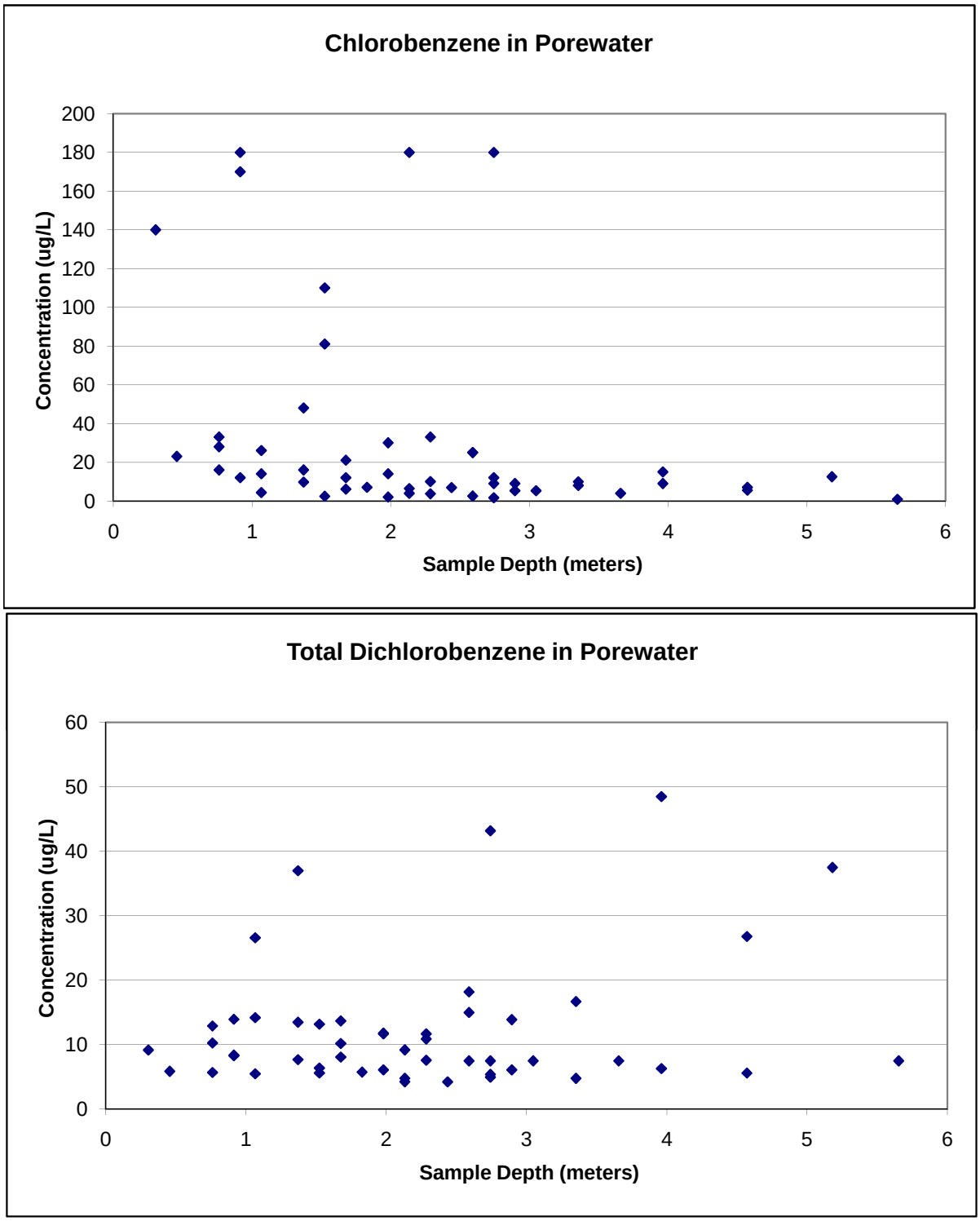
Percentile	Sediment
90th	6
95th	8

Data Presentation:
Dashed lines represent the proposed removal depth.
Green lines indicate 90th and 95th percentile concentrations.
Numbers in red denote concentrations beyond the range of the scatterplots.

Note: These figures were used to identify contaminant distribution trends, which were then used to develop target removal depths.
These removal depths will not be achieved everywhere, such as within transition zones near shore and approaching the profundal zone.
Therefore, some data points shown above the target removal depth may remain following dredging.

Notes: Non-detects are set at 1/2 the MDL.
Path: P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\Figure G-12-21.xls

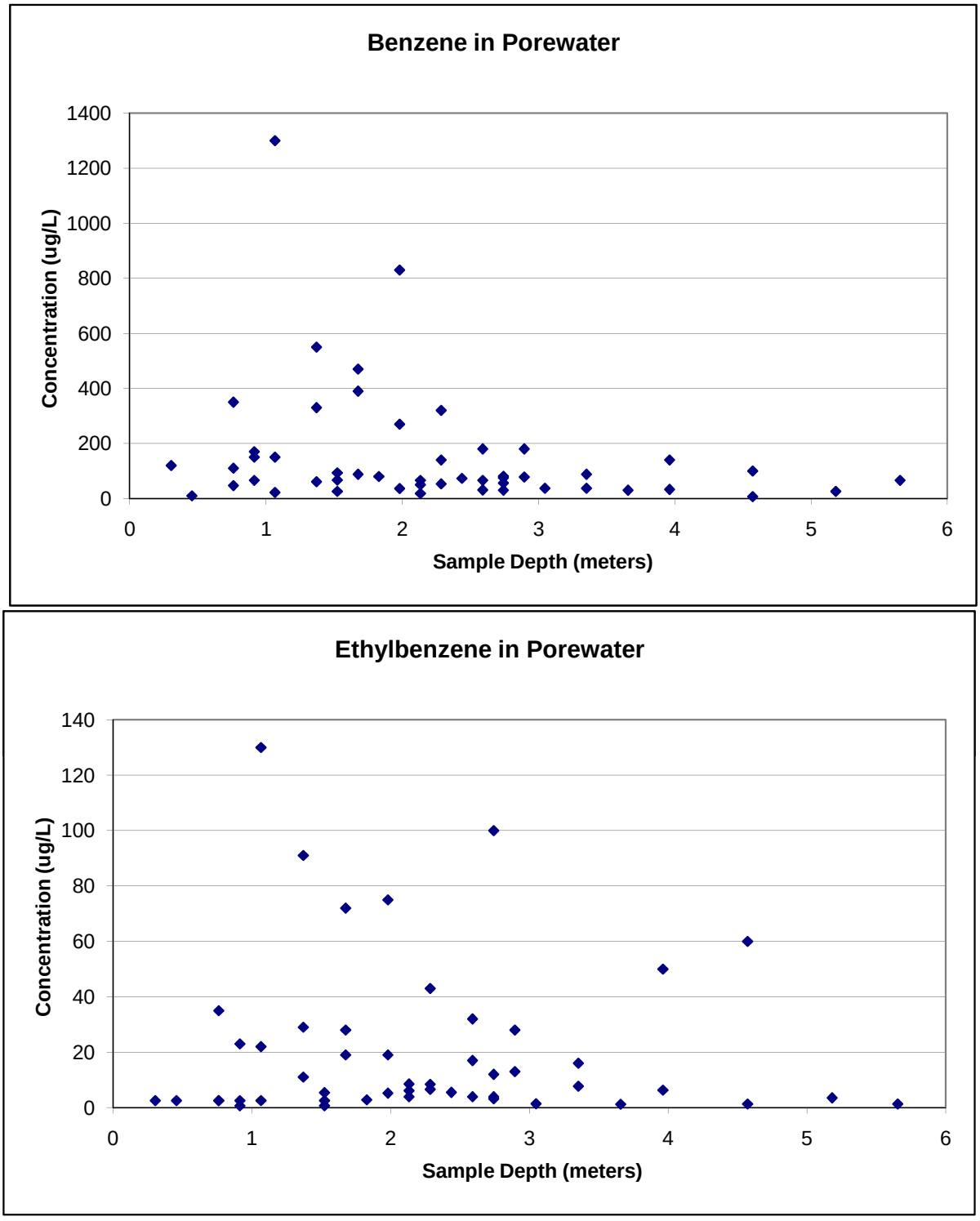
Figure G-22. SMU2 Porewater Data within ILWD



Note: All concentrations shown on the plots are below the 90th percentile values for SMUs 1 & 7.

Notes: Non-detects were set at 1/2 the MDL.

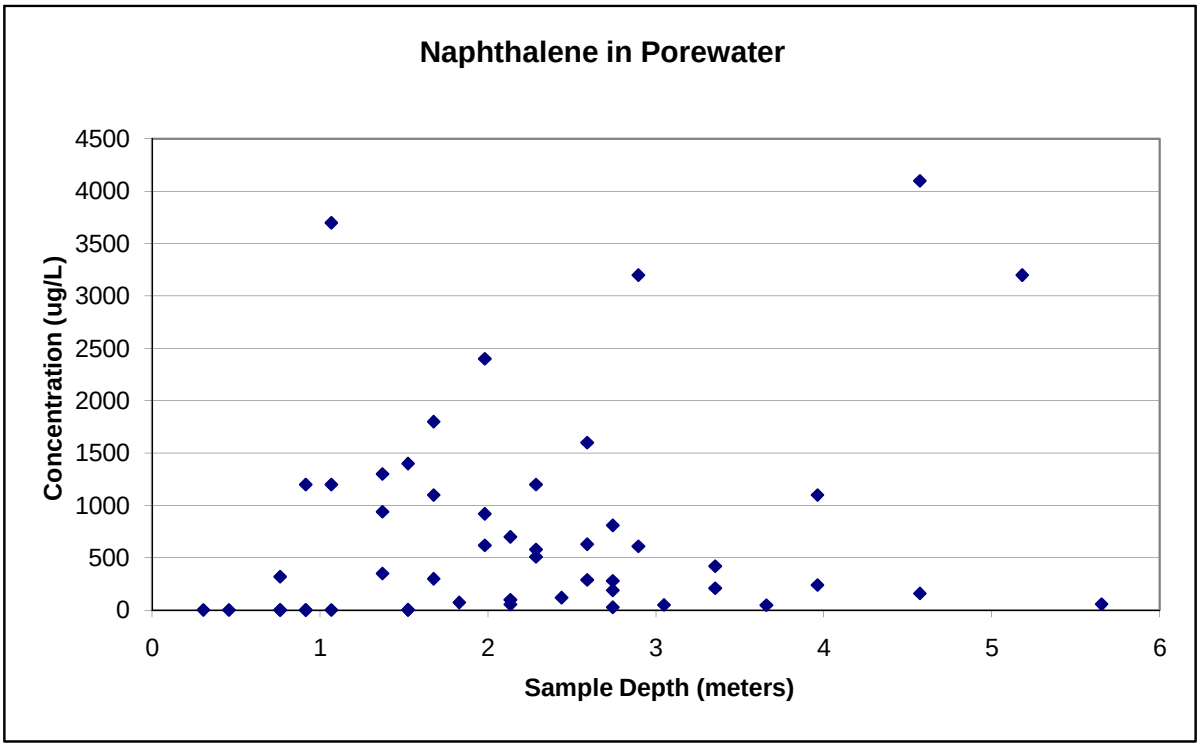
Figure G-22. SMU2 Porewater Data within ILWD (continued)

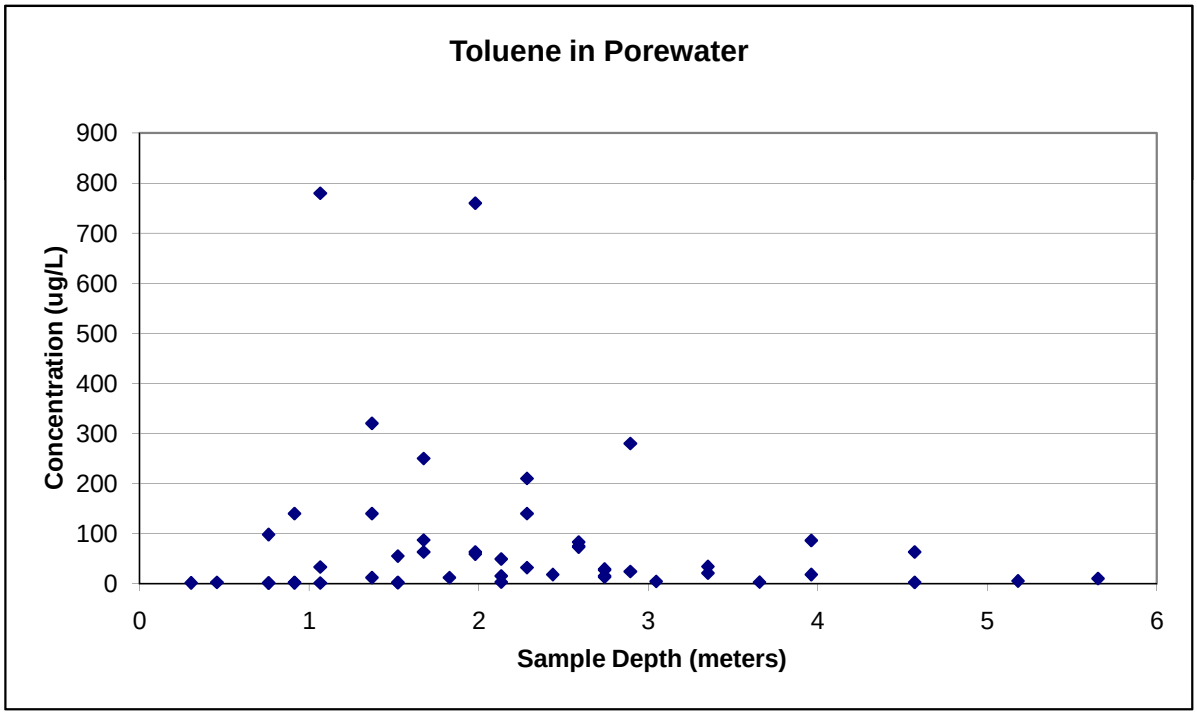


Note: All concentrations shown on the plots are below the 90th percentile values for SMUs 1 & 7.

Notes: Non-detects were set at 1/2 the MDL.

Figure G-22. SMU2 Porewater Data within ILWD (continued)

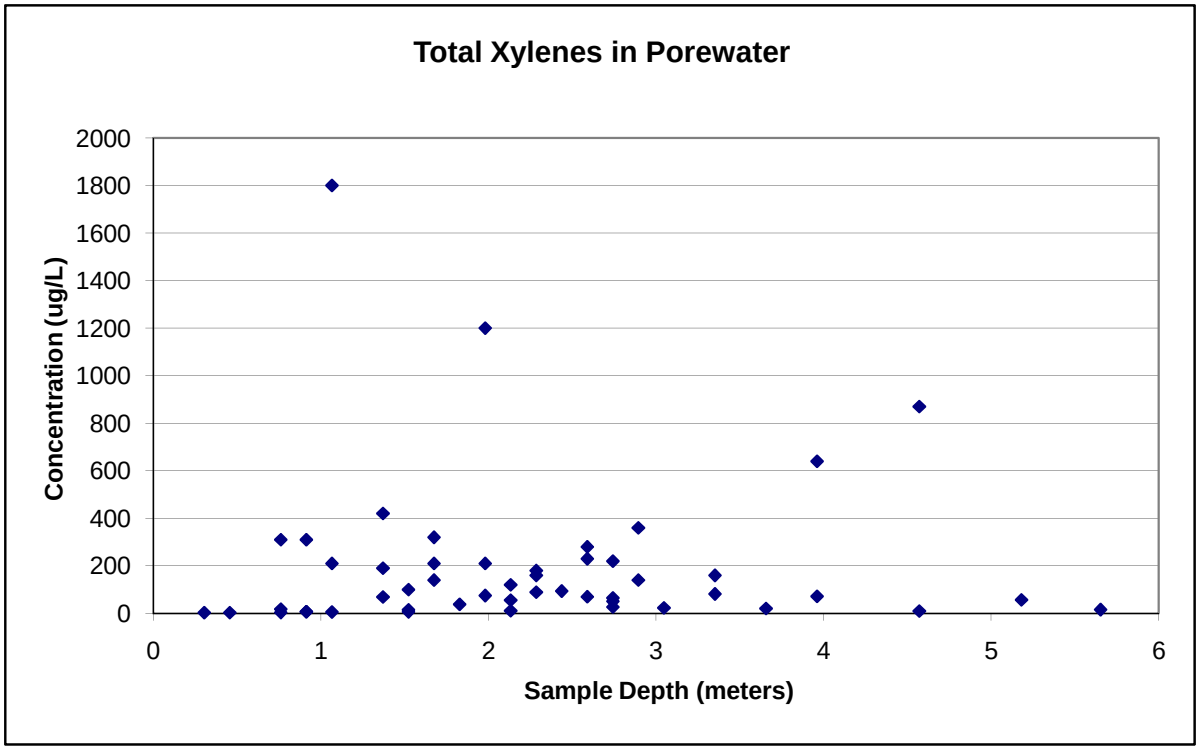


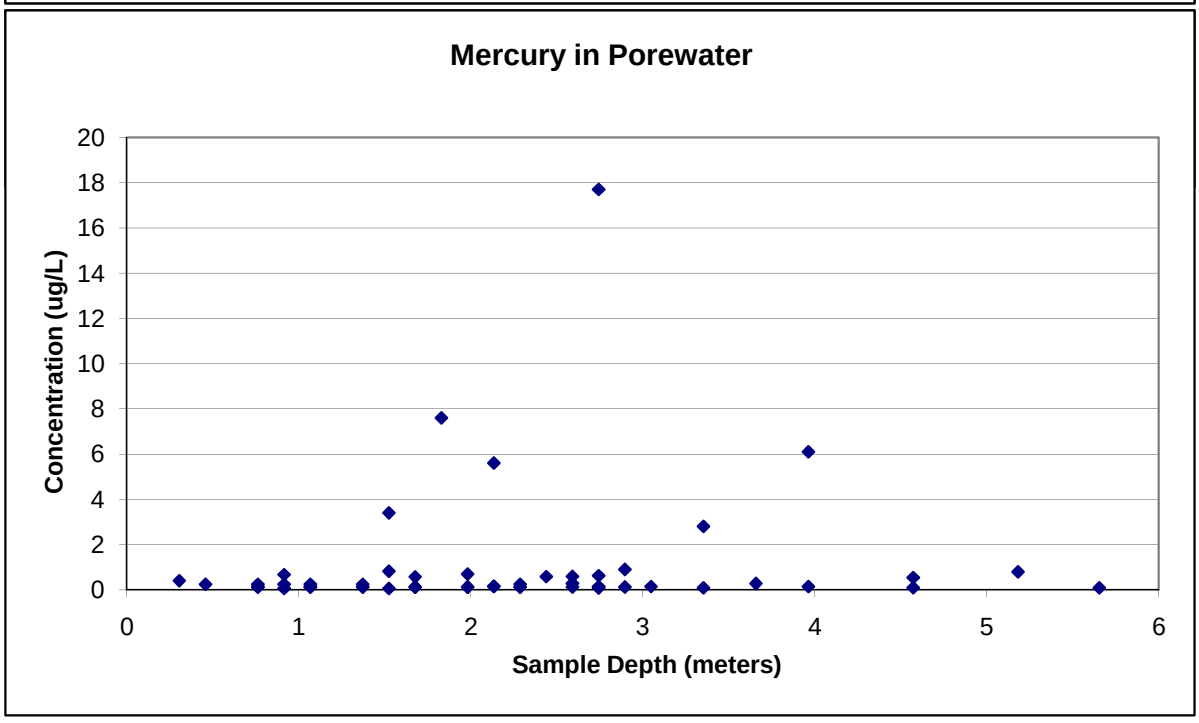


Note: All concentrations shown on the plots are below the 90th percentile values for SMUs 1 & 7.

Notes: Non-detects were set at 1/2 the MDL.

Figure G-22. SMU2 Porewater Data within ILWD (continued)

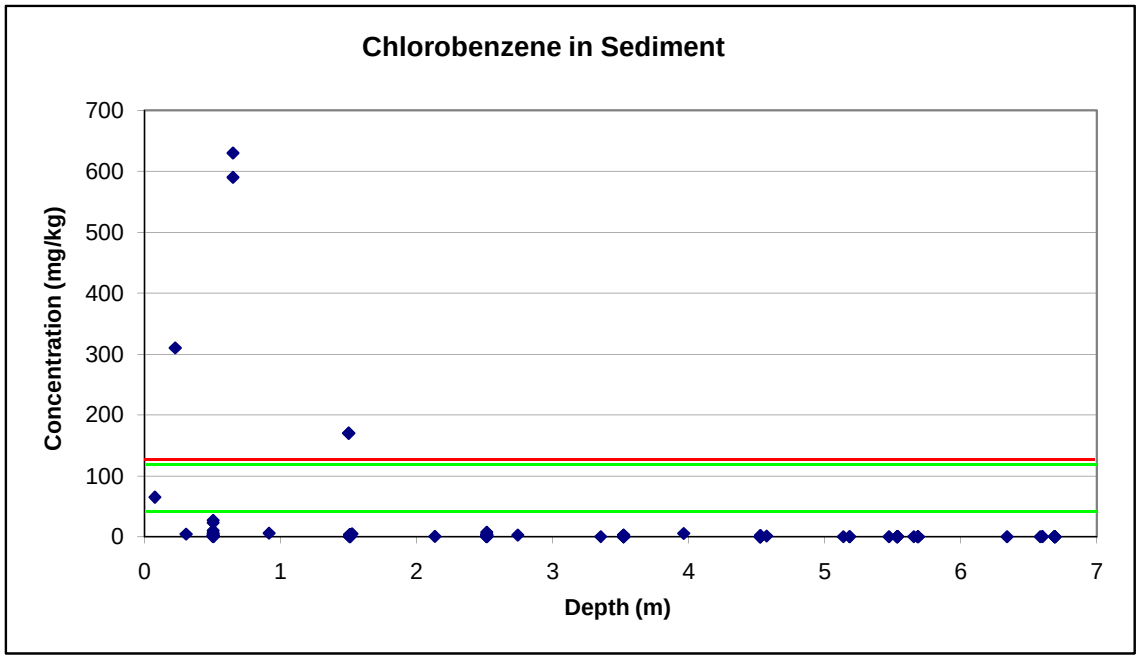




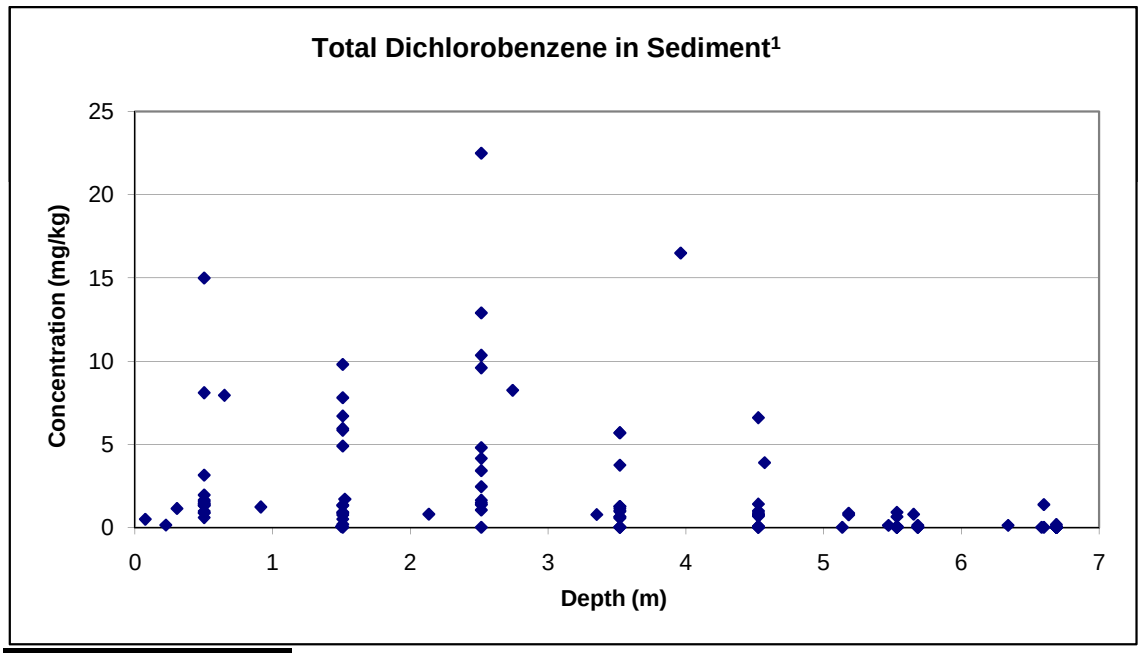
Note: All concentrations shown on the plots are below the 90th percentile values for SMUs 1 & 7.

Notes: Non-detects were set at 1/2 the MDL.

Figure G-23. SMU2 ILWD Sediment Data



Hotspot Criterion	114



Hotspot Criterion	90

Green lines indicate 90th and 95th percentile concentrations in SMUs 1 & 7 in the ILWD.
Red line indicates hotspot criterion for sediment as listed in the ROD.
Note: (1) Hot spot criteria for sediment above the range of plots.

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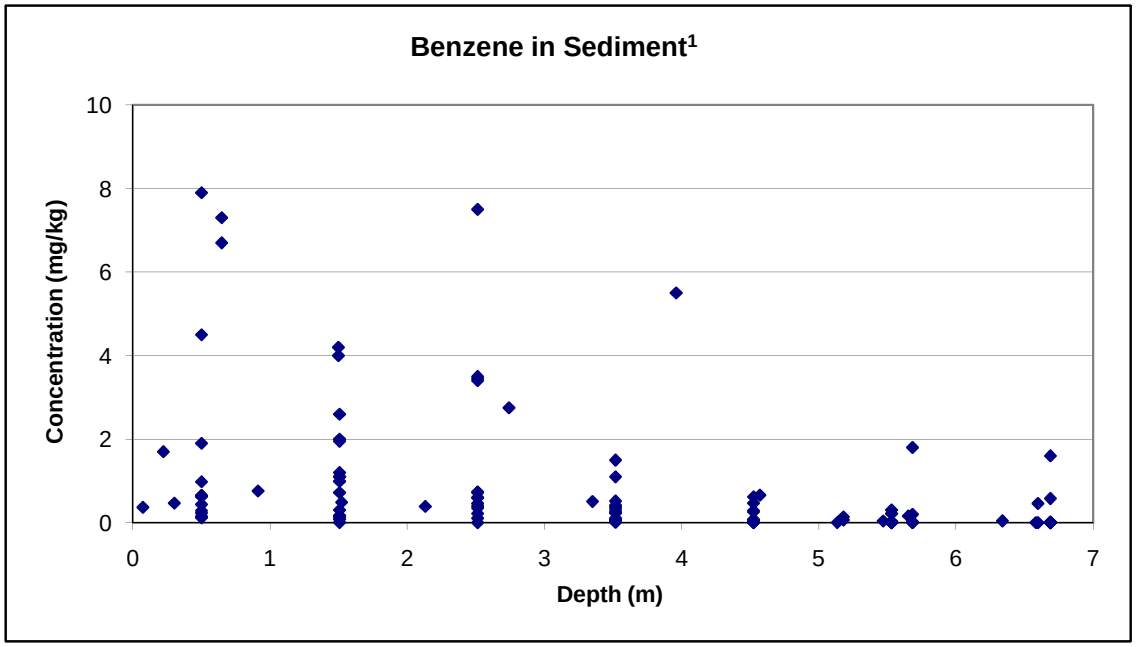
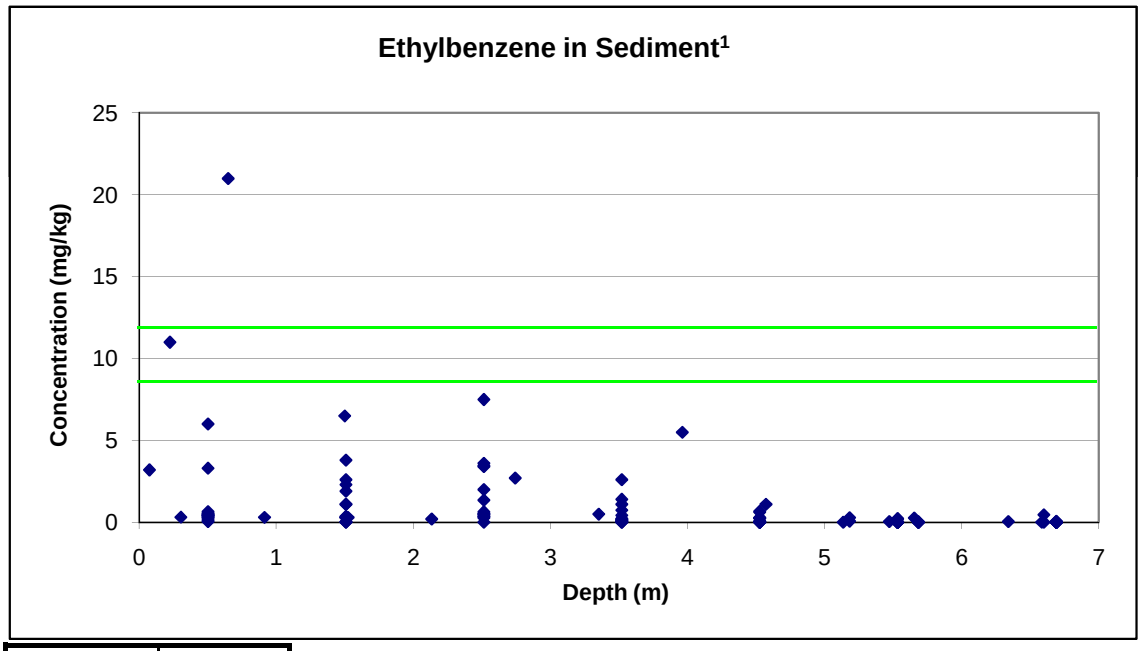
Notes: Non-detects were set at 1/2 the MDL.
P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\

Figure G-23. SMU 2 ILWD Sediment Data (continued)



Hotspot Criterion	208

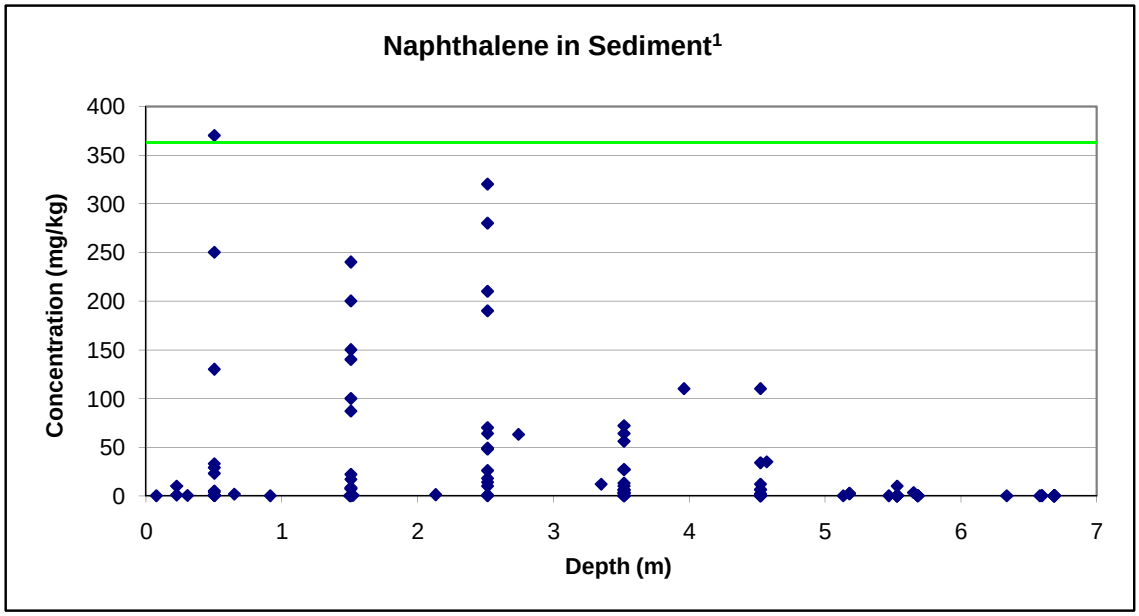


Hotspot Criterion	1,655

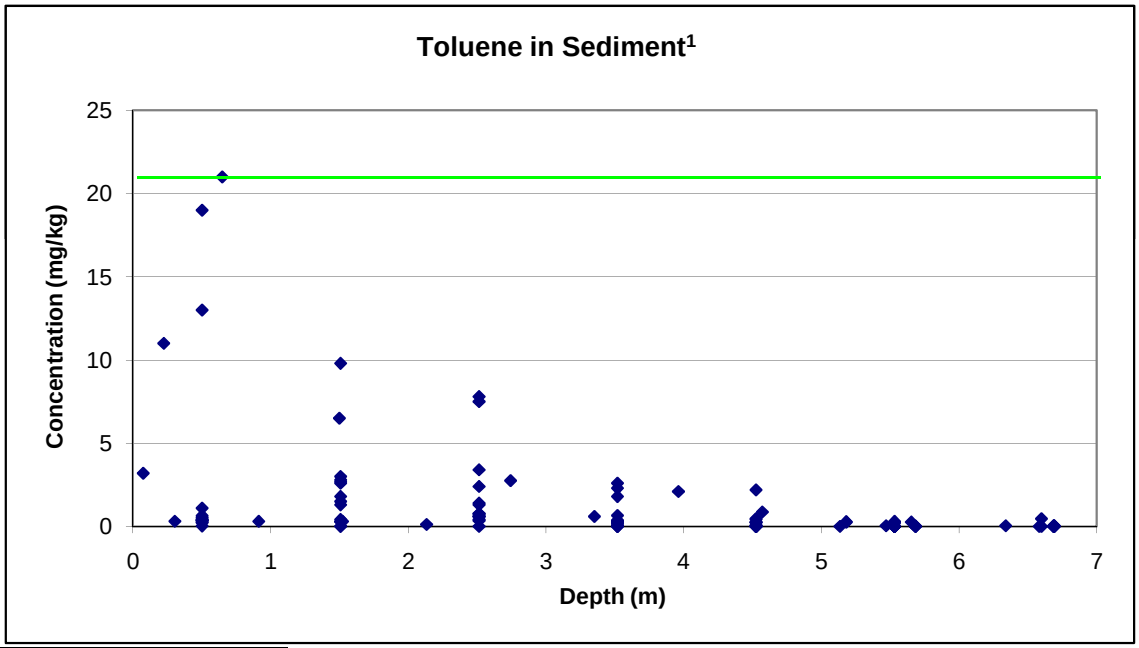
Green lines indicate 90th and 95th percentile concentrations in SMUs 1 & 7 in the ILWD.
Note: (1) Hot spot criteria for sediment above the range of plots.

Notes: Non-detects were set at 1/2 the MDL.
P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\

Figure G-23. SMU 2 ILWD Sediment Data (continued)



Hotspot Criterion	20,573

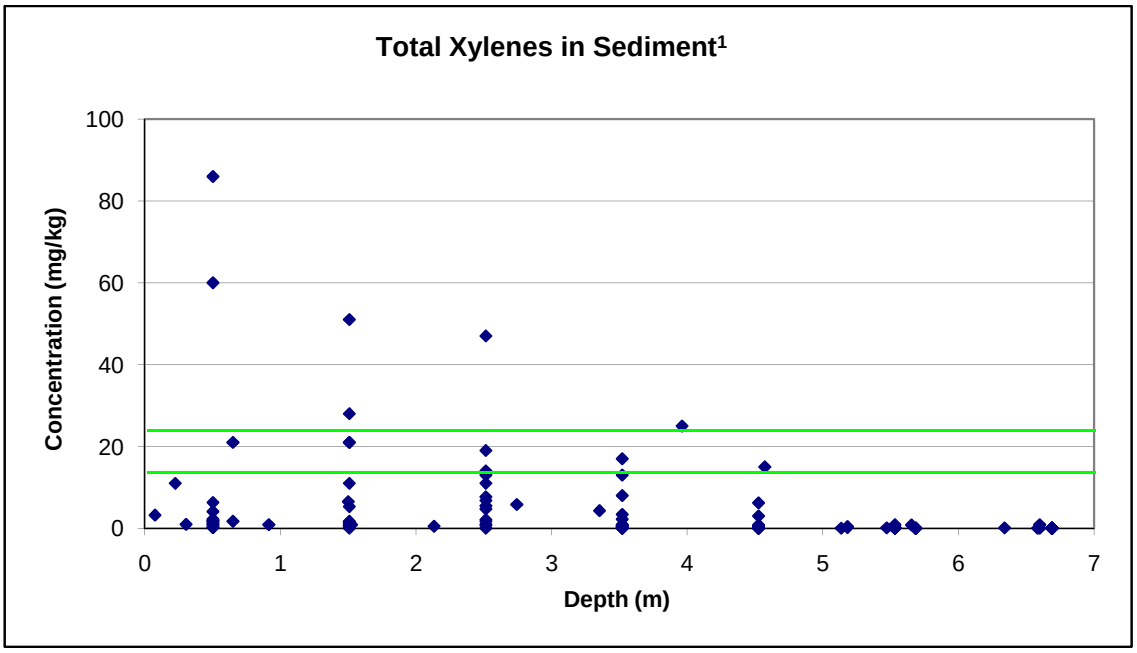


Hotspot Criterion	2,626

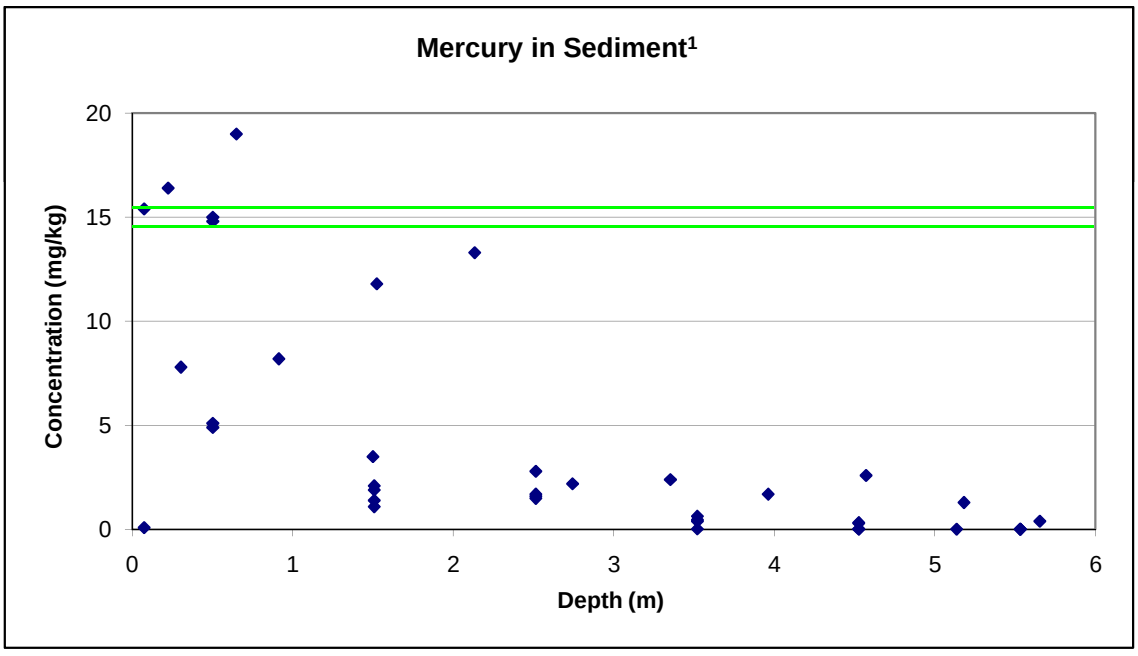
Green lines indicate 90th percentile concentration in SMUs 1 & 7 in the ILWD.
Note: (1) Hot spot criteria for sediment above the range of plots.

Notes: Non-detects were set at 1/2 the MDL.
P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\

Figure G-23. SMU 2 ILWD Sediment Data (continued)



Hotspot Criterion	142



Hotspot Criterion	2,924

Green lines indicate 90th percentile concentration in SMUs 1 & 7 in the ILWD.
Note: (1) Hot spot criteria for sediment above the range of plots.

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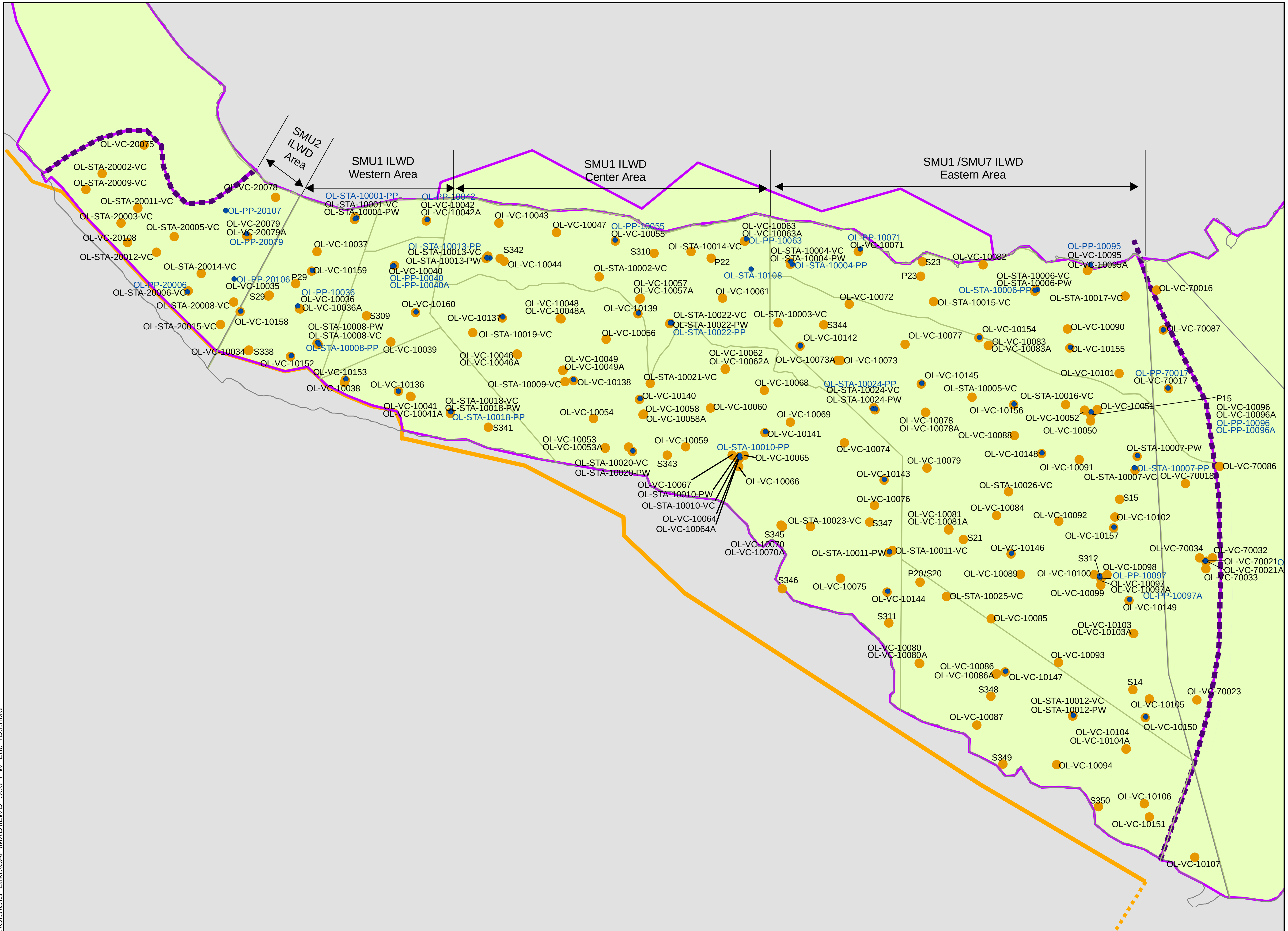
Notes: Non-detects were set at 1/2 the MDL.
P:\Honeywell -SYR\444576 2008 Capping\09 Reports\9.1 Draft Capping and Dredge Area & Depth IDS\Appendices\Appendix G - ILWD Dredge Area\



Sample Locations

Porewater Sample Location

Sediment Sample Location

Note: Co-located porewater and sediment locations having the same location ID have been labeled using the sediment ID for map clarity.

Remediation Area Boundary

Cap Area

Sediment Management Unit (SMU) Boundary

Extent of ILWD in Littoral Zone

Barrier Wall

Approximate location of East Wall Portion of the SB-B/HB IRM

FIGURE G-24

Honeywell

Onondaga Lake
Syracuse, New York

Remediation Area D
Sediment & Porewater Locations

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301 PLAINFIELD RD, SUITE 350, SYRACUSE, NY 13212 Phone:(315) 451-9560

Q:\GIS\GIS Lake\CAP\MXD\ILWD Sed PW Loc IDs.mxd

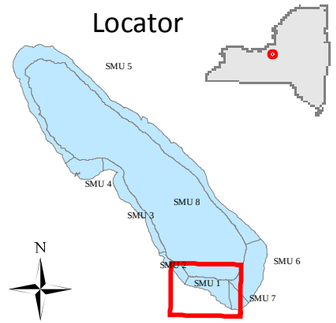
Any Exceedance

Chlorobenzene: HS criteria = 114 mg/kg

Dichlorobenzene: HS criteria = 90 mg/kg

Xylenes: HS criteria = 142 mg/kg

Locator



Scale

0 500 1,000 1,500 Feet

Legend

- Remediation Area Boundary
- SMU Boundary
- < Hot Spot Criteria
- > Hot Spot Criteria

Note: Symbols displayed depict maximum concentrations in the 1-m interval below the dredge elevation for core sections with at least 50% of the section in that interval that exceed the hot spot criteria for a given CPOI.

Figure G-25
Hot Spot exceedance locations within the 1 meter interval below the dredge cut in the ILWD.

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LD - H:\090139-01_Parsons-Onondaga\Cap_IDS\GIS\mxds\ILWD_HotSpot\ILWD_Hot_Spot_1m_rmv_half_sect.mxd

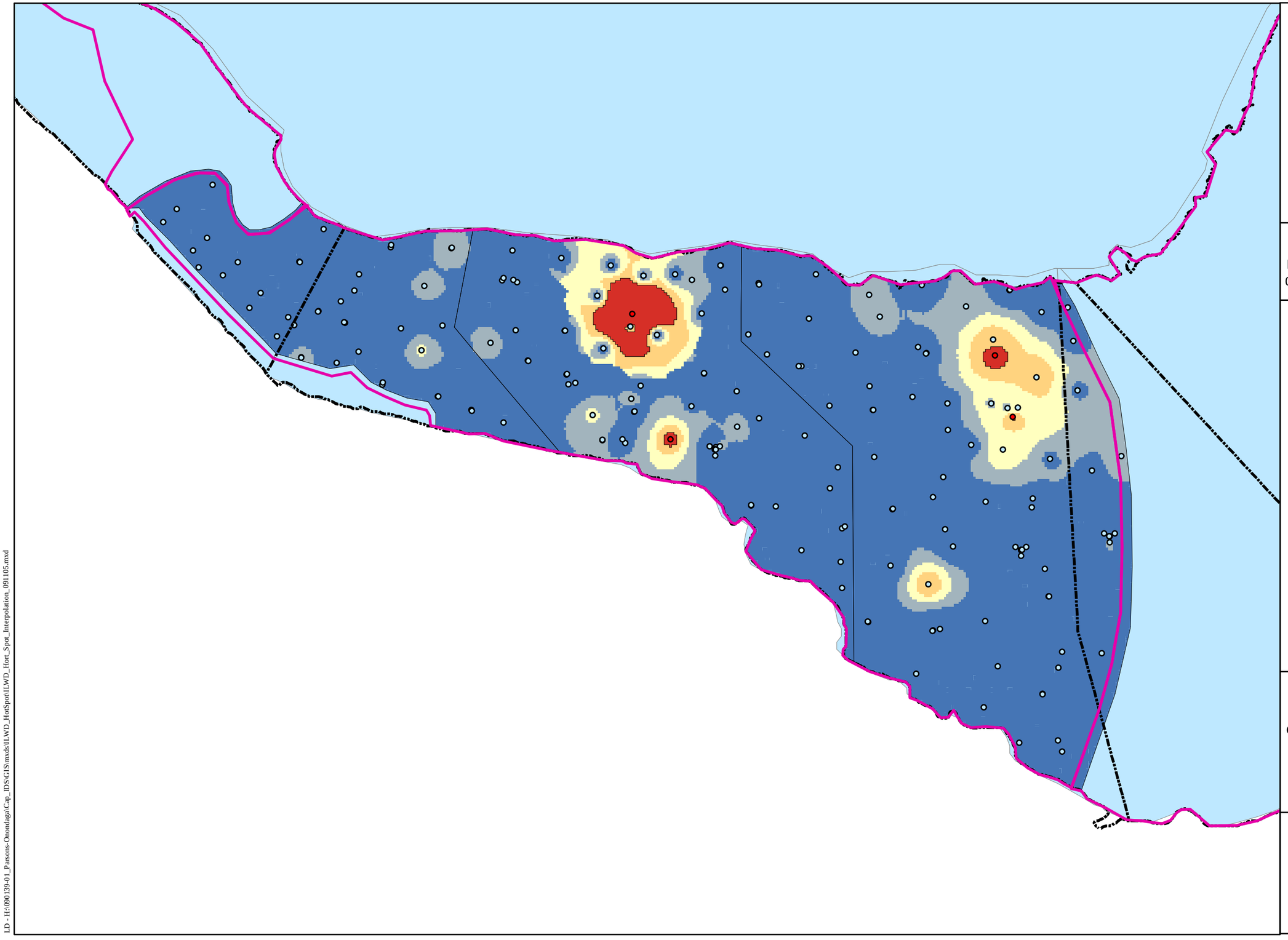

Figure G-26
Interpolation of Chlorobenzene concentrations within the 1 meter interval below the dredge cut in the ILWD and associated Hot Spot exceedances

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QEA

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LD - H:\090139-01_Parsons-Onondaga\Cap_IDS\GIS\mxds\ILWD_HotSpot\ILWD_Hort_Spot_Interpolation_091105.mxd

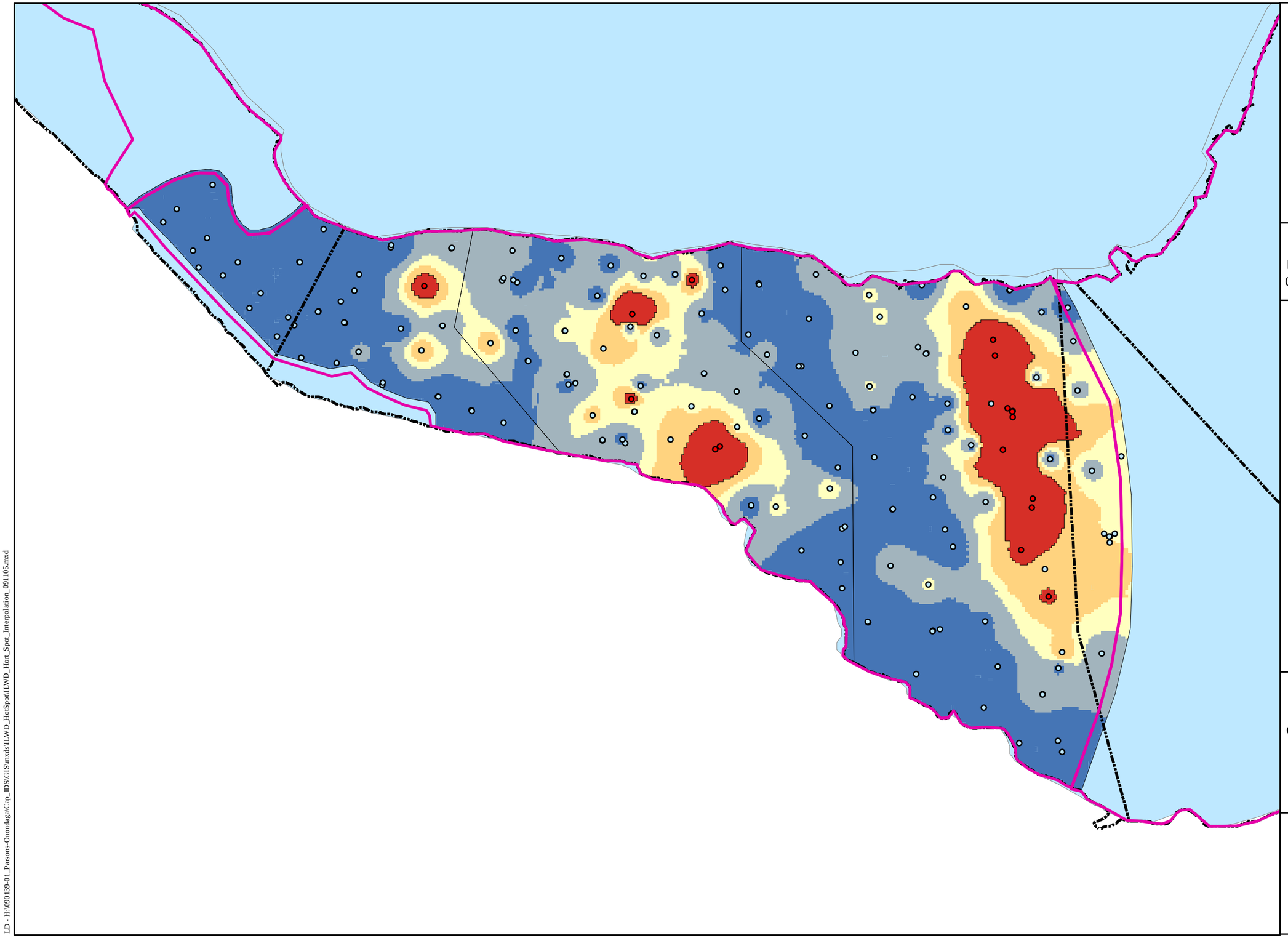

Figure G-27
Interpolation of Dichlorobenzene concentrations within the 1 meter interval below the dredge cut in the ILWD and associated Hot Spot exceedances

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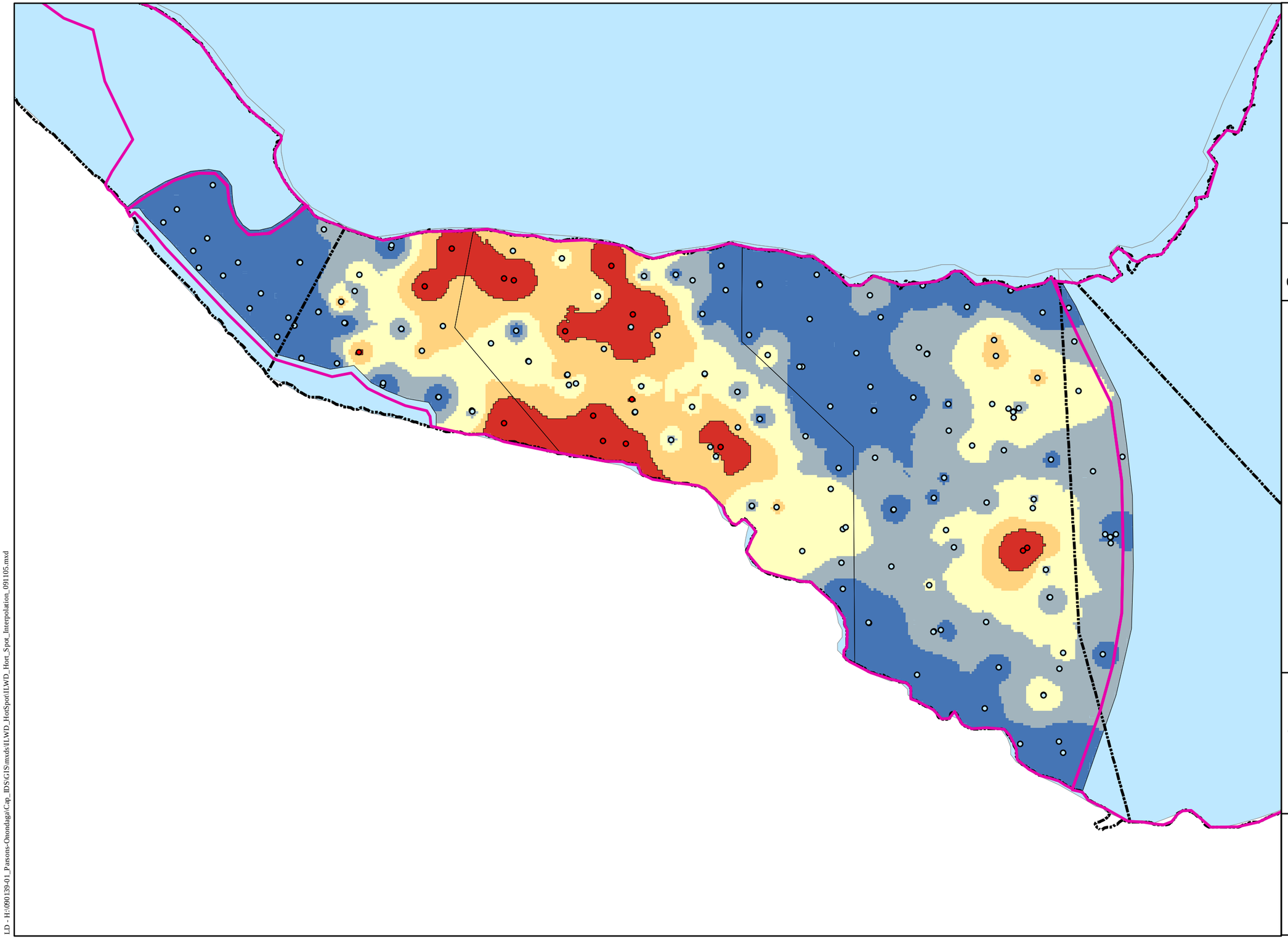
LD - H:\090139-01_Parsons-Onondaga\Cap_IDS\GIS\mxds\ILWD_HotSpot\ILWD_Hort_Spot_Interpolation_091105.mxd



Locator

Scale

0 200 400 600 800 Feet

Legend

- Remediation Area Boundary
- SMU Boundary
- < Hot Spot Criteria
- > Hot Spot Criteria

Concentration (mg/kg)

- 0 - 20
- 20 - 40
- 40 - 80
- 80 - 142
- > 142 (HS Criteria)

Note: Values displayed represent the maximum concentrations in the 1-m interval below the dredge elevation for core sections with at least 50% of the section in that interval. Concentrations were interpolated using the Inverse Distance Weighted (IDW) method (Power = 2).

Figure G-28
Interpolation of Xylene concentrations within the 1 meter interval below the dredge cut in the ILWD and associated Hot Spot exceedances

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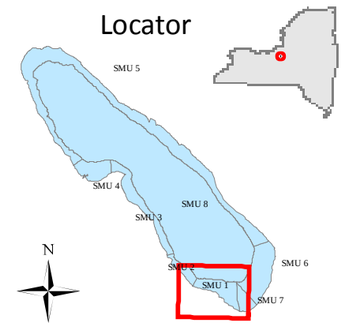
I:\D - H:\090139-01_Parsons-Onondaga\Cap_IDS\GIS\mxds\ILWD_HotSpot\ILWD_Hort_Spot_Interpolation_091105.mxd

Hot Spot A
Hot Spot B
Hot Spot C
Hot Spot D
Hot Spot E
Hot Spot F
Hot Spot G
Hot Spot H
Hot Spot I
Hot Spot J

Locator



Scale

0 200 400 600 800 Feet

Legend

- Remediation Area Boundary
- SMU Boundary
- < Hot Spot Criteria
- > Hot Spot Criteria
- Hot Spot Removal Boundary

Note: Combined Hot Spot removal boundaries based on merging of individual constituent Inverse Distance Weighted (IDW) Hot Spot interpolations.

Figure G-29
Boundaries of combined Hot Spot exceedances within the 1 meter interval below the dredge cut in the ILWD

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