Using PAH Compositional Analysis to Evaluate Dissolved-Phase Groundwater Discharge to Surface Water from Local Soil/Sediment Influence

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Framing the Issue

Focus on Groundwater-Surface Water interaction increasing nationally

Key issues and questions:

- GW dissolved-phase PAHs plume discharge?
- Soil/GW conditions in upland source areas
- GW "flushing" of PAHs in pore water?
- Pore water advection of PAHs into SW?
- Sediment/pore water conditions in SW discharge areas
- What can PAH compositions tell us?

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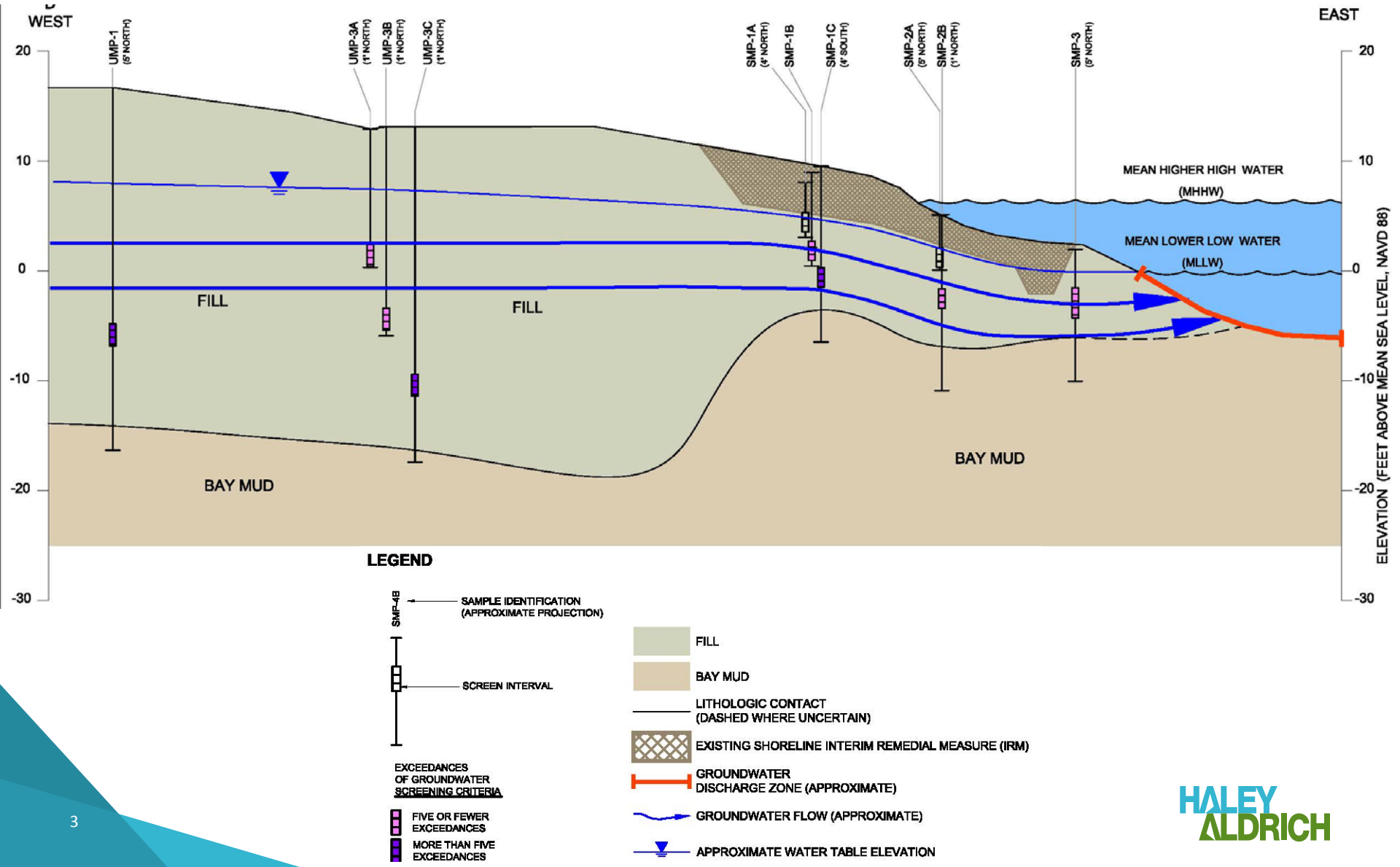
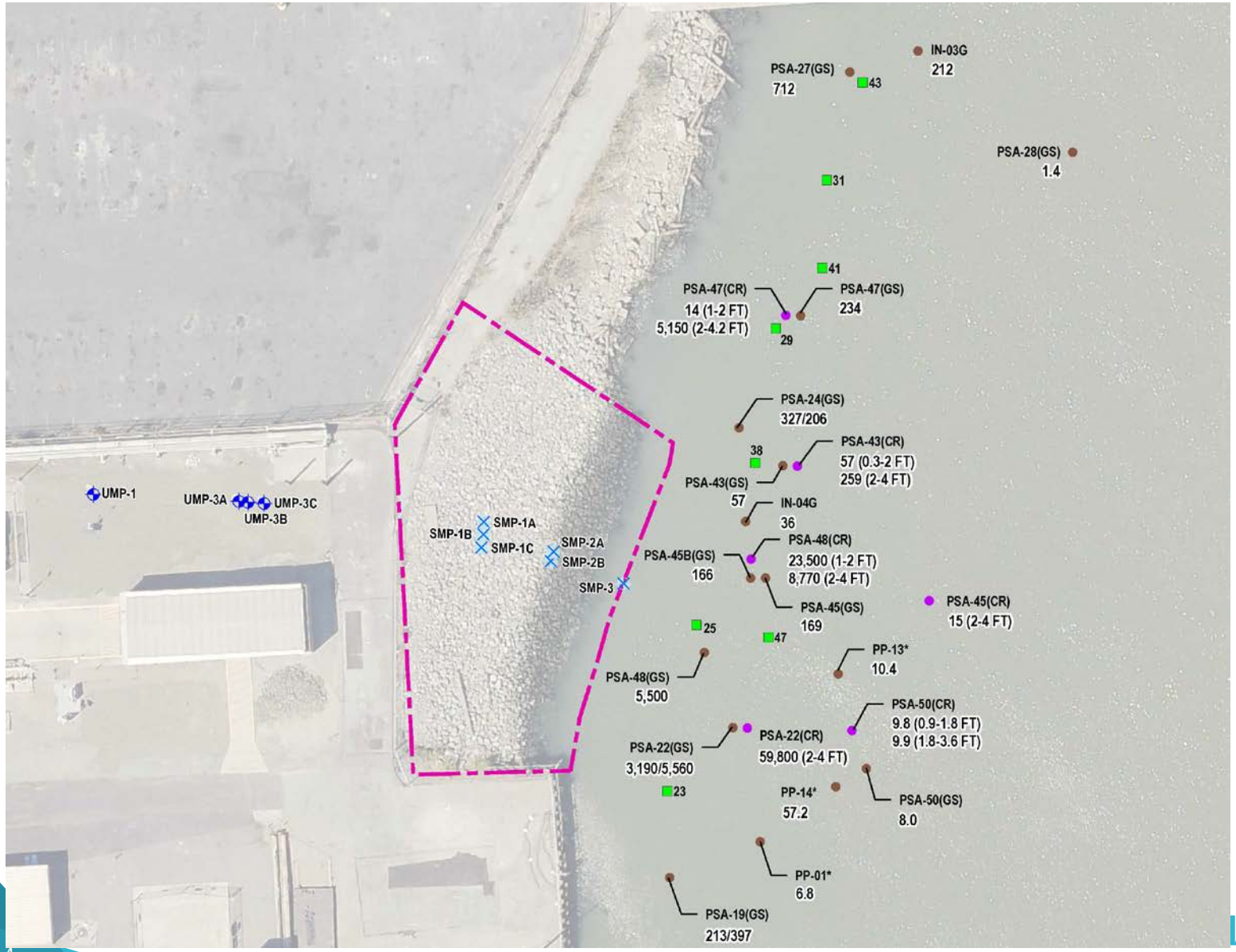
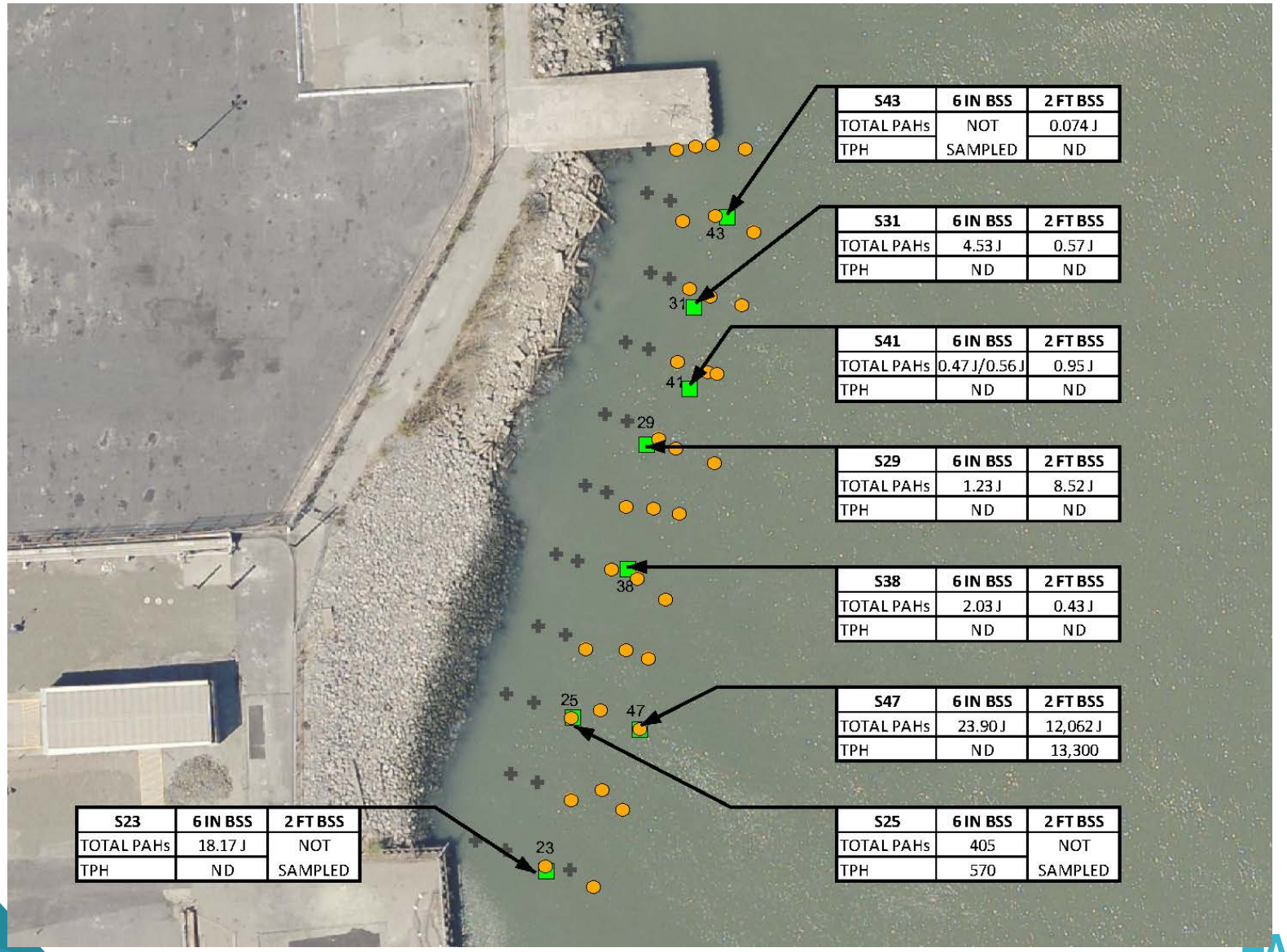
Conceptual Groundwater Discharge Model



Groundwater and Sediment Stations



In-Situ Pore Water Sampling Locations



S43	6 IN BSS	2 FT BSS
TOTAL PAHs	NOT	0.074 J
TPH	SAMPLED	ND

S31	6 IN BSS	2 FT BSS
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S25	6 IN BSS	2 FT BSS
TOTAL PAHs	405	NOT
TPH	570	SAMPLED

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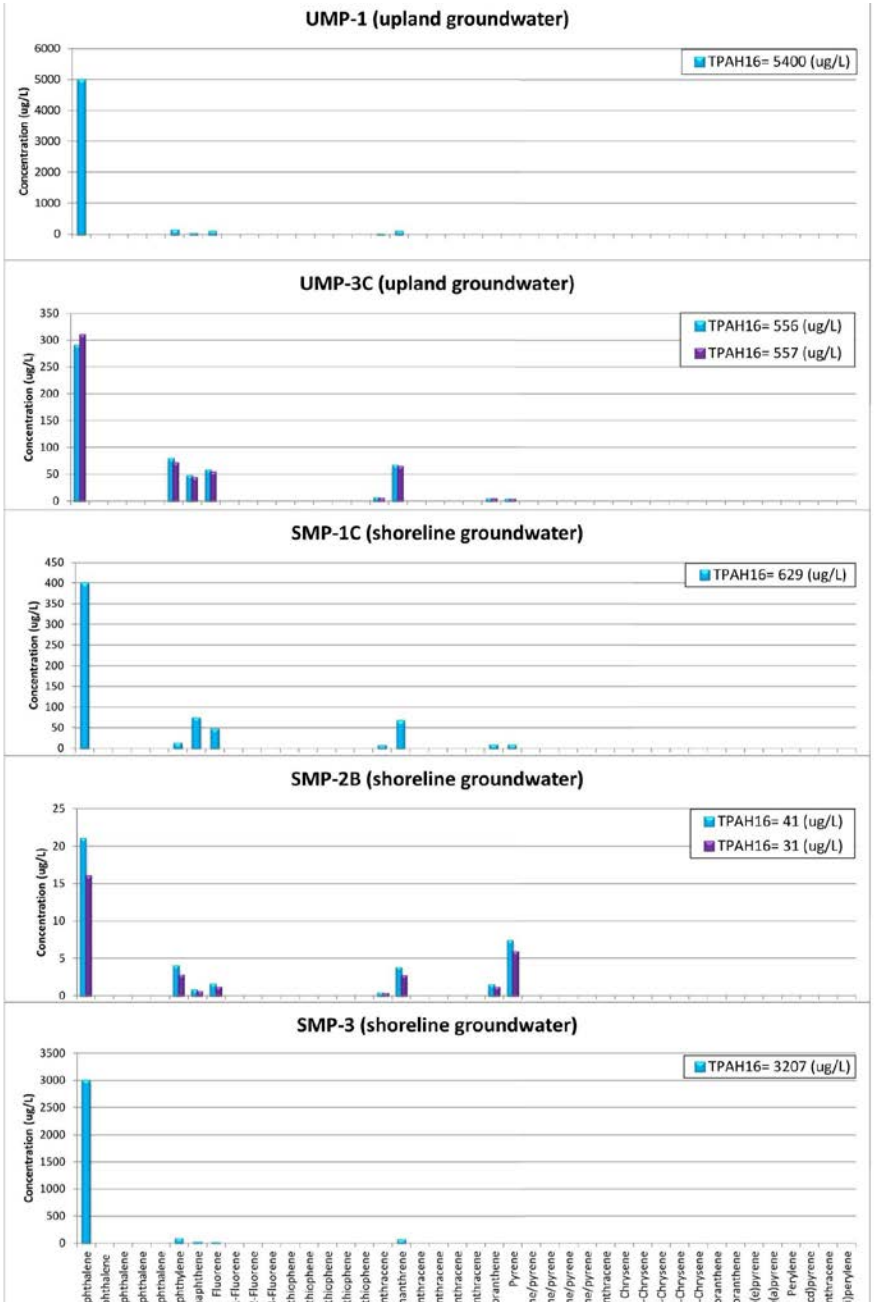
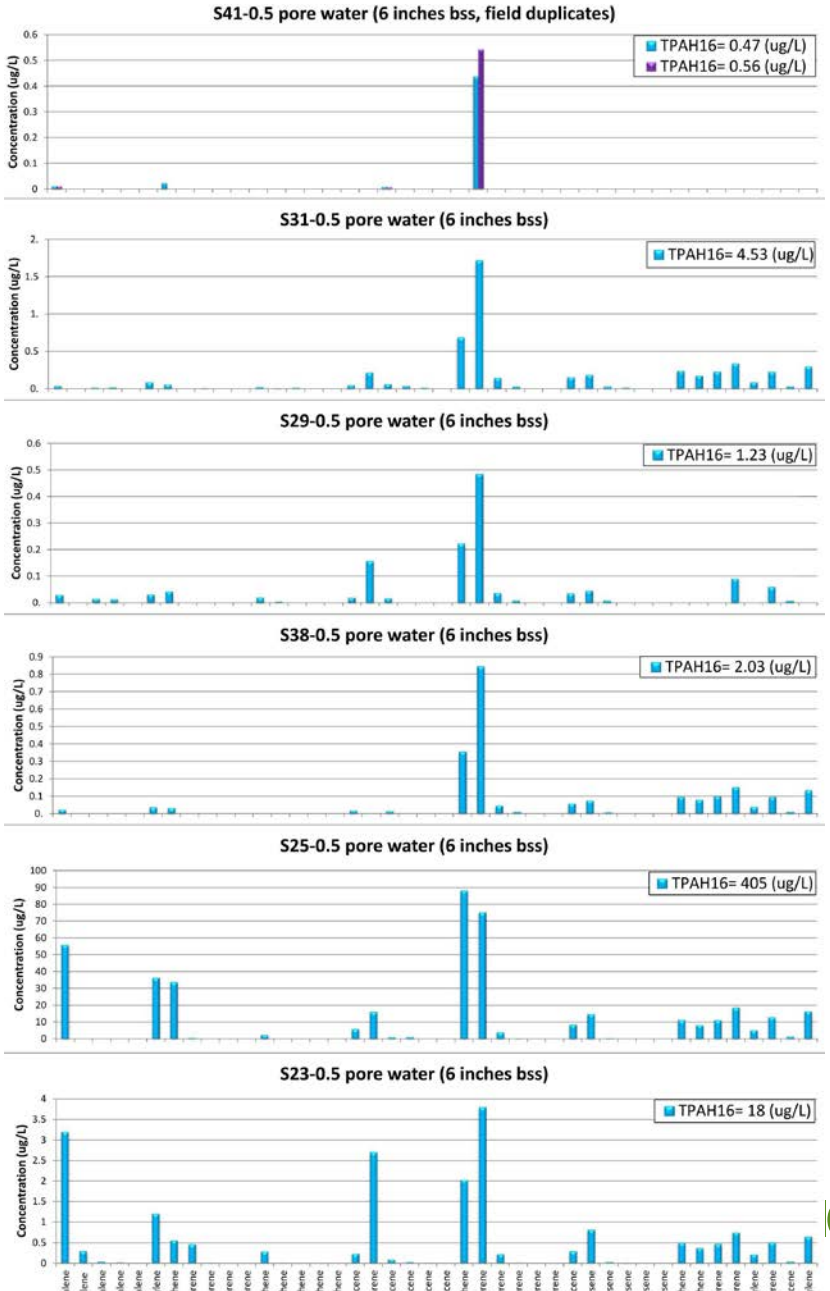
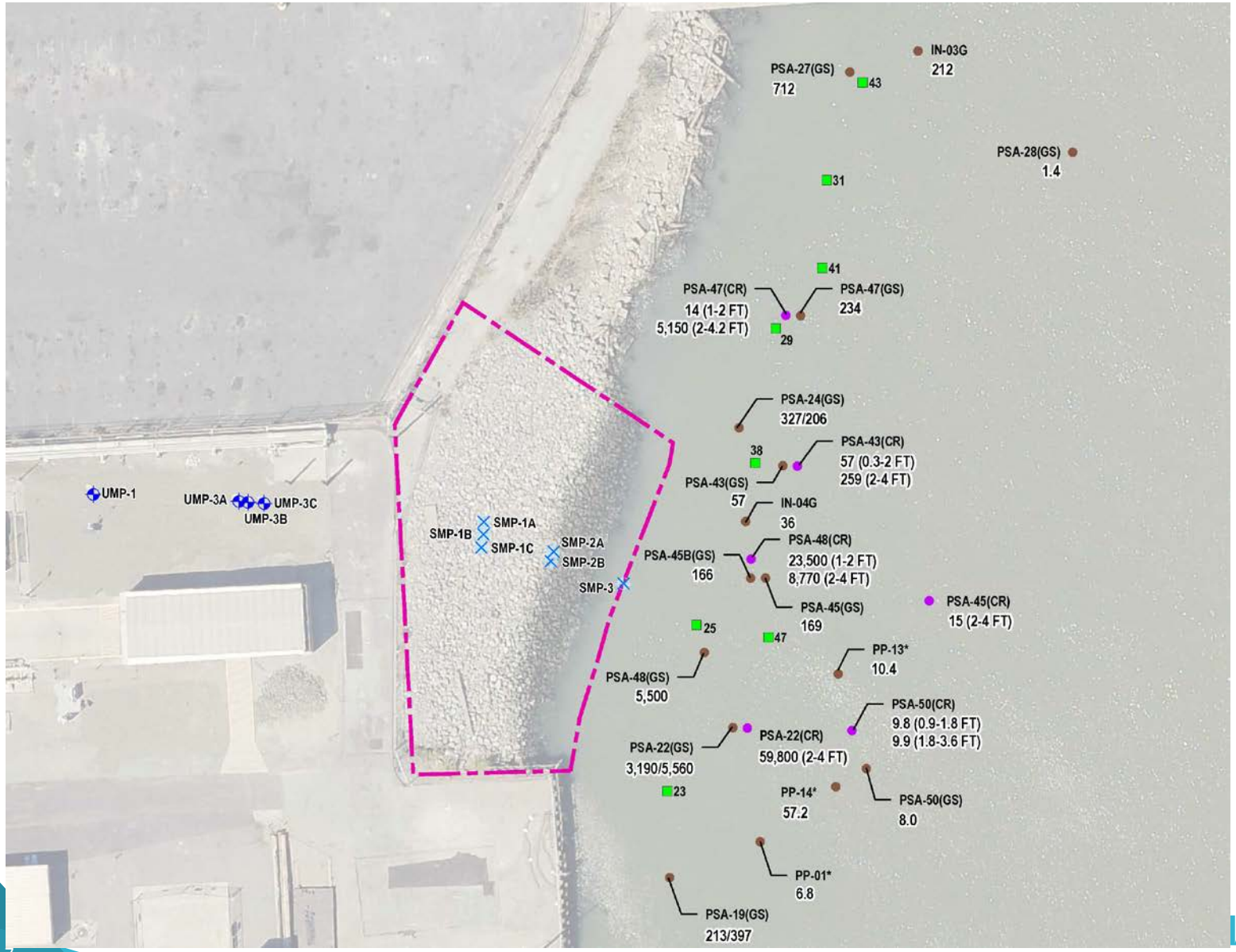
Groundwater



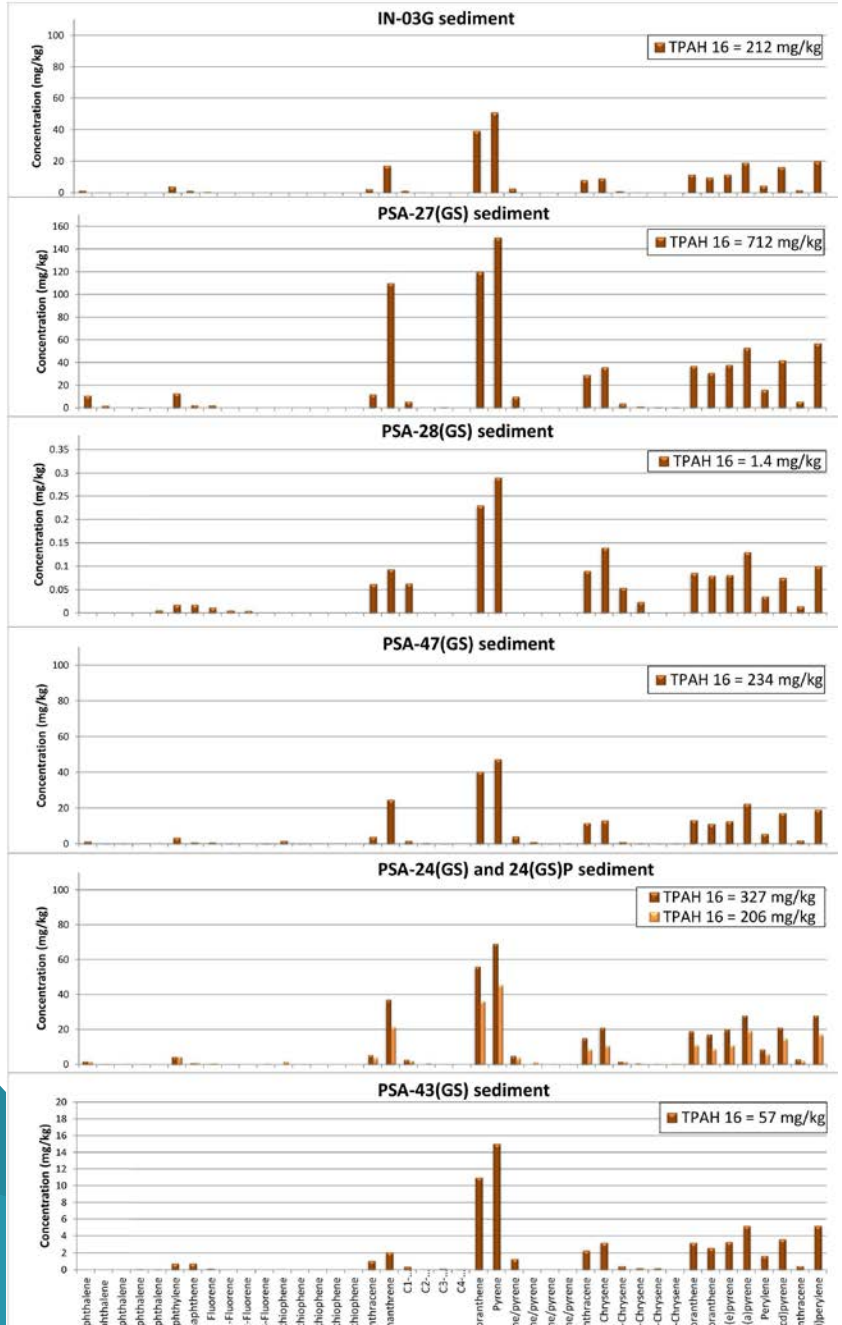
Shallow Pore Water



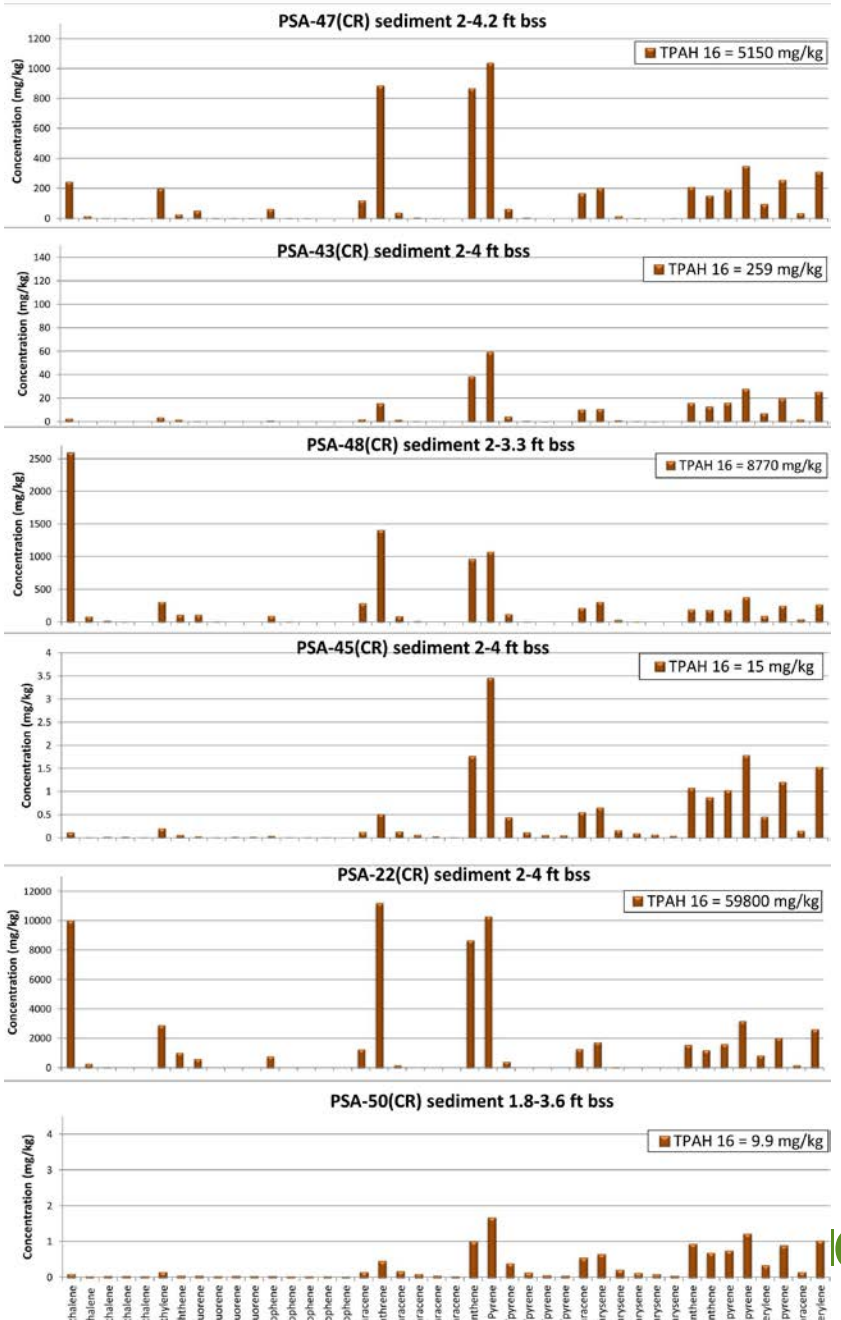
Groundwater and Sediment Stations



Surface Sediment



Sediment 2-4’ bss



Framing the Issue

Key issues and questions:

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- Sediment/pore water conditions in SW discharge areas
- What can PAH compositions tell us?

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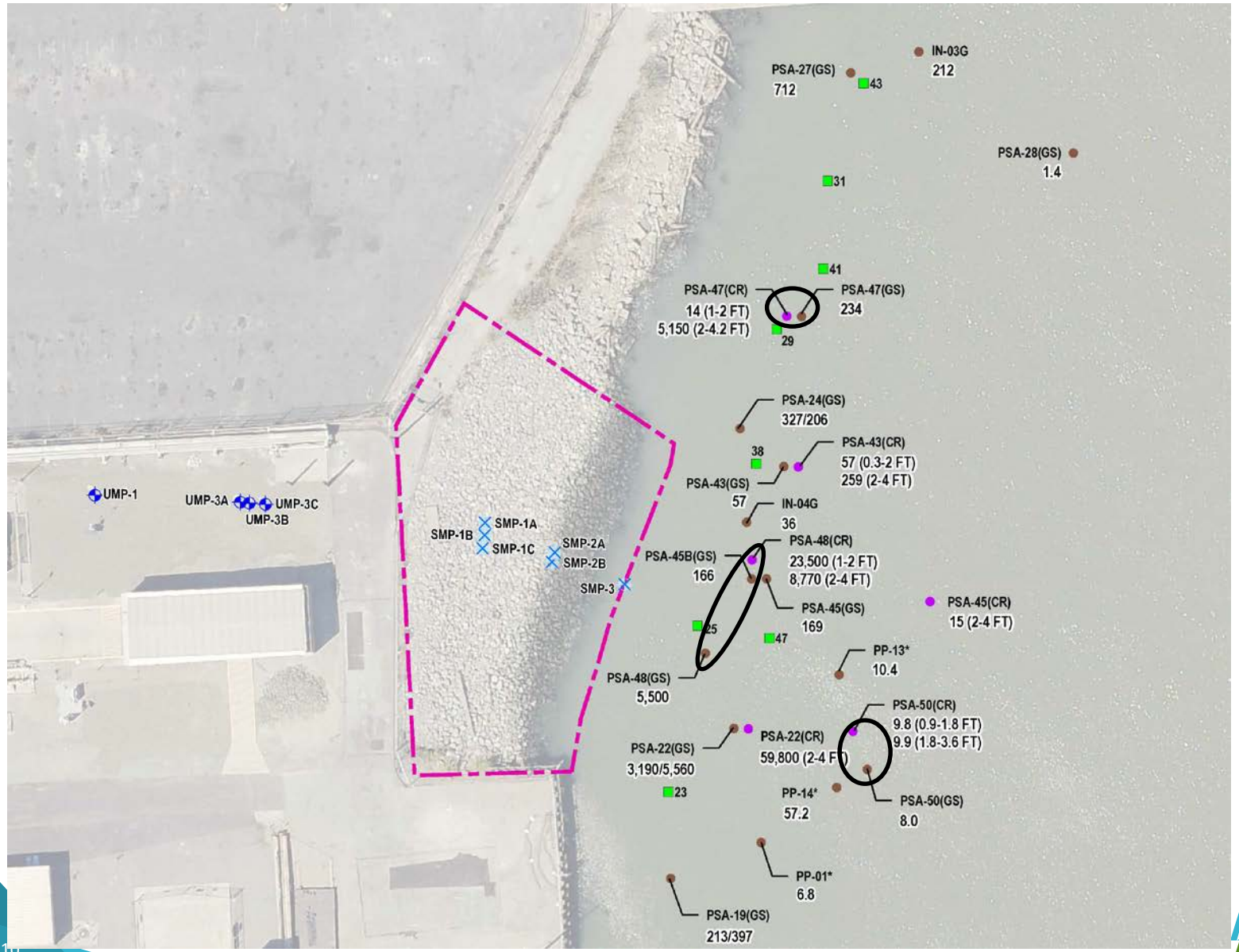
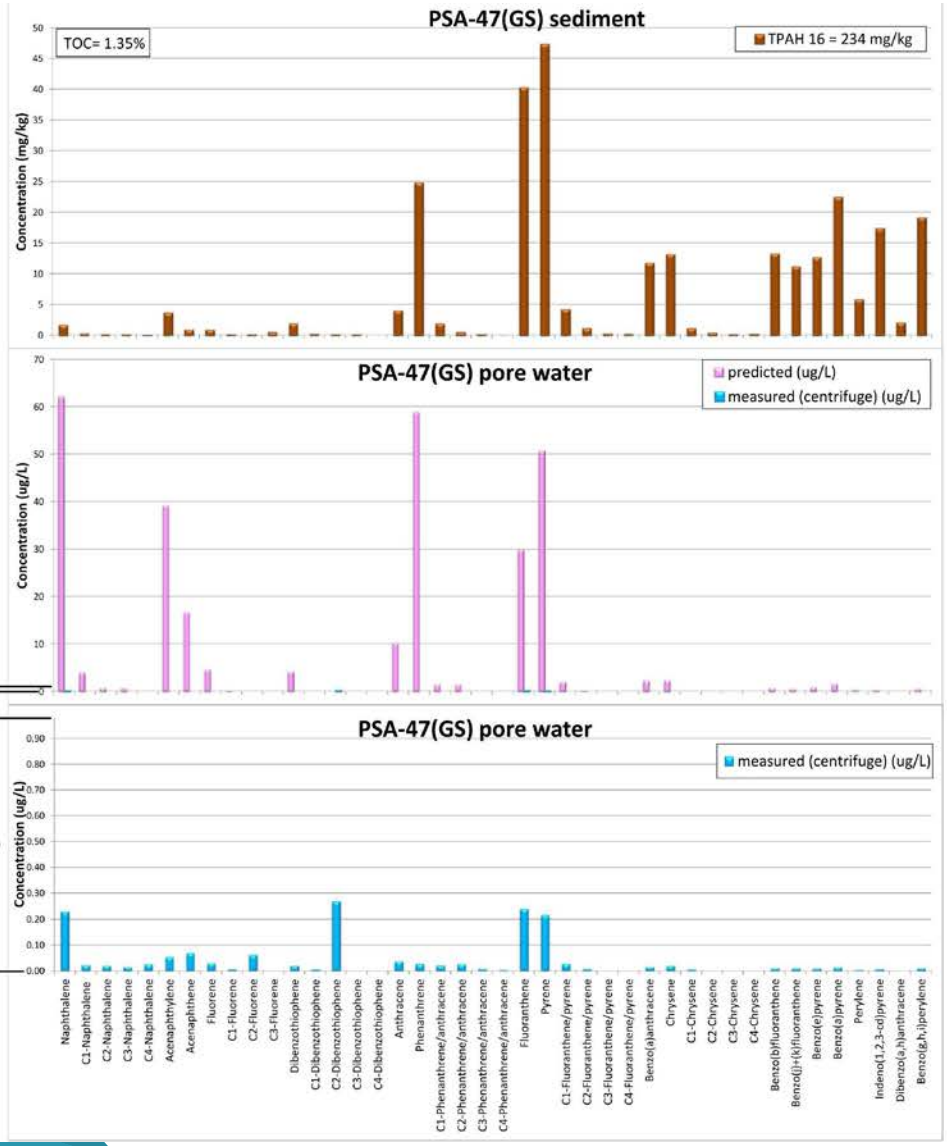
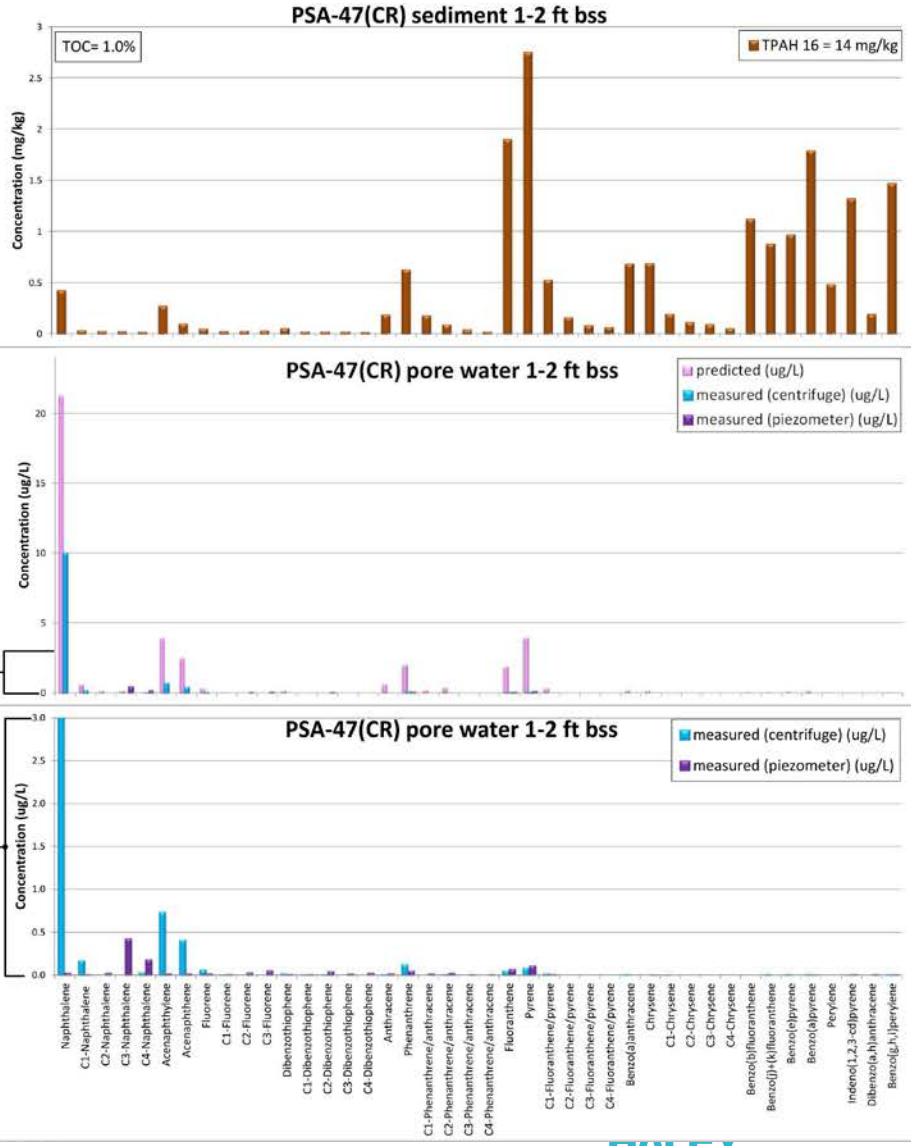
Centrifuged Pore Water Samples

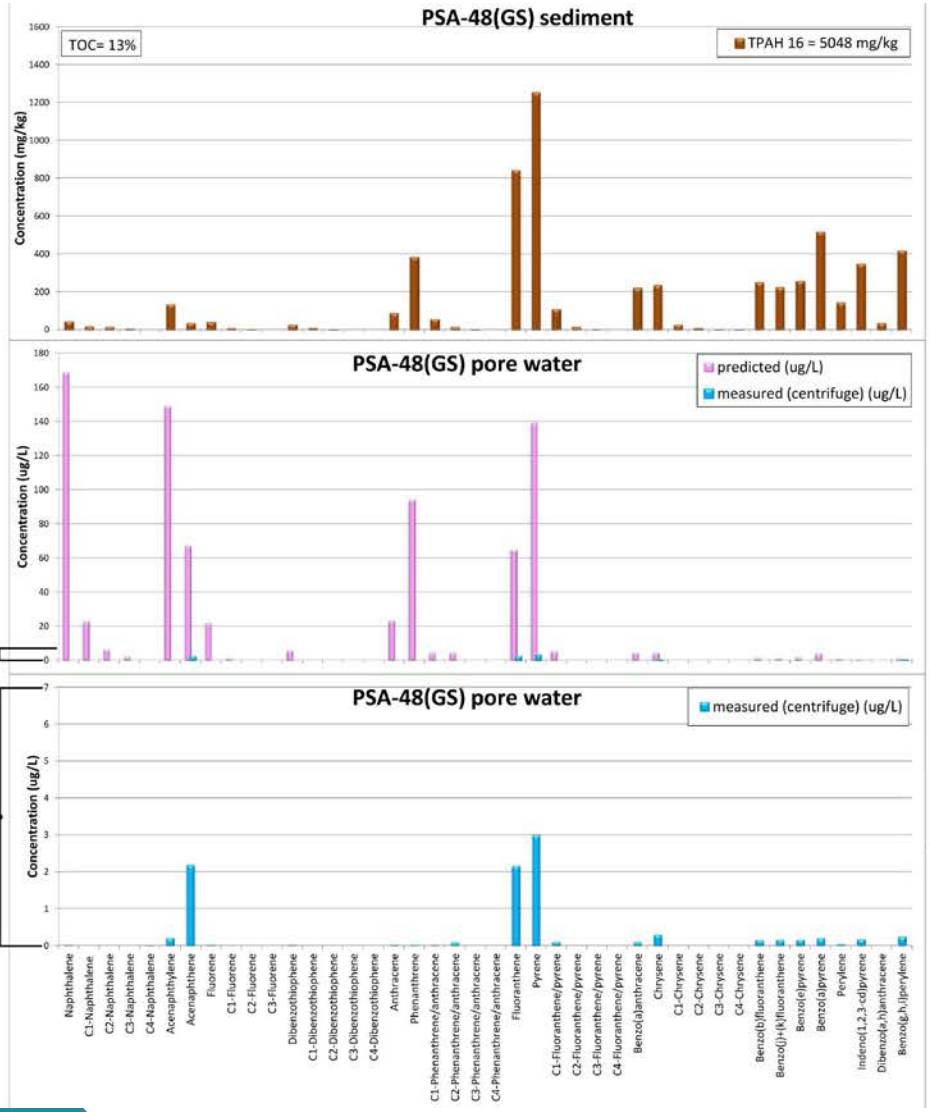


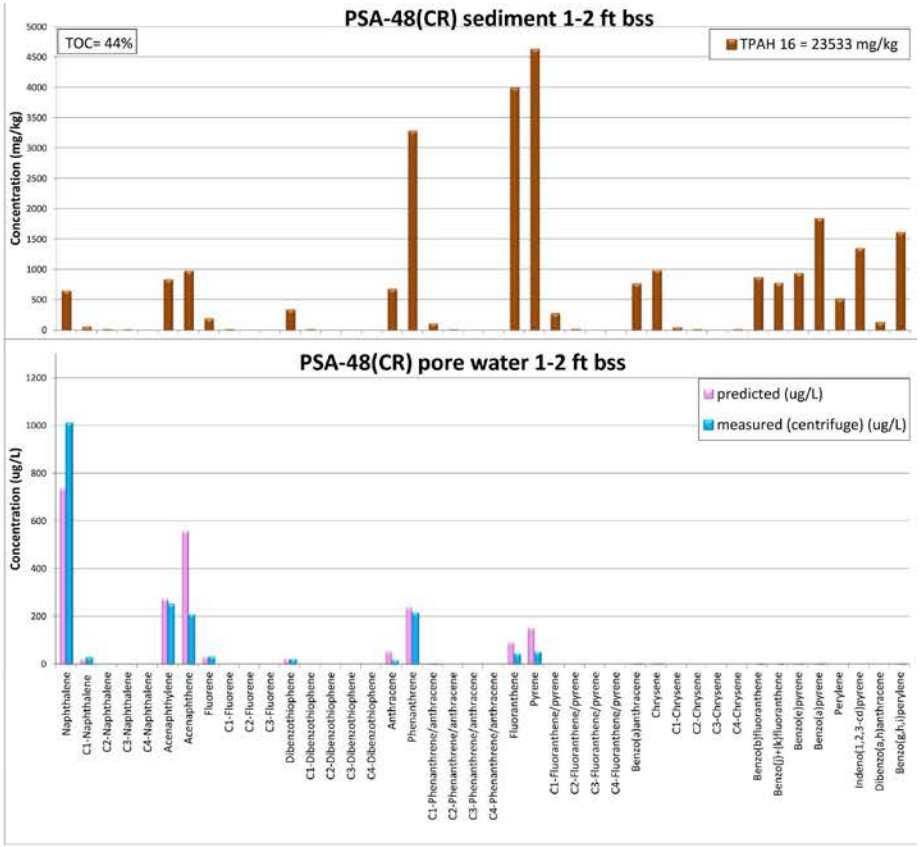
Measured vs. Predicted Pore Water, PSA-47



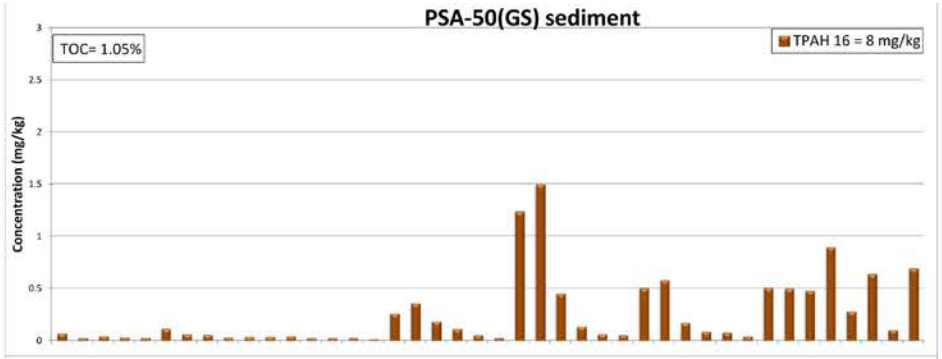


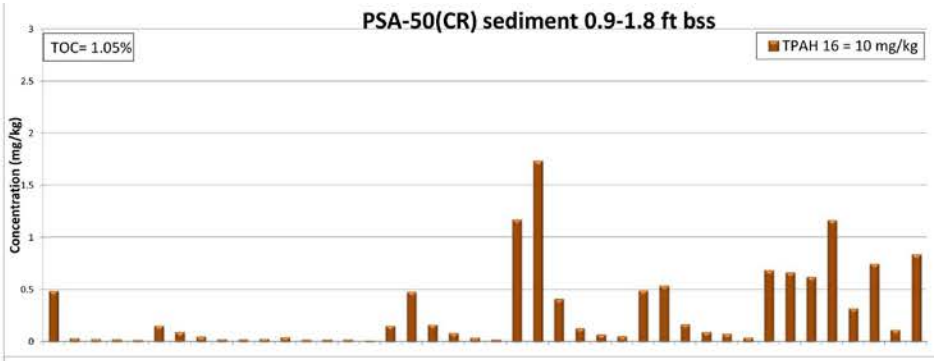
Measured vs. Predicted Pore Water, PSA-48

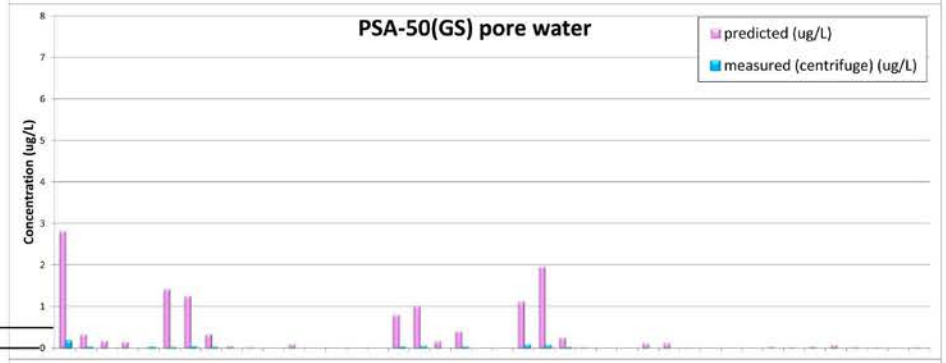


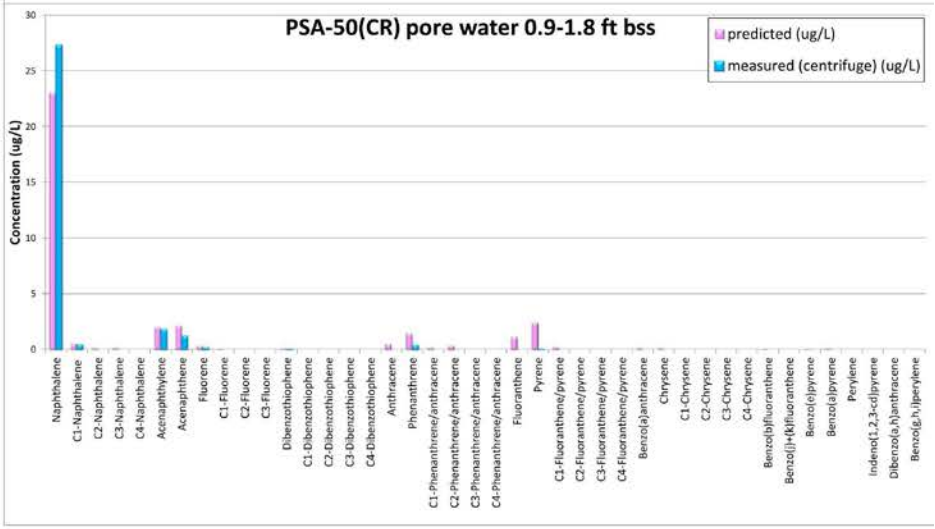


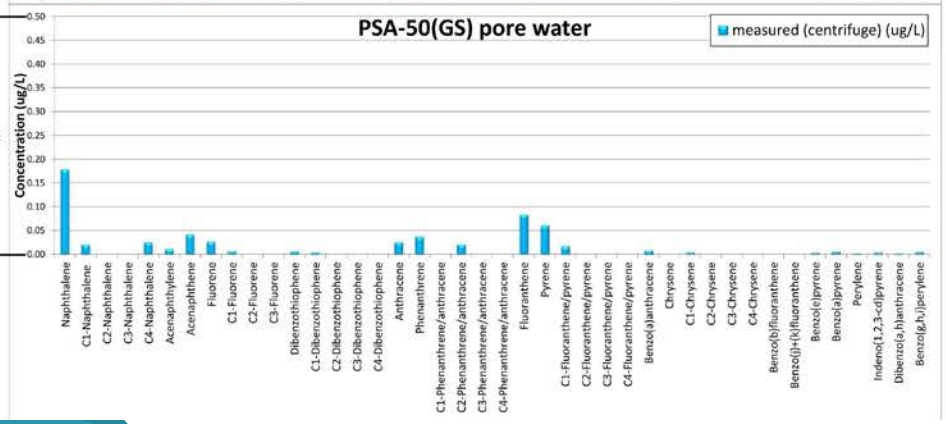
Measured vs. Predicted Pore Water, PSA-50



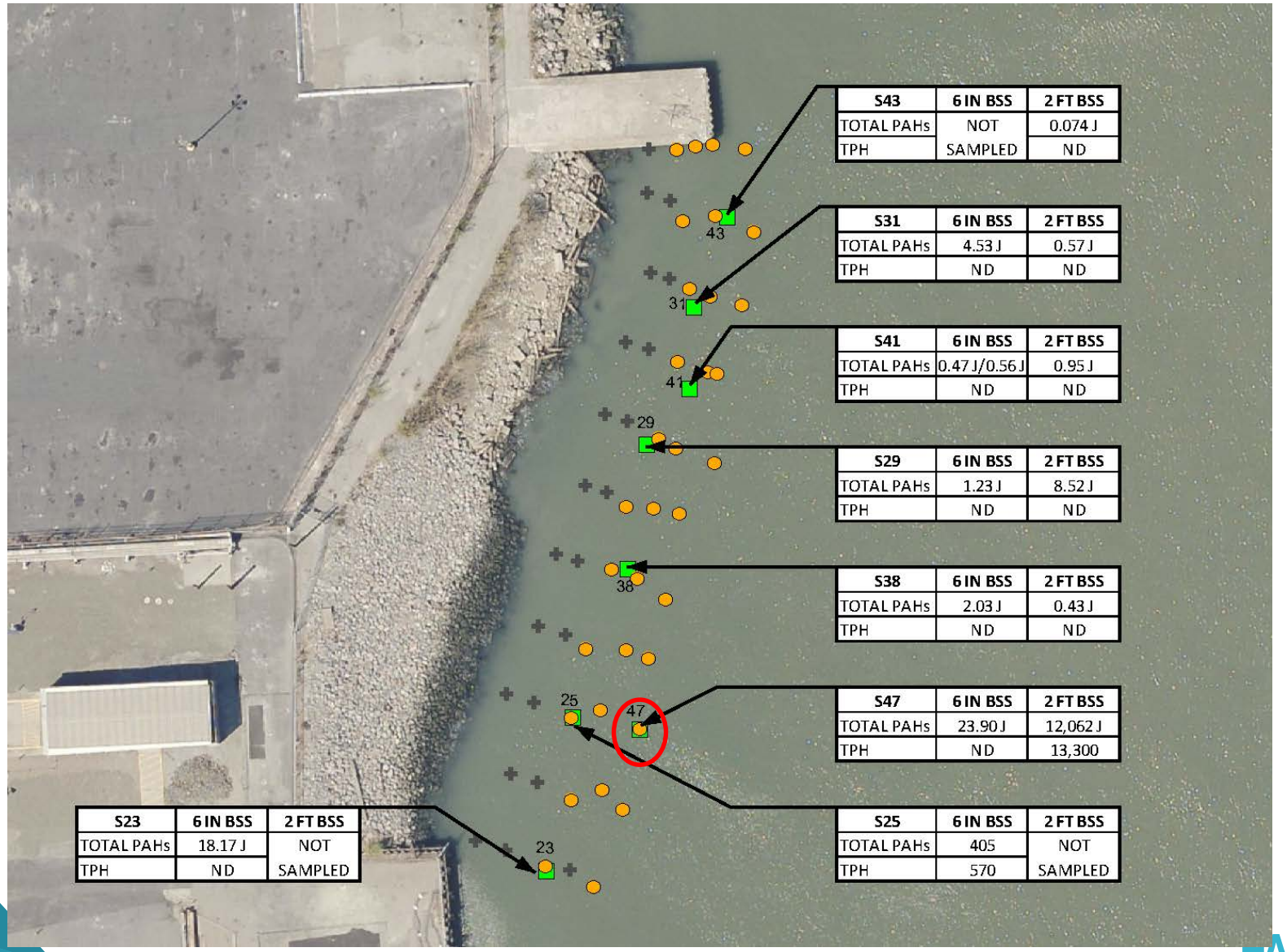








In-Situ Pore Water Samples from S47



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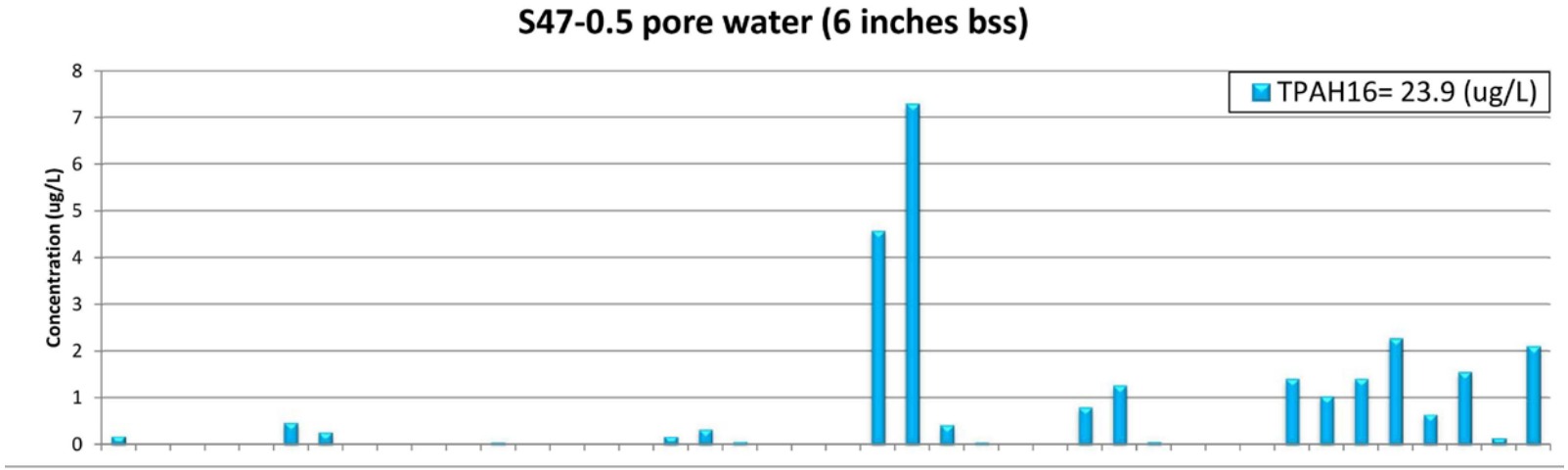
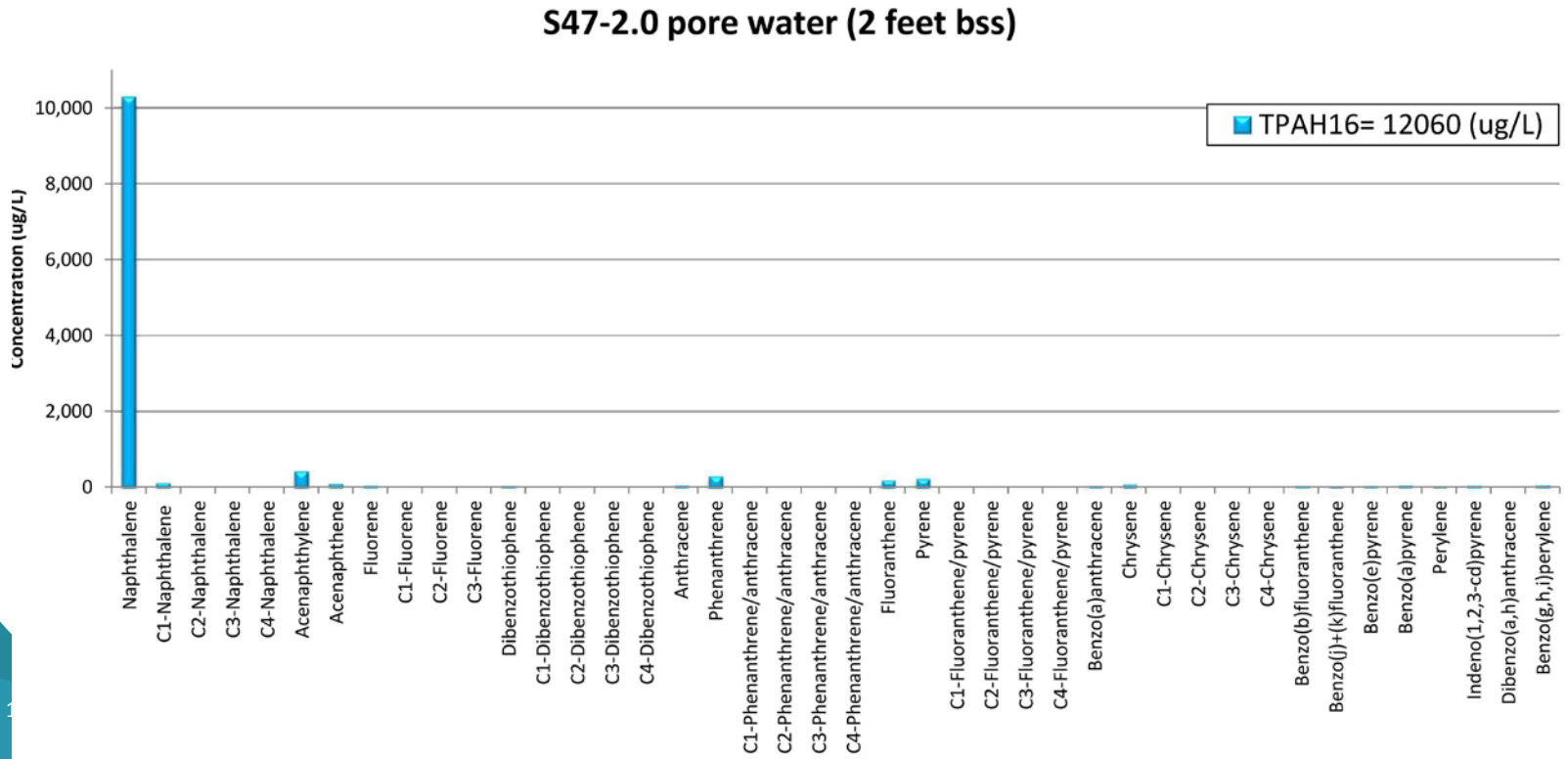
Pore Water Samples Separated by 18 inches





Summary

- GW dissolved-phase PAHs plume discharge?
  - Site conceptual model – hydrogeology
  - Contaminant vertical stratification in GW
  - Model then delineate discharge zone (when possible)

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Summary

- GW “flushing” of PAHs in pore water?
- Pore water advection of PAHs into SW?
  - Characterize sediment and pore water within GW discharge flowpath
  - Shallow (~ 6 in) and subsurface (~ 2 ft)
  - Predict concentration & composition in pore water (EqP model)
  - Compare measured values

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Conclusions

- PAH composition helps inform sediment/pore water

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