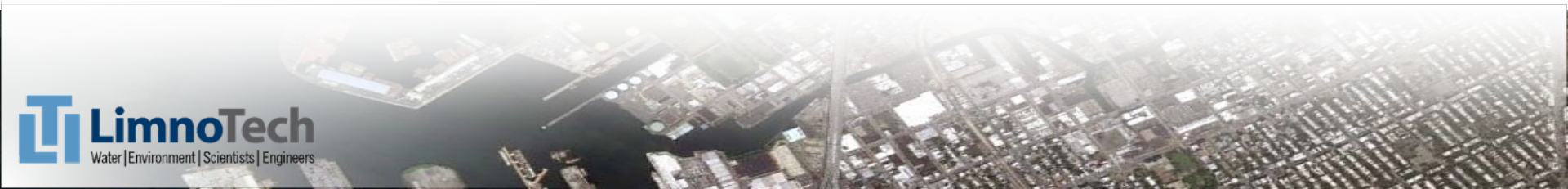


**Preview of Forthcoming  
Guidance Document:  
“Performing a Sediment Erosion  
and Deposition Assessment  
(SEDA) at Superfund Sites”**

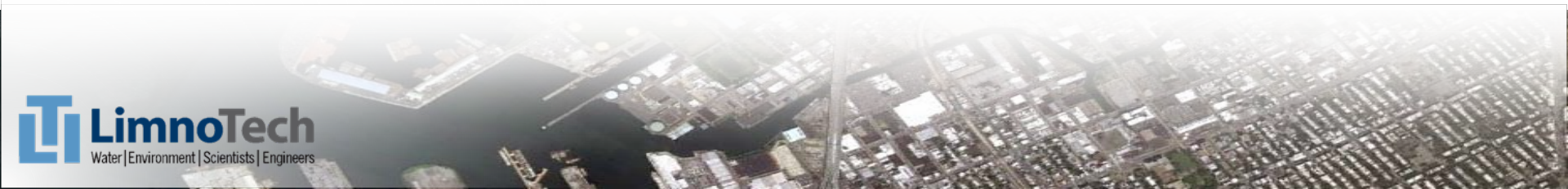
SMWG Sponsor Forum

October 2011



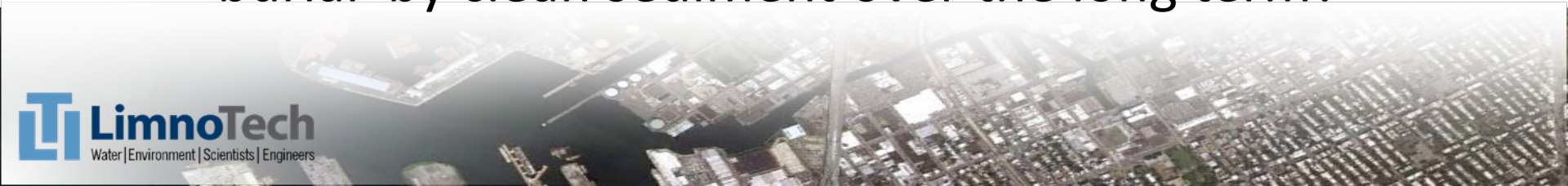
# Authors/Acknowledgements

- John Wolfe, Tim Dekker, and Todd Redder, LimnoTech
- Earl Hayter, Army Corps of Engineers
  - Earl is primary author of the guidance document, which is currently in draft under EPA review
- Acknowledgements to Steve Ells, USEPA, and Karl Gustavson, USACE

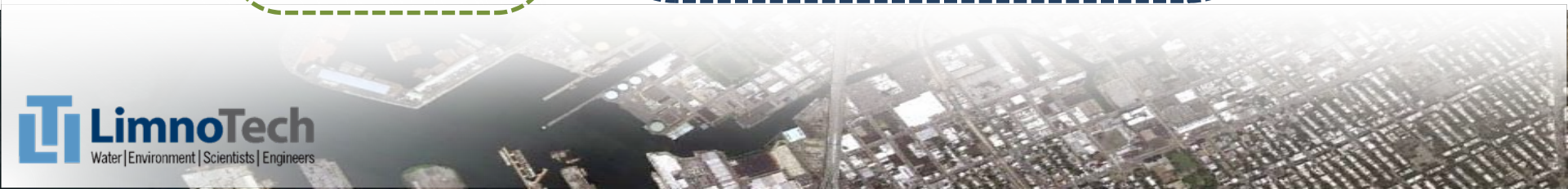
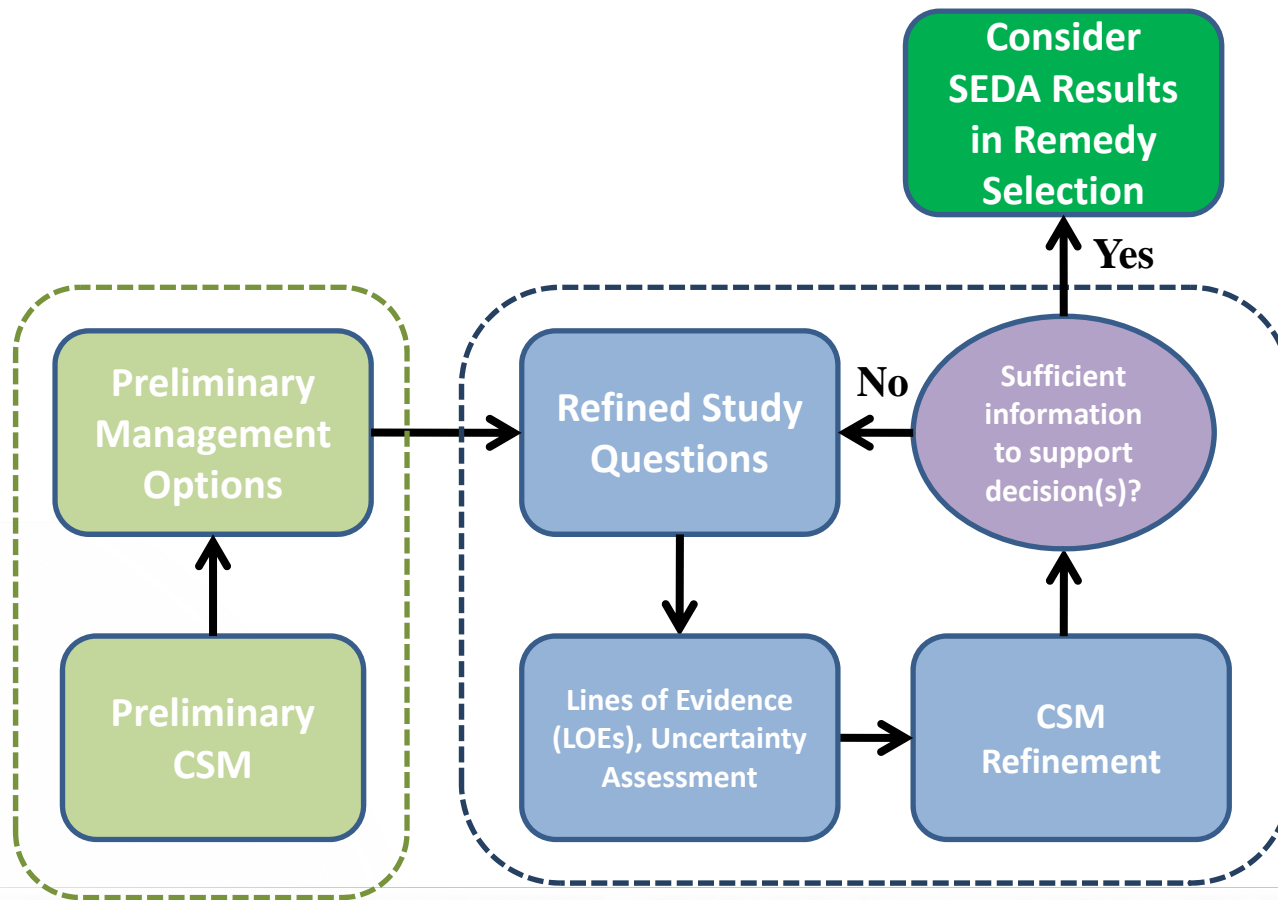


# Objectives of SEDA Guidance

- At many sites, contaminants are a legacy of historical sources that have been controlled
  - Highly contaminated material is often buried by cleaner sediment
  - The presence of sediment deposits indicates some degree of inherent long-term stability
- What is the likelihood of:
  - disruption/exposure under extreme conditions?
  - burial by clean sediment over the long term?

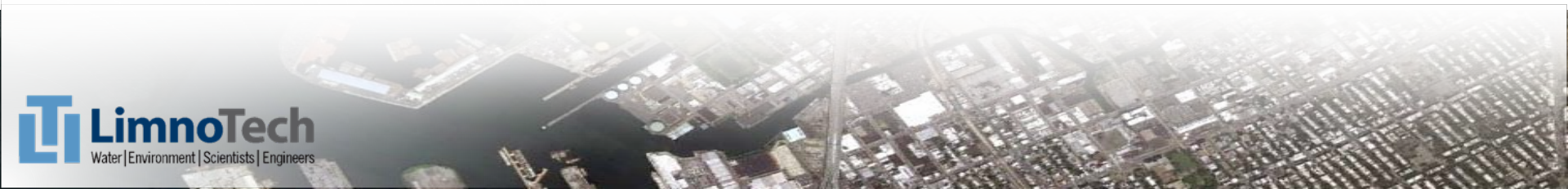


# The Role of SEDA in Decision-Making



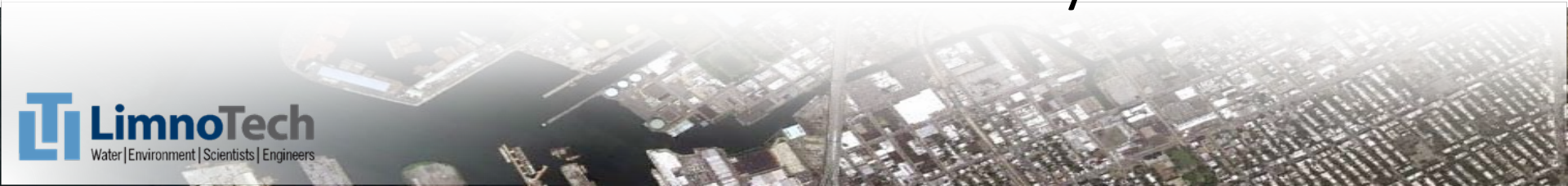
# Most Important Study Questions for SEDA

- Where Monitored Natural Recovery is being considered:
  - What is the probability of erosion of the surface layer, resulting in exposure of buried sediment posing unacceptable risks?
  - What is the likelihood that exposures to surface sediments will be reduced to acceptable levels in a reasonable time by deposition of clean sediments?



# Possible SEDA Outcomes

- Probability of erosion events is low and/or magnitude of resulting risk would be low
  - This could include exposures that are short-lived or small in extent
  - Then the sediments can be considered “stable” for remedial decision-making
- Significant probability of an event producing an unacceptable increase in risk
  - Then sediments are not sufficiently stable

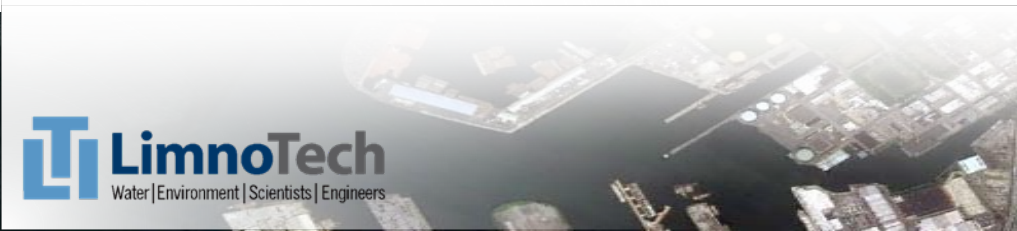
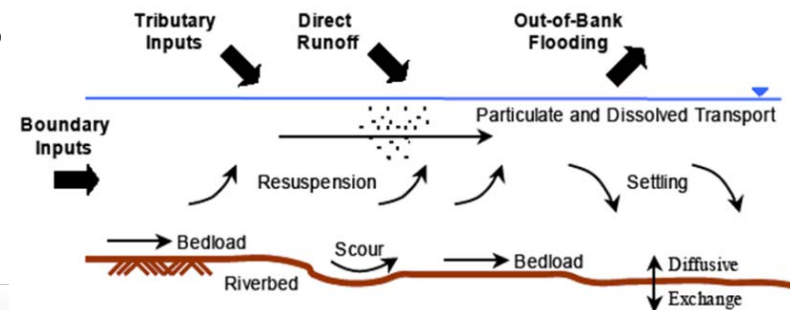


# More Key Study Questions

- Where *In Situ* Remedies are considered:
  - Where unacceptable risk could be mitigated with an armored cap: What is the likelihood that the risk reduction will be permanent?
  - Where *In situ* amendments could reduce bioavailability: Is armor needed to protect those amendments from loss due to erosion?
- Where Dredging is considered:
  - Sand backfill could reduce risk to acceptable levels. How permanent is the protection?

# Elements of the SEDA

1. Identifies processes/mechanisms that might result in erosion and deposition
2. Determines the most appropriate methods to assess erosion and deposition
3. Quantifies erosion and deposition under varying flow conditions

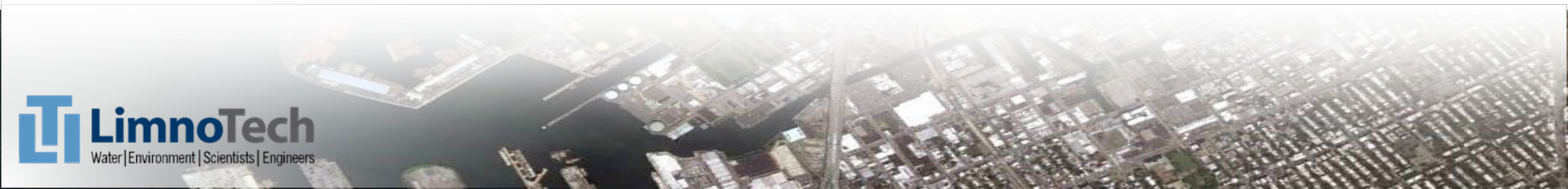


# The Scientific Method (TSM) is the Unifying Principle

- Define the question
- Gather available information and resources
- Develop hypotheses (CSM)
- Collect data as needed to fill in gaps
- Analyze & interpret new and old data, test hypotheses, and draw conclusions
- If not yet answered, restate the question, test new hypotheses, and refine CSM

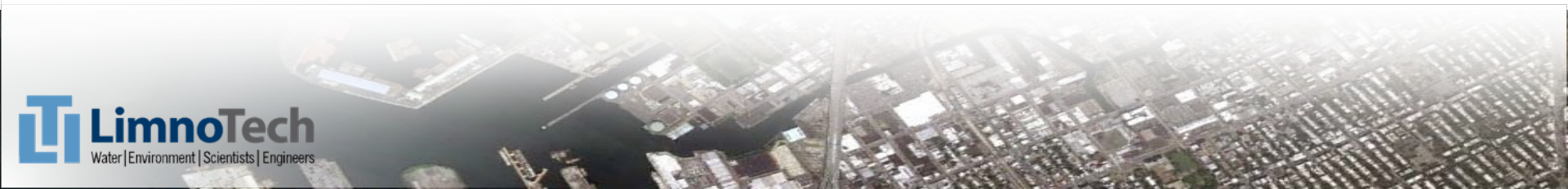
# When is a SEDA Appropriate?

- *Not required* as part of RI/FS, but
  - *Should* be performed as part of RI, especially at large sites where future transport or exposure of contaminated sediments could cause risk
  - Appropriate for both fresh-water and near-shore marine sediment sites
- Use findings from SEDA:
  - In developing alternatives for the FS
  - To support the remedy decision



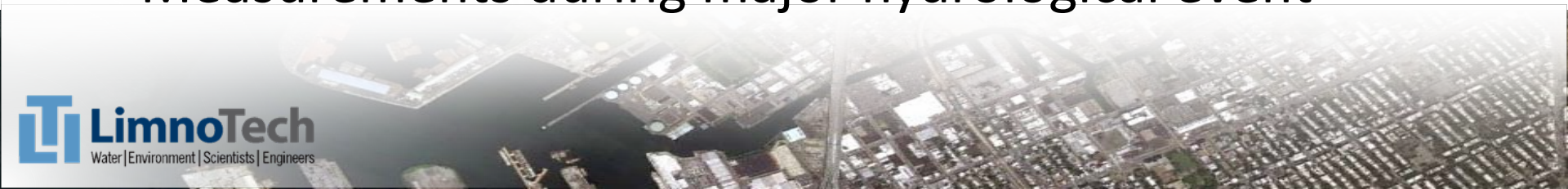
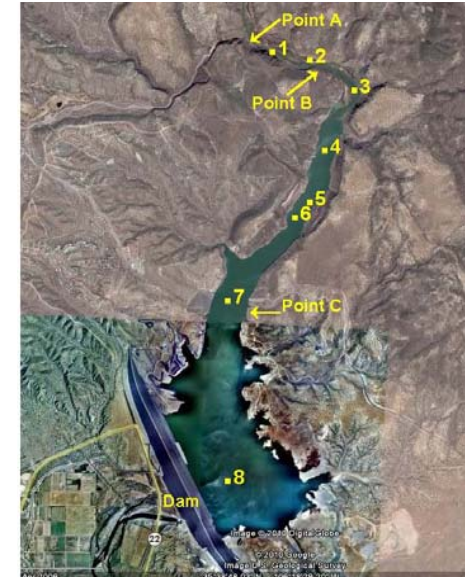
# Design of a SEDA

- No single design for all sites – depends on scale and complexity of site
  - Simple sites: representative cores, understanding of physical environment may suffice
  - More complex: may need better understanding of flow stage and sediment transport based on empirical and modeled relationship
  - Most complex: may need linked hydrodynamic/sediment transport/contaminant transport model



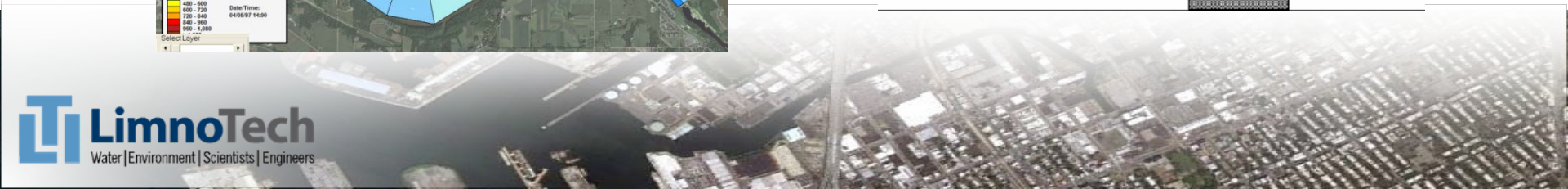
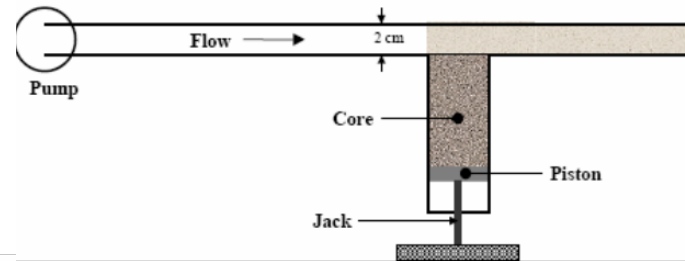
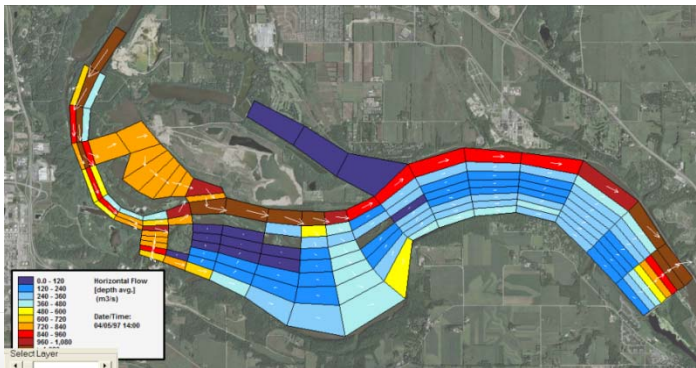
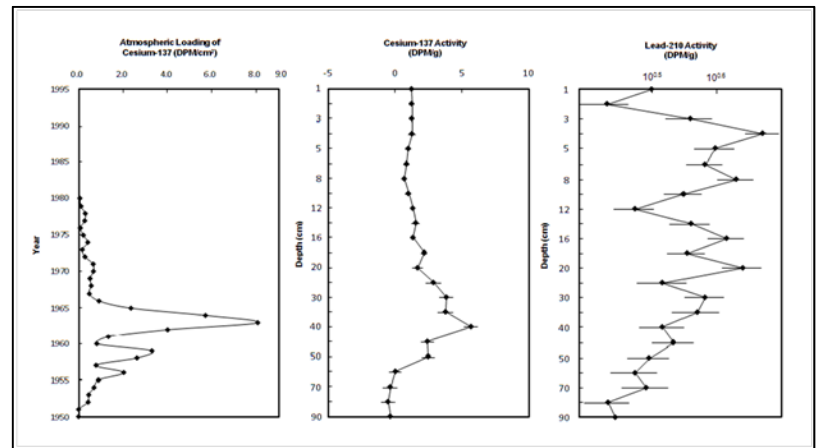
# SEDA Assessment Methodologies

- Current & historical site review
- Bathymetry
- Hydrodynamic assessment
- Geomorphology assessment
- Evaluate anthropomorphic impacts
- Sediment stratigraphy and geochronology
- Quantification of erodibility
- Measurement of settling velocity
- Measurements during major hydrological event



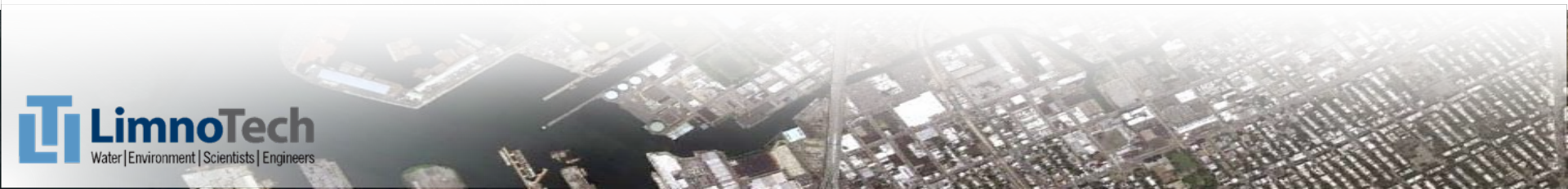
# Multiple Lines of Evidence (LOE)

- Likely that no single data set will be sufficient
  - Historic data
  - Present study data
  - Forensic data
  - Model simulations



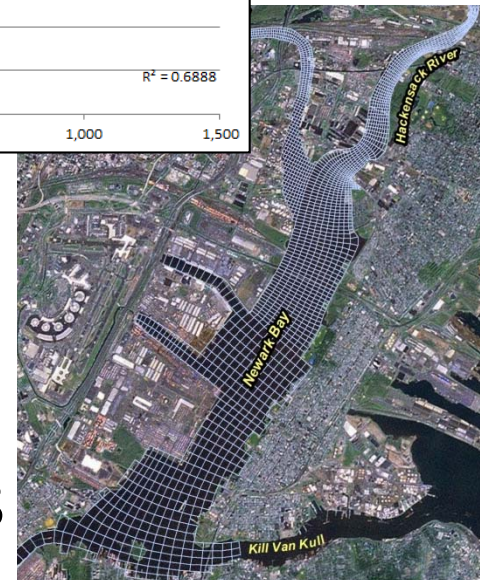
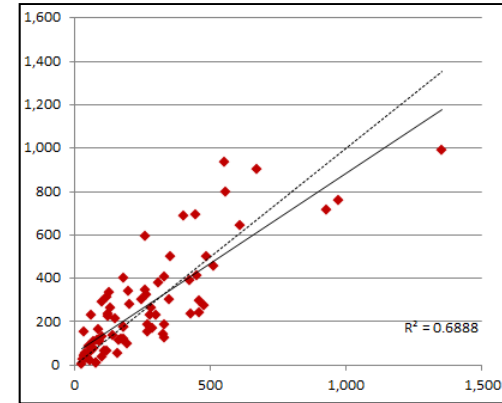
# Uses of Models

- Identify data gaps
- Illustrate spatial variation in properties
- Predict transport over years to decades
- Predict future exposures
- Compare modeled results to measurements and test for convergence to quantify uncertainty



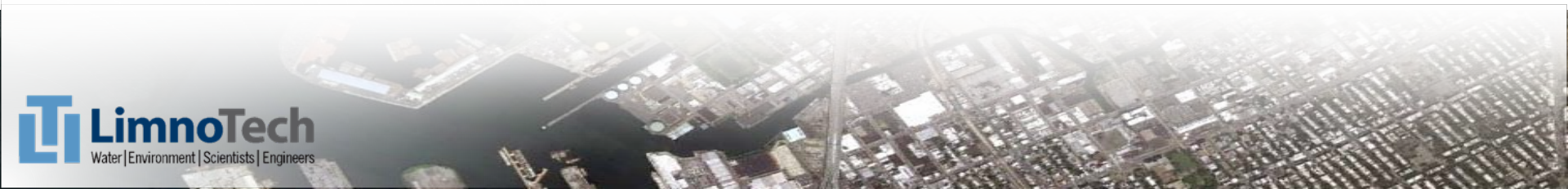
# Modeling Recommendations

- Select an appropriate model
  - Analytical model
  - Regression model
  - Numerical model
- Use a phased approach
- Avoid developing new frameworks
- Contract with experienced modelers
- Seek collaboration among EPA & PRPs

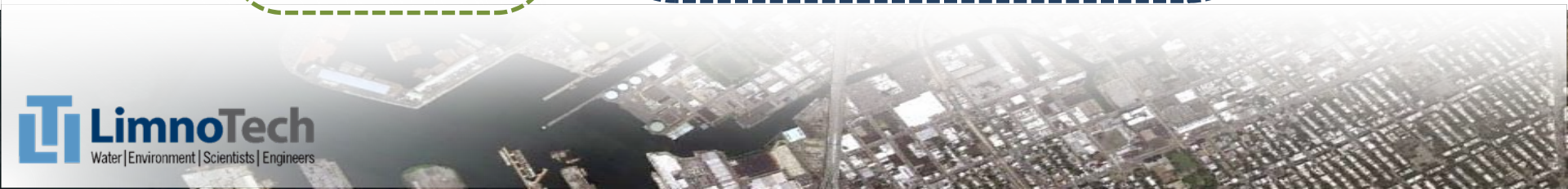
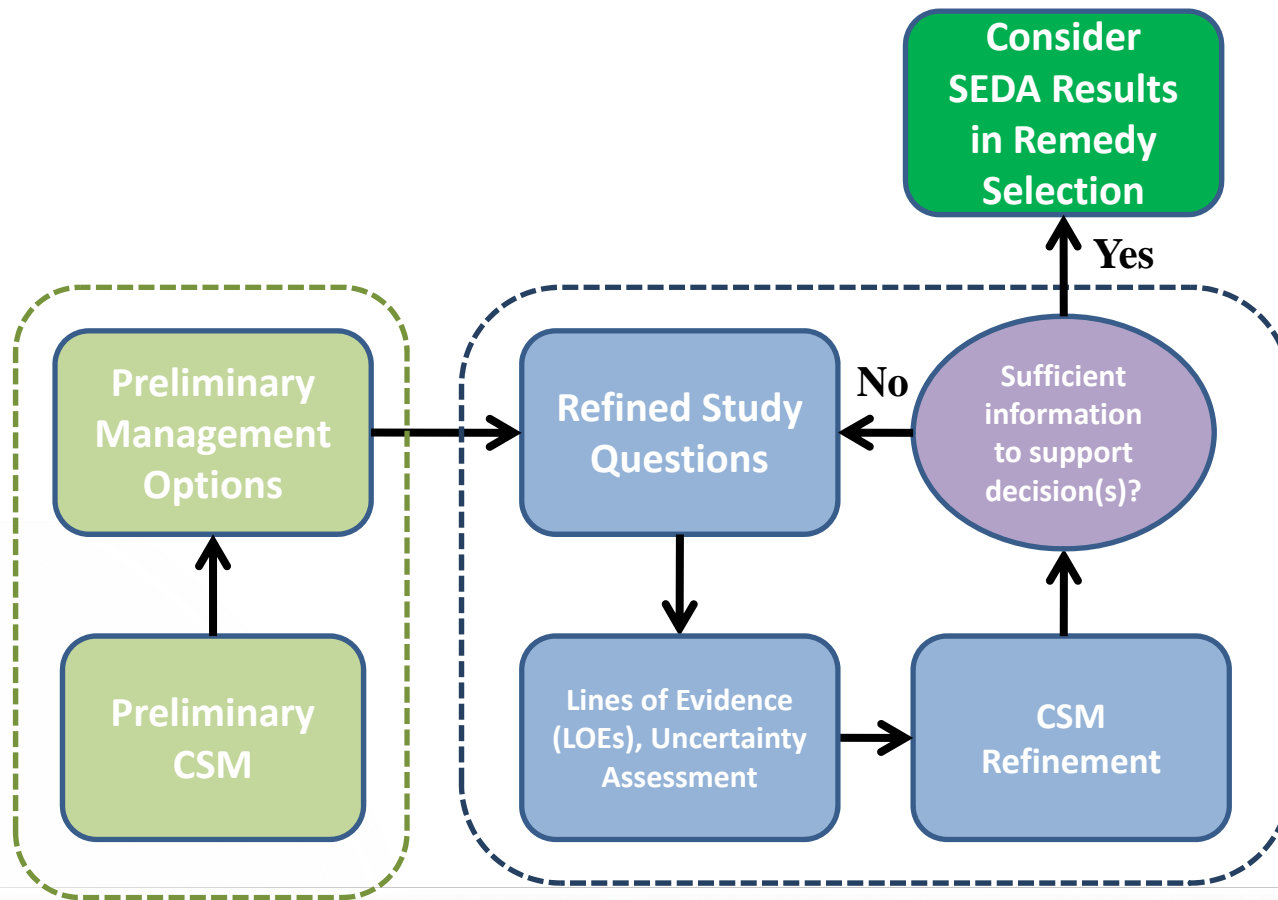


# Evaluating Strength and Consistency of Lines of Evidence

Consistency of LOEs	Strength of LOEs	
	Strong	Weak
<b>Consistent</b>	Proceed; include findings in detailed analysis	Collect confirmatory data before proceeding
<b>Inconsistent</b>	Reassess data and interpretations to choose between competing CSMs	Collect additional data to refine CSM

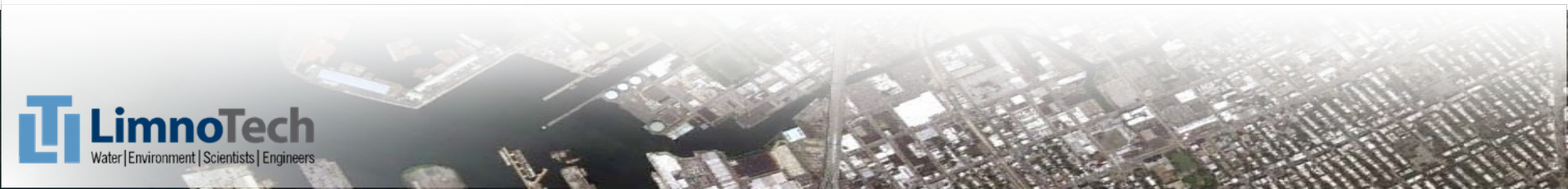


# The Role of SEDA in Decision-Making



# Timeline

- Federal Workgroup comments due October 11
- EPA Regional review expected late 2011
- Issuance planned for early 2012



# Questions?

