Airborne Electromagnetic (AEM) Data to Groundwater Modeling

Woodard & Curran

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PRESENTED BY

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Project Goals

Overall AEM Program Goals

Technical assistance to GSAs and other local agencies by providing data, tools, guidance, and training for improving:

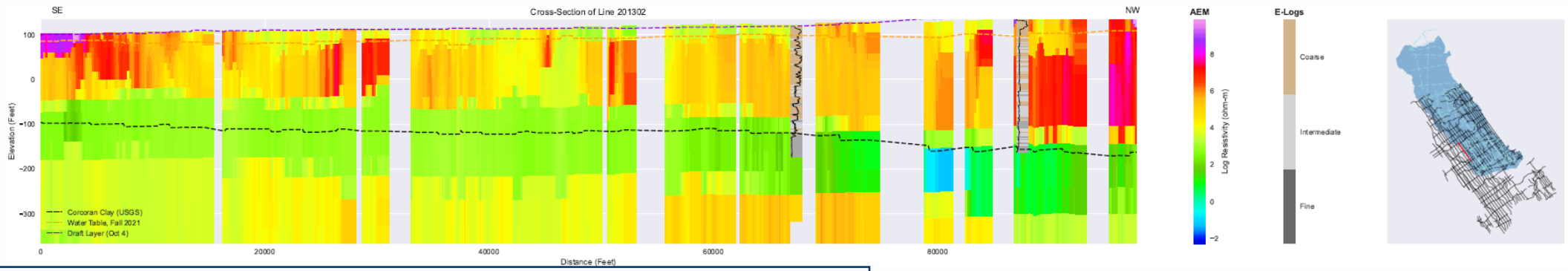
HCMs	Groundwater Models

Ensure tools are practical and modular/flexible

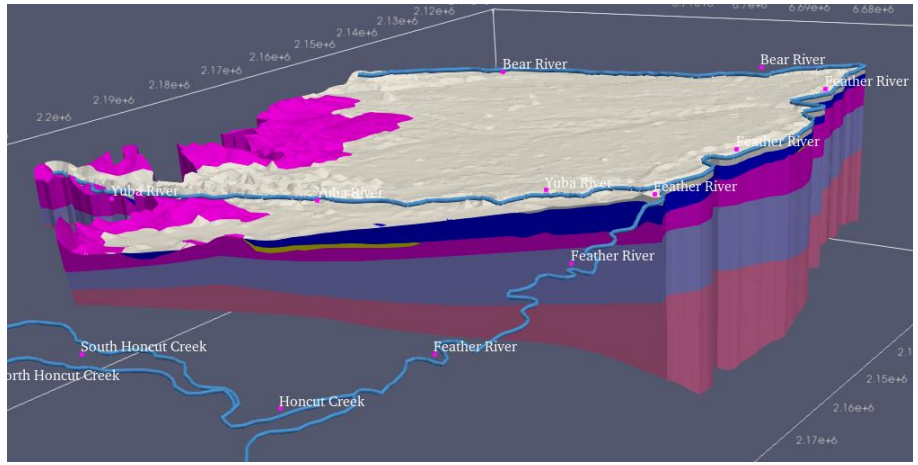
Project Goals

Develop methods and associated utility tools/case studies for AEM data application to groundwater models

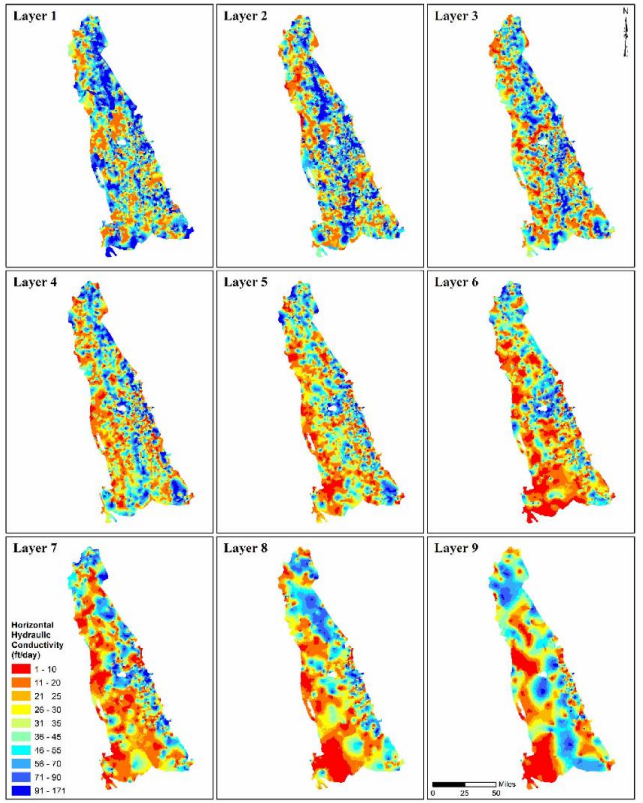
AEM



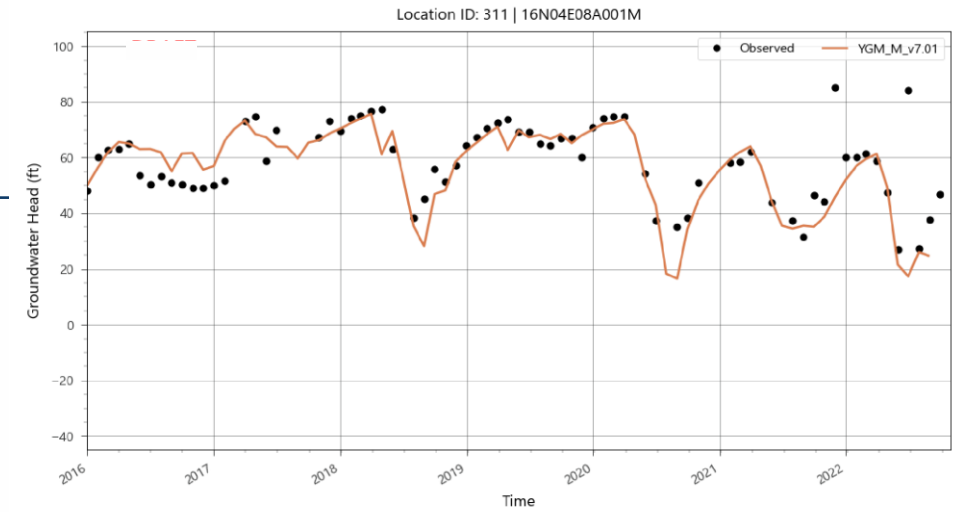
Improved HCM



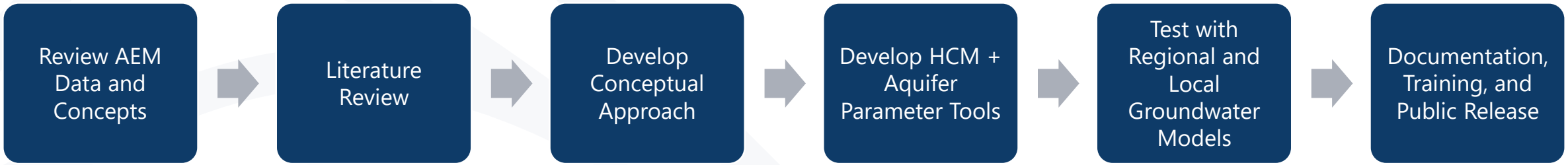
Improved Aquifer Parameters



More Robust Models



Project Steps



Key Project Considerations

→ Limitations encountered in real-world situation

- Available data and scale of AEM survey
- Non-uniqueness of methods
- Interpolation of coarse scale data into a 3-D data set using local geology (e.g. well logs)
- Simplified model of complex systems at a limited resolution

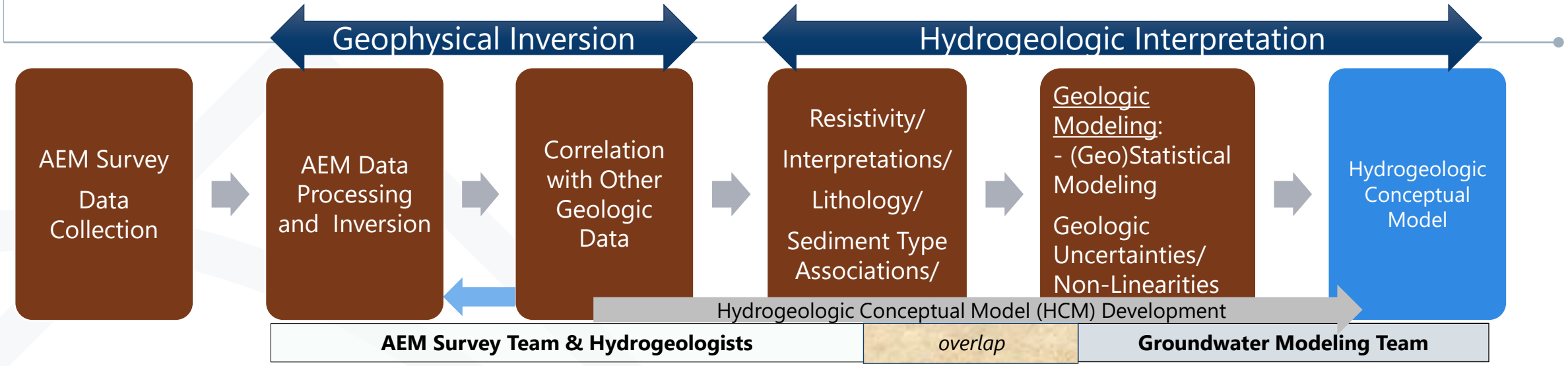
→ Variations in data scales

- Model grids vs. AEM survey grids vs. boring logs, etc.
- Interpolation and parameterization

→ Adaptive approach

- An adaptive approach will be utilized during testing and implementation, enabling adjustments/refinements to the suggested approach as necessary

AEM Survey Data
Process Flow from Data Collection to Model Application



Model Application
Approaches Considered

→ Approach 1: Limited Uncertainty Characterization

- Single Realization of AEM Data
  - » Deterministic dataset – no probability associated with data

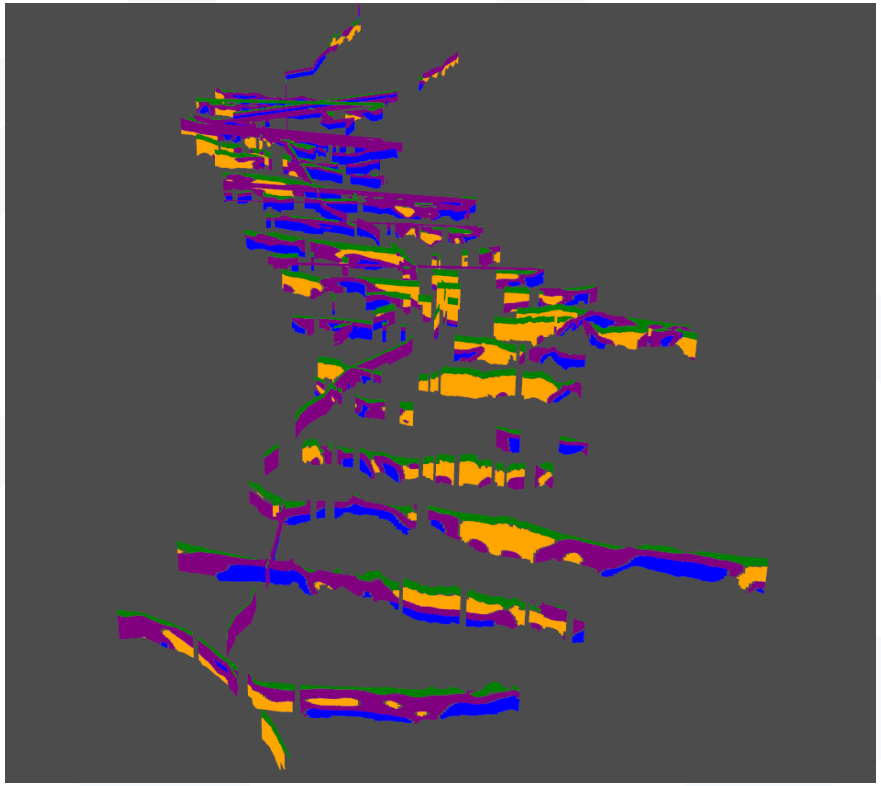
→ Approach 2: Robust Uncertainty Characterization

- Multiple Realizations of AEM Data
  - » Probabilistic Approach - Multiple Inversions or Probability Distribution

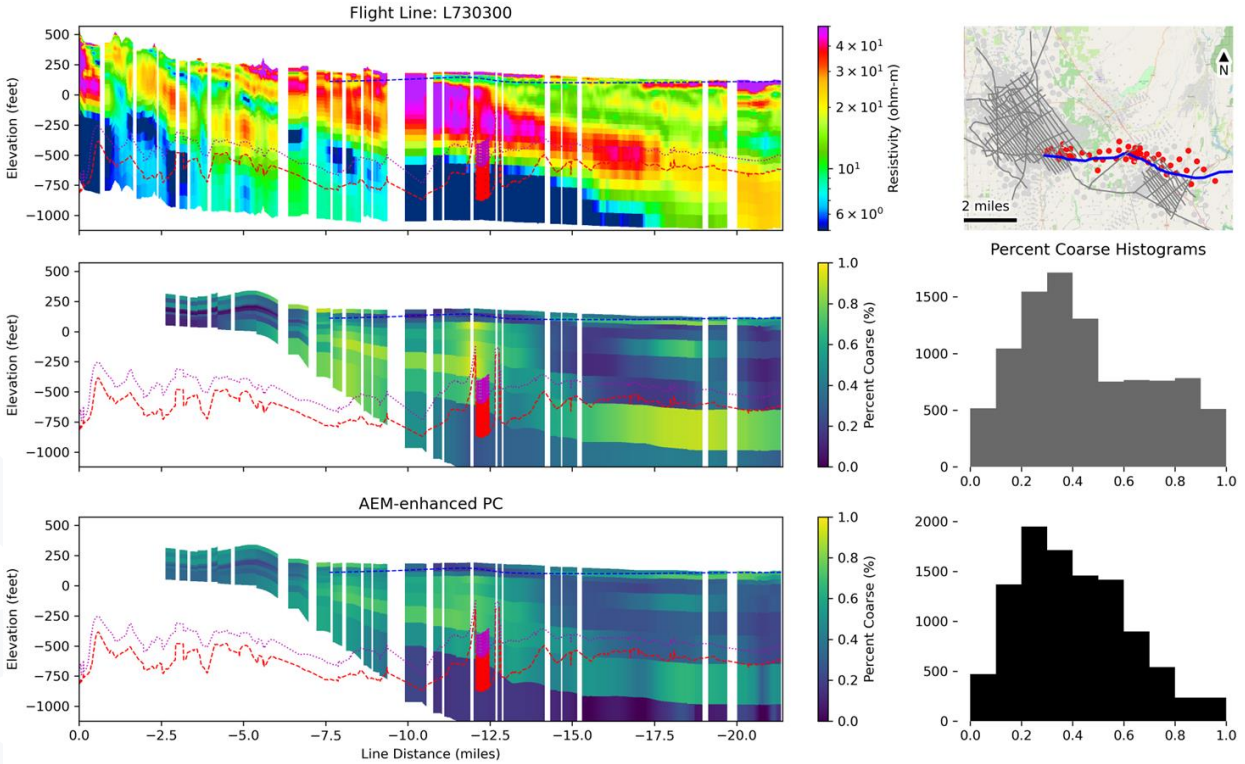
- *Approach 2A* – Simultaneous Adjustment of HCM and Aquifer Parameters During Calibration
- *Approach 2B* – Sequential Adjustment of HCM and Aquifer Parameters During Calibration

Progress to Date

Draft Hydrogeologic Conceptual Model Tool
AEM2HCM



Draft Aquifer Parameter Tool
Texture2Par



Next Steps (2023-2024)

- → Refine tools
- → Testing with regional and local models
- → Documentation and training

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Thank You!