



Numerical Modelling Approaches – Best Management Practices

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 - Sonia Glubish (CNRL)
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 - Preme Mohamed (AEP)
 - Sara Blacklaws (AER)



Project Context

- Numerical Model Approaches Relevant to:
 - Remediation Planning
 - Risk Management Plans
 - Site Closure
- Remediation plans based on numerical modelling:
 - Have been approved
- Best Management Practices document provides:
 - Guidance to support quality submissions
 - Tools to support review of such projects

The Challenge

- Guideline-based approaches (Tier 1, Tier 2)
 - Are concentration based
- But for groundwater-mediated pathways:
 - Source mass and distribution matters
- Fundamental conflict:
 - Concentration-based guidelines
 - Mass-based problem

Numerical Modelling

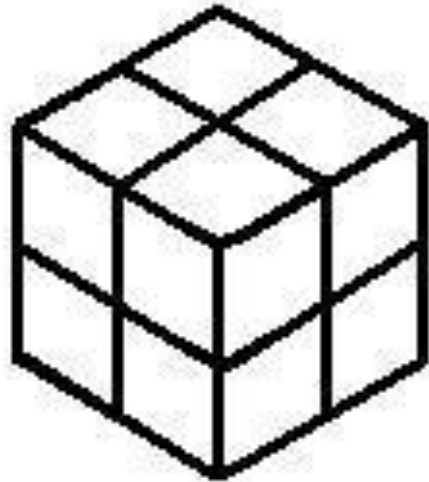
- Uses actual contaminant distribution
- Can better estimate remediation required to protect receptors
- May be the only realistic approach for very complex sites

Applicability

- Groundwater-mediated pathways only
- Large, complex contaminant plumes
- Mobile, non-degrading COPC
- Not required at:
 - Smaller and simpler sites
 - Any sites where other pathways are limiting:
 - Human direct contact
 - Vapour inhalation
 - Eco-contact
 - Management limit

Chemical Spatial Distribution

- Problem: How can we realistically represent chemical spatial distribution?

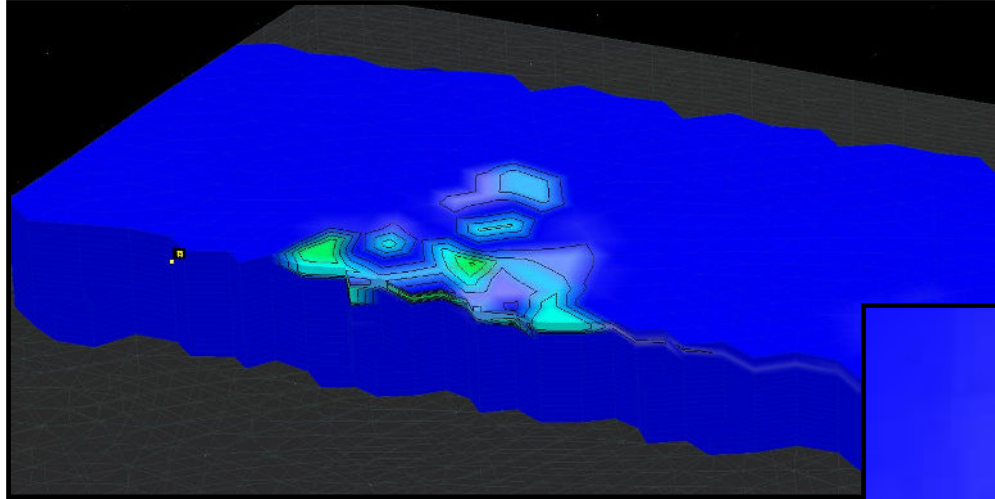


What if my plume doesn't look like this...

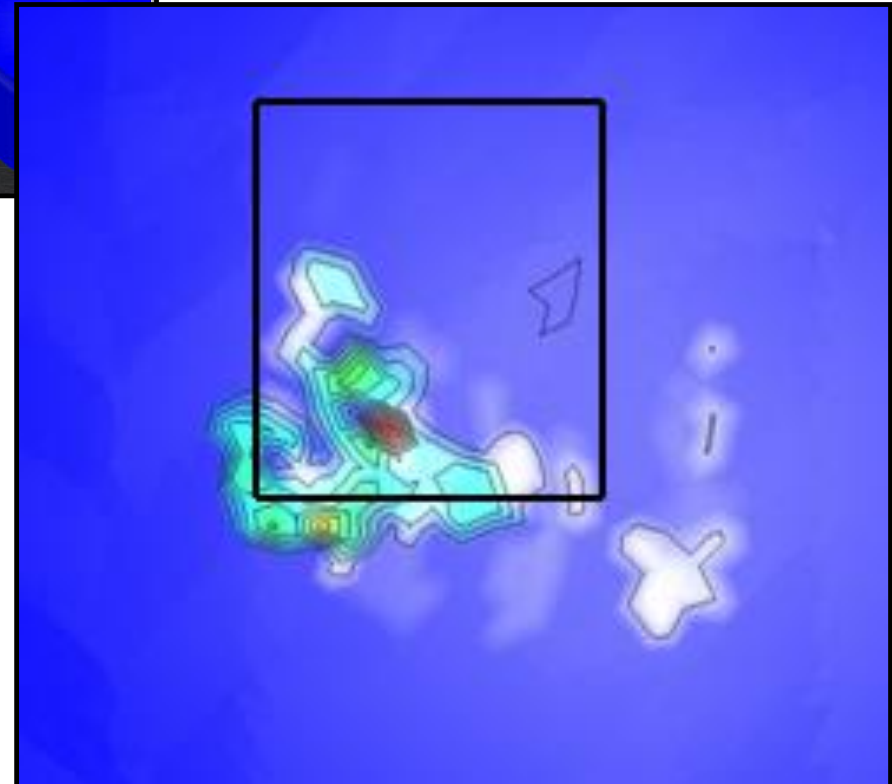


...but looks more like this?

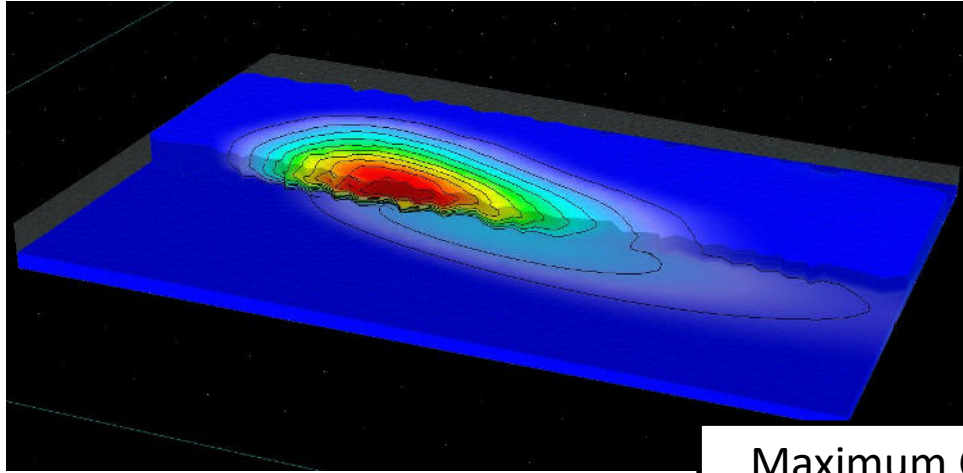
Initial Solute Input



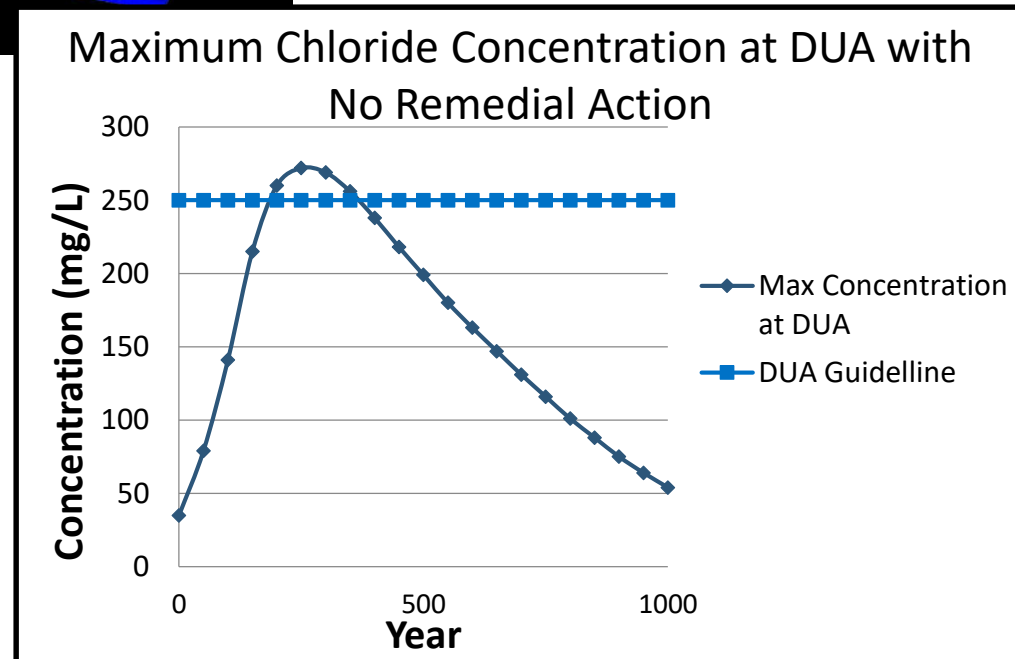
Three-dimensional input of
concentration data



DUA Assessment

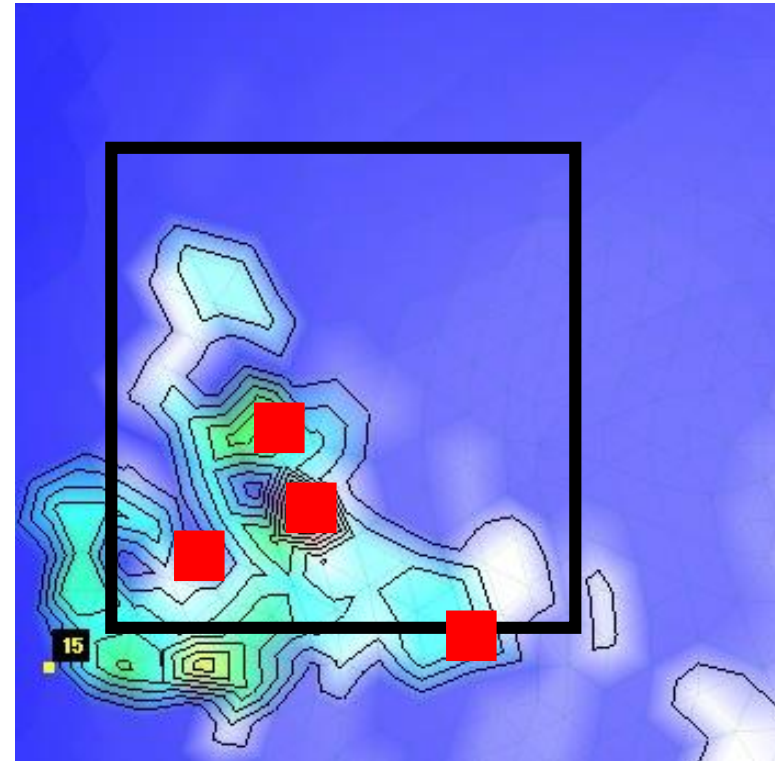


Maximum chloride concentration reaching DUA is 272 mg/L at 250 years



Targeted Remediation

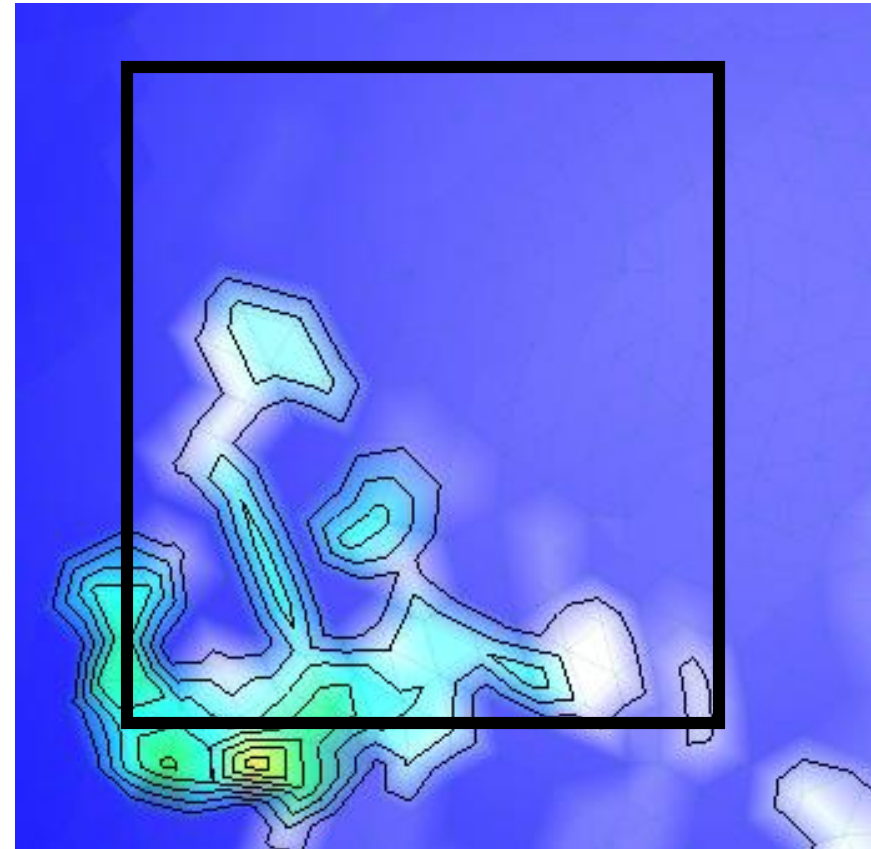
- Current conditions: DUA at risk
- Iterative removal of chloride “hotspots”
- Continue until DUA not at risk



Post-Remediation

- Re-run model with post-remediation chloride distribution

Post-Remediation



Best Management Practices Document

- Outcome-based guidance
- Focused on:
 - Key elements that need to be demonstrated
 - What is required to successfully achieve those elements
 - Examples of acceptable and non-acceptable elements
- Provides guidance to help ensure high-quality submissions
- Available as a reference framework for regulatory review

How Do I Use This Document?

- “Regulatory encouragement without formal endorsement”
- Document available on PTAC website:
 - “Best Management Practices for Using Numerical Modelling Approaches in Contaminated Sites Management” August 2022
 - <https://auprf.ptac.org/standardizing-risk-assessment-approaches-base-on-residual-mass-vs-numerical-endpoints/>
 - Or Google “PTAC Residual Mass”
 - And look for “2022 Final Report/Best Management Practice”
- **Important!** Does not supersede any other regulatory requirements