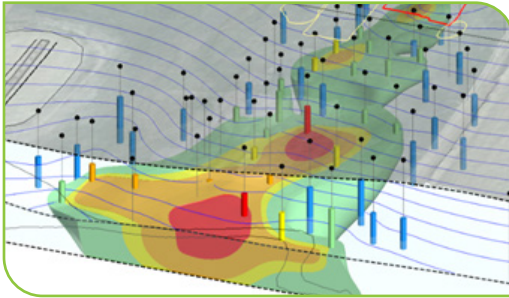
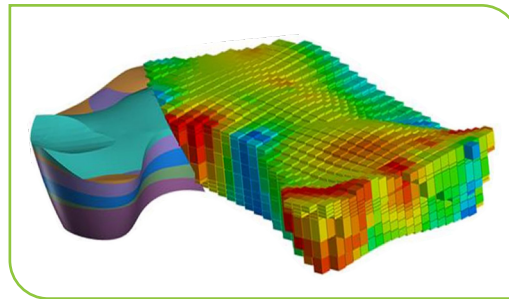


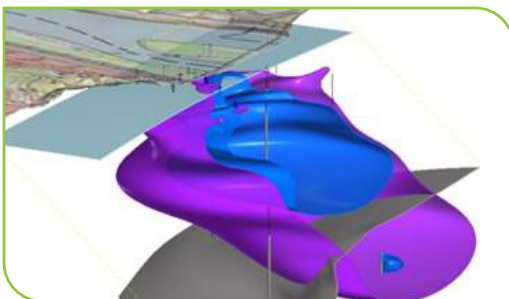
3D Visualization and Analysis Services



Hydrocarbon groundwater plume with potentiometric surface contours



Groundwater model grid concentrations with ESS hydrogeologic units



Nested groundwater plumes with topography, water table, and aquitard

Overview

3D Visualization and Analysis (3DVA) allows project teams to visually articulate complex environmental datasets to activate key decisions, enabling faster, cheaper, and more effective remediation compared to 2D graphical analysis.

Assimilation of historical site datasets into a 3D visualization model helps bridge the gaps among consultants, clients, regulators, and the public by presenting easy-to-understand visualizations of complex site processes and treatment/cleanup plans.

A well-developed 3D visualization model allows project teams to build confidence that site conditions are well understood and generates cost savings and efficiencies throughout the project life cycle by:

- Supporting consensus-building and collaborative problem solving
- Visually identifying data gaps and reducing decision risk
- Optimizing sampling/treatment areas
- Visualizing and quantifying impacts of remedial actions
- Creating graphics and animations for project deliverables and litigation support
- Accelerating project closure

Visualization Software Capabilities

Montrose's 3DVA specialists have expert-level proficiency in sophisticated environmental visualization tools including Leapfrog Works®, Earth Volumetric Studio®, RockWorks®, and Surfer®. These tools are capable of rapidly assimilating data sets in 3D from a wide variety of sources including:

- Water, soil, sediment, and air quality data
- Groundwater elevation and flow data
- Site maps and GIS layers
- Aerial photography
- Satellite and remote sensing images
- Stratigraphic, lithologic, and geophysical data
- Environmental Sequence Stratigraphy (ESS) data
- High-Resolution Site Characterization (HRSC) data
- Topography
- Cross sections
- PDF and scanned hardcopy historical reports

Interactive 3D models may be shared collaboratively with stakeholders, allowing users to:

- Share work to show how and why decisions were made
- Spin the model, zoom, pan, create slices, and conduct measurements
- Interrogate the model by clicking on features to reveal attributes such as building names, sampling information, plume volumes, and much more.

3DVA Service Areas

Air Quality

- Air Dispersion Model Visualization
- Drone Survey and Sampling Visualization

Civil Engineering

- Above-(BIM) and Below-Ground 3D Model Integration
- Brownfields Site Redevelopment Visualization
- Geophysical Visualization
- Tunnel and Subsurface Infrastructure Visualization

Emergency Response

- Real-Time Incident Visualization via 3D SQL Database

Energy

- Gas Migration Investigations
- Geothermal Visualization
- Oil and Natural Gas Well Pad Visualization

Remediation

- Conceptual Site Models
- Contaminant Transport Visualization
- Environmental Forensic Chemistry
- Green/Sustainable Remediation
- High-Resolution Site Characterization
- Environmental Sequence Stratigraphy
- Landfill Visualization
- Mass Flux/Mass Discharge
- PFAS and Emerging Contaminants
- Remedial Investigations/Feasibility Studies
- Remedial Design/Construction/O&M

Mining

- Dam/Impoundment Safety
- Mine Reclamation Project Visualization

Water

- Aquifer and Water Supply
- Groundwater Model Development and Outputs

The Galvanizing Power of 3DVA

Montrose's value-added approach to intelligent and elegant 3DVA can be a differentiator for your projects, bringing your CSM alive in forceful and effective ways.

Vivid 3D graphics and animations convey information critical to the CSM in easy-to-understand terms and leverage years of hard and costly site investigation work, so historical efforts aren't wasted or forgotten.

A 3D visualization model can serve as a 3D database and digital archive, becoming a powerful tool for institutional knowledge storage and transfer and limiting the impact of staff turnover.

3DVA tools enable increased accuracy and precision of subsurface contaminant volume and mass estimates over traditional methods, leading to cost savings in the remedial design phase due to reduced excavation footprints, fewer installed monitoring wells and soil borings, and efficient application of remedial technologies (e.g., optimizing in-situ thermal remediation well spacing and locations of vertical barriers).

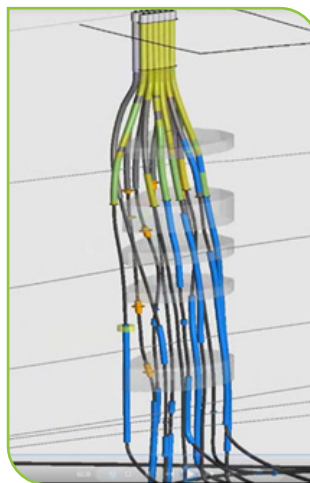
Accelerate Your Project with 3DVA

- Drive high-value collaboration sessions among experts, managers, and clients
- Present live 3D models to enable informed decisions
- Create narrated animations with manipulated models
- Streamline development and updates of CSMs
- Uncover correlations between contamination and hydrogeology
- Identify data gaps and perform QA/QC
- Reduce decision risk and long-term project costs
- Increase the sophistication of groundwater flow modeling
- Enhance fate and transport (F&T) analyses with illustrations of groundwater flow and contaminant migration pathways
- Produce 3D physical models for litigation, public meetings, and conferences

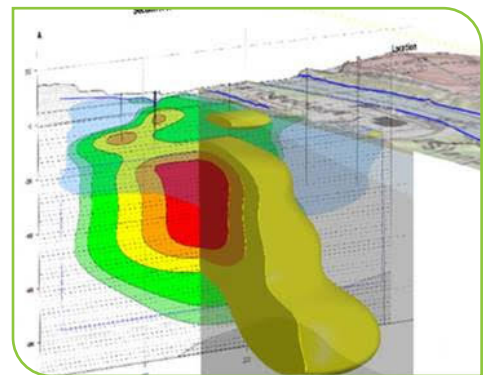


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Natural gas well pad with casings, cement intervals, and formation fracture zones



Slice through 3D groundwater plume with cross section