Case Studies

This section includes case studies that use different geospatial methods and software packages to optimize project life cycle activities. These case studies demonstrate the usefulness of geospatial methods and the particular abilities of some common software packages. The case studies were chosen for their applicability to groundwater, soil, and sediment and for the variety of software applications that they present.

These case studies were performed for purposes other than this guidance document, were completed prior to the preparation of this document, and were done in context with individual project parameters and constraints. These real-world examples show how the software can be used to solve real problems, with limitations of time, resources, and specific project needs.

Table 10. Summary of case studies

Case study/location	Life cycle stage	Environmental medium	Methods	Software used	Contaminants	Applicable questions
Superfund Site, TX	Monitoring	Groundwater	• Mann Kendall • Voronoi/Delaunay mesh	MAROS	VOCs, 1-2-DCA, Benzene, Metals	• Trend Maps • Monitoring Program Optimization
PAH in Sediments, Quebec, Canada	Site Characterization	Sediment	• Experimental variogram • Uncertainty • Conditional Simulations • Isatis	Isatis	PAHs	• Hot Spot Detection • Sample Spacing • Estimating Quantities
Ordnance Plant, NE	Monitoring, Closure	Groundwater	• Kriging • Iterative Thinning • Quasi-genetic optimization	GTS Summit Envirosolutions	TCE, Research Department Explosives (RDX)	• Monitoring Program Optimization • Remedial Program Optimization
Smelter, IL	Site Characterization, Remediation	Soil	• Inverse Distance Weighting (IDW) • Kriging • Volumetric estimation	Environmental Visualization System (EVS) Mining Visualization System (MVS) Earth Volumetric Studio EnterVol	Lead, cadmium, mercury	• Interpolation • Estimating Quantities • Remedial Action Optimization
Nuclear Plant, Fukushima, Japan	Site Characterization, Remediation	Soil	• IDW • Kriging	ArcGIS Spatial Analyst ArcGIS Geostatistical Analyst	Cesium-137	• Estimating Quantities • Hot Spot Detection • Interpolation • Estimating Average Concentrations

Research Facility, NJ	Monitoring	Groundwater	• Mann-Kendall • Nonparametric statistics • Penalized splines • Voronoi/Delaunay mesh	GWSDAT	BTEX, MTBE	• Trend Maps • Quantifying Uncertainty • Plume Change/Attenuation Over Time
Tidal Site, NJ	Site Characterization	Sediment estuary	• EDA • Variography • Point/block kriging	ArcGIS	PCB, Aroclors	• Sample Spacing • Estimating Concentrations Based on Proxy Data • Estimating Quantities
Superfund Site, CA	Monitoring	Groundwater	• Mann-Kendall • Parametric linear regression • Voronoi/Delaunay mesh • Cost Effective Sampling algorithm	MAROS	Perchlorate, TCE, Chloroform	• Monitoring Program Optimization
Lead in Soil, GA	Site Characterization	Soil	• Point/Block Kriging • Exploratory Variography	ArcGIS	Lead	• Hotspot Detection • Estimating Average Concentrations • Remedial Action Optimization