Using Geospatial Technology to Design and Manage Reclamation of the Mabel New-Superior Mine

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Texas AML Program

Texas – AML Project

- **Pre-Law Open-Pit Uranium Mine**
- **11,340 ft Unreclaimed Highwall**
- **Posed Radiation Hazard**

Site Information

- Western Rio Grande Plain MLRA
- Mining conducted from 1961 to 1963
- Semi-arid open grassland with scattered trees and brush

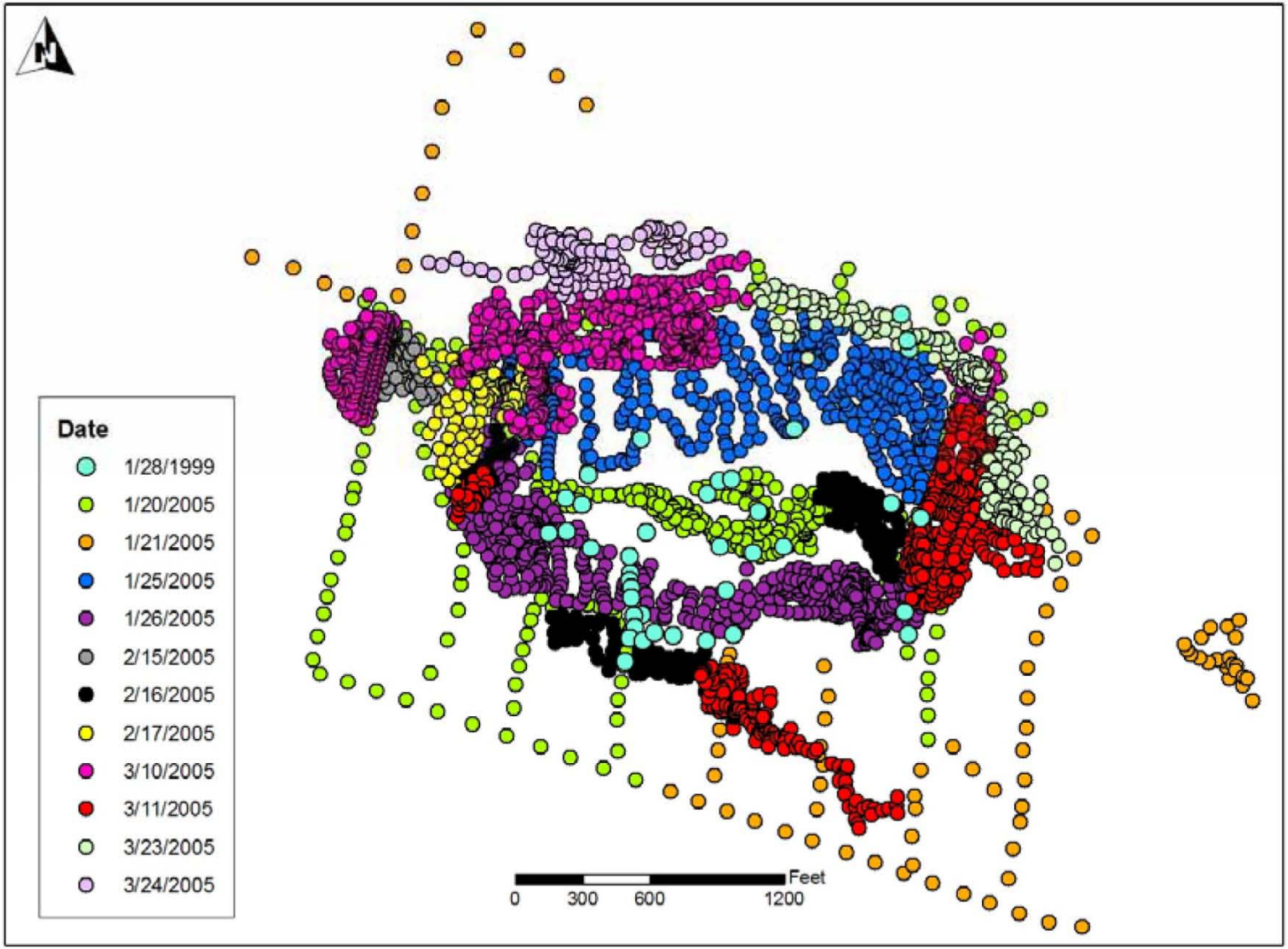
Geospatial Technology

- Mabel New-Superior U Mine
- Site assessment - mapping
- Project design
- Project management

GPS Equipment Used

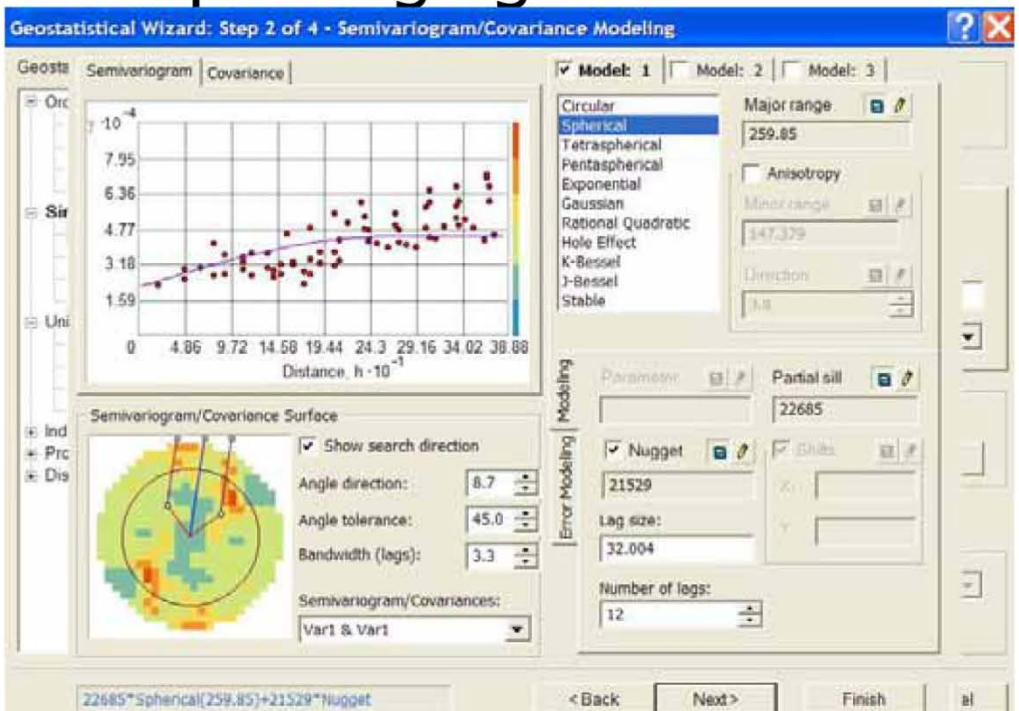
- Trimble ProXRS – acquired in 1999
- Asset Surveyor 5.27
- OmniStar Satellite Corrections
- 1-m accuracy
- Trimble GeoXT acquired in March 2005


ArcPad
11:15
hot windrow
flagged 3/22/06 hot spot - ed 3/28/06
50 ft
Locke
569580.7 3159313.9
1:1033
Z


Date
1/28/1999
1/20/2005
1/21/2005
1/25/2005
1/26/2005
2/15/2005
2/16/2005
2/17/2005
3/10/2005
3/11/2005
3/23/2005
3/24/2005
0
300
600
1200
Feet

Geostatistical Analyst

- ArcMap extension
- Several interpolation methods offered
- Used simple kriging



Earthwork Design / Bid Documents

- **AutoCAD**
- **Carlson SurvCADD**
- **ArcGIS**

Survey Control

Leica Geosystems SR530 RTK DGPS – Base Station

Project Management

- Used Trimble GeoXT
- Windows Mobile
- ArcPad – easy to create new shapefiles for different datasets
- Color-coded points, based on values (symbology exported from ArcMap)

Progress of Reclamation Efforts

- Field observations
- Document work progress
- Delineate areas needing attention
- Interim project status maps

Progress of Work

Verification of Radioactive Material Clean Up

- Plotted radiation observations on predicted radiation level map
- Clean up radiation levels ~70% lower than estimated

Work Payment Quantities

- Verification that clean up levels attained
- Delineation of cleaned up areas
- Payment quantities facilitated – areas routinely documented

Vantage Point Photographs

Mabel New-Superior Project: Vantage Point Photos

Photo Point	True Direction
1	18 (N18E)
2	156 (S24E)
3	240 (S65W)
4	96 (S84E)
5	97 (S83E)
5	150 (S30E)
6	239 (S59W)
7	223 (S43W)
8	61 (N61W)
9	57 (N57W)
10	17 (N17E)
11	5 (N5E)

Photos Taken on:

0 150 300 600 900 1200 Feet

01/31/2006

01/25/2006

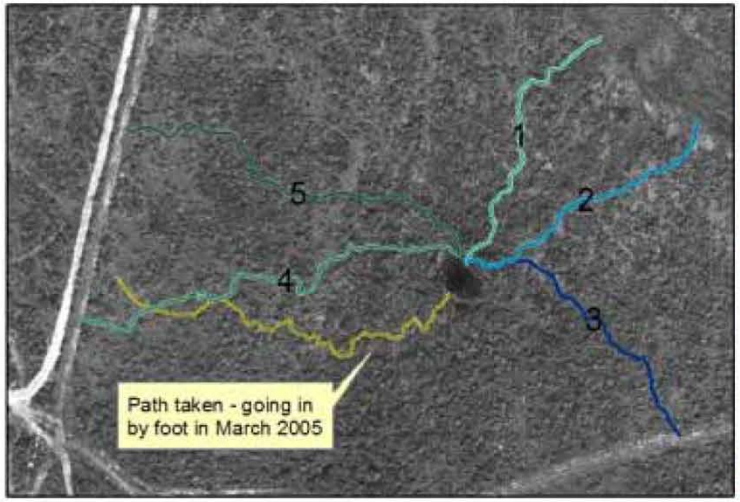
02/09/2006

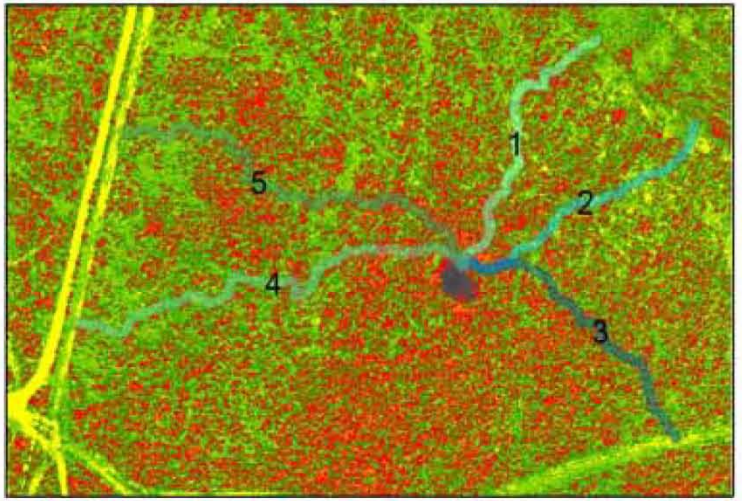
03/22/2006

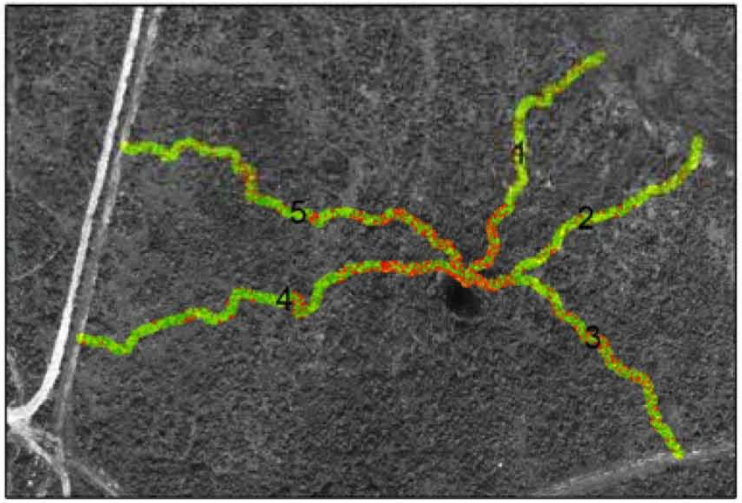
Other GIS-Related Tools

- ERDAS Imagine
- Image Analysis extension – ArcMap
- Evaluation of vegetation cover from aerial photographs
- Spatial Analyst
  - Raster to vector conversion

Field Conditions







Feet
0 125 250 500

Note: north arrow and scale bar are related to all three maps.

Sorted pixels from B&W aerial photograph (taken in 2003) into five ground cover classes, using Spatial Analyst. The description of each class was based on an evaluation of the photograph (classification data have not been ground-truthed).

- Brush / Trees
- Brush / Trees
- Grasses / Forbs
- Grasses / Forbs
- Bare Ground

Tabulated the areas of each class intersected by 10-foot wide trails (enough to allow passage with a pickup truck) and estimated the length of each trail.

Access Trail	Length, ft	Total Area, sq. ft.	Estimated Brush/Trees, sq. ft.	Proportion of Trail Swath
1	599	12,248	2812	23.0%
2	580	11,903	2227	18.7%
3	626	12,751	3404	26.7%
4	940	18,869	3786	20.1%
5	894	17,920	4221	23.6%

Access Trail #2 looks like the best option - shorter and less clearing needed. Final choice of trail will depend on site condtions (gullies, obstacles, etc).

GeoWEPP

- WEPP – Water Erosion Prediction Project
- Interface with ArcMap

Summary and Conclusions

- 18 months from data collection to completion of the earthwork
- Every phase of project utilized data collected or displayed with GPS
- Mobile and desktop GIS used to analyze, interpret, and display data
- Tasks accomplished accurately and quickly

Mabel New-Superior Mine

2009 Midcontinent Region

AML Reclamation Award