

RESOURCE NOTES

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Merging GPS Technologies and Geoscience

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Discussion

Global Positioning System (GPS) technology is quickly becoming an indispensable tool in assisting the science community in reporting physical properties of surface and sub-surface structures. GPS receivers are very small and easy-to-use. Some GPS receivers have an internal barometric pressure chip that allows elevation data to be collected with an accuracy of

1.5 feet. This level of accuracy permits the mapping of surface elevation and subsurface change(s). An ArcView extension is being created by NSTC staff members Wendy Bullock and Matt Brown (ST-134) that will automate the importation of the Sting.DAT file in order to create a "point feature" theme including the resistivity measurement X, Y and Z points created in UTM coordinate system. This ArcView "Automated Import" extension can be used with the ArcView "3D-Analyst" extension to create a three-dimensional map. You can also "peel" the layers off to show extent of certain values at depth. Contact Brent

Lewis at b1lewis@blm.gov or Tom Morris at tom_morris@blm.gov.

As you can see GPS can document attributes related to a geologic formation and allow the reporting GIS software to calculate not only: (1) distance and areal extent of the formation; but also (2) allow the geologist to "tie-in" subsurface geophysical surveys to produce a 3-D visual. At the same time the GPS-derived data will assist you in preparing volume calculations.

Figure 1. demonstrates surface placements of electrodes, which will, through

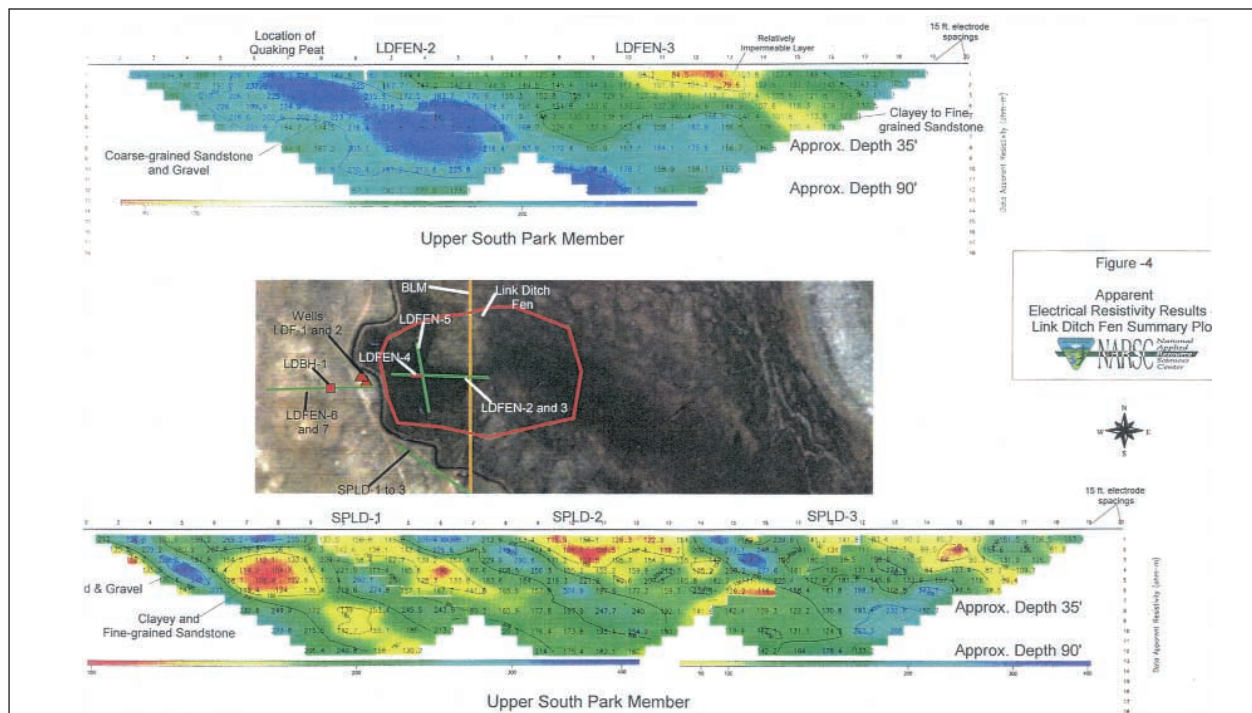


Figure 1. Using electricity to portray subsurface conditions.



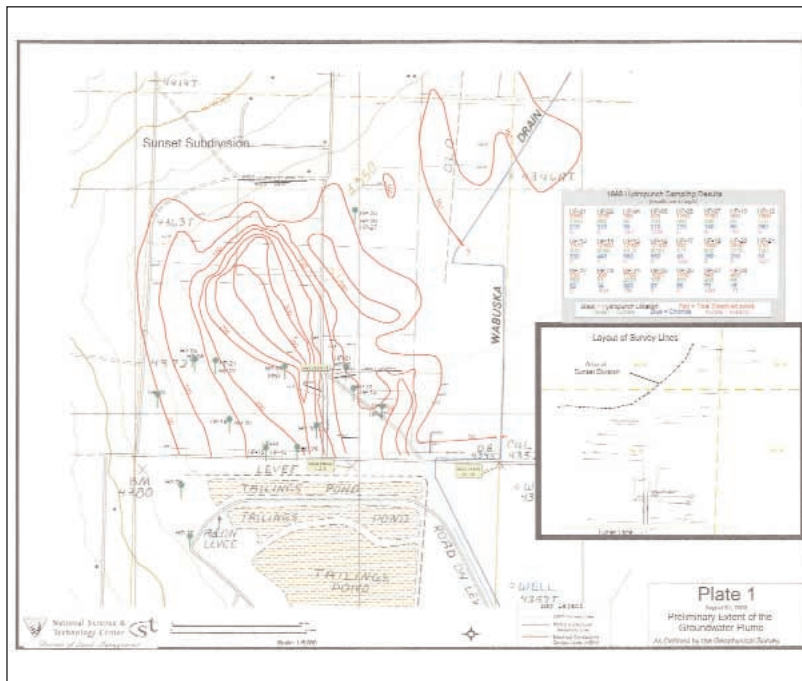


Figure 2. Integrating resistivity survey data and ArcView.

use of electricity, portray relative subsurface resistivity results and their physical relationship to the wetlands that are being studied. Figure 2. is an example of a study of an evaporation pond groundwater plume, which extends to the Northwest.

Integration of the resistivity survey lines with the ArcView software provides a map that can depict the plume flow and its geographic collocation to

a nearby residential area. This integration can accurately assist the subject specialist in their task of providing for public safety.

The BLM's National Science and Technology Center can provide the agency Resource Administrator with expert geophysical and GIS documentation of most surface and subsurface structures and targets. This support saves the

subject specialist from having to pursue costly and time-intensive negotiated contract processes.

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