

RESOURCE NOTES

NO. 51

DATE 04/18/01

Merging GPS Technologies and Geoscience

By Tom Morris, Computer Specialist, National Science and Technology Center, ST-333

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

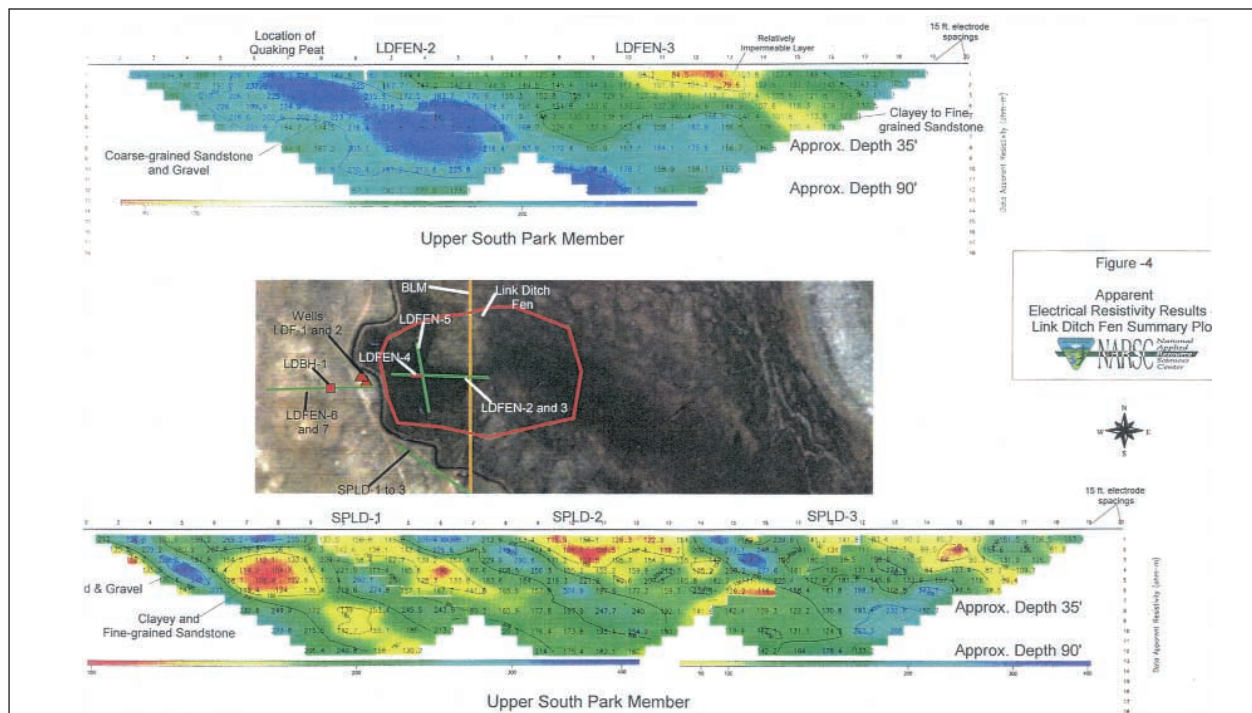


Figure 1. Using electricity to portray subsurface conditions.



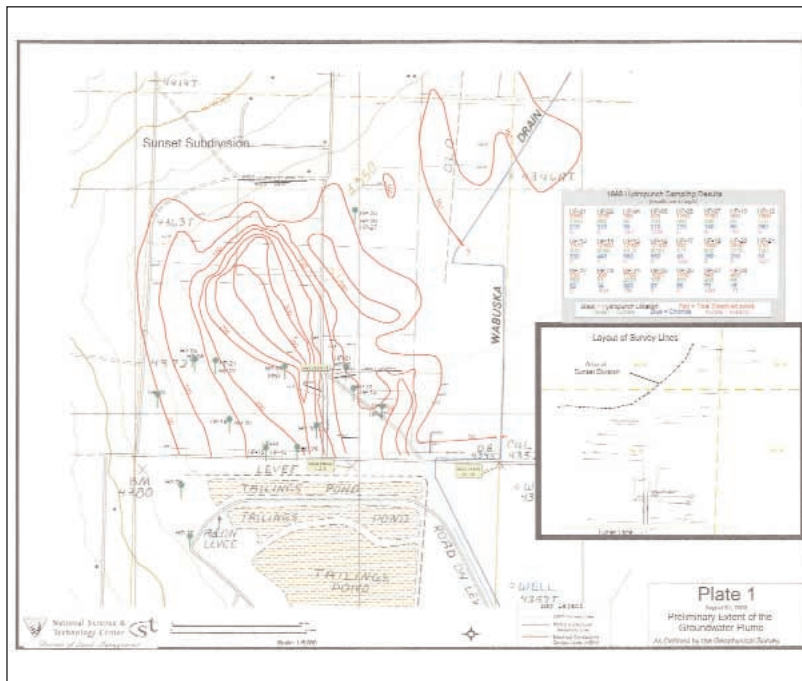


Figure 2. Integrating resistivity survey data and ArcView.

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.

Contact

Tom Morris
 National Science and
 Technology Center, BLM
 Denver Federal Center
 Building 50, PO Box 25047
 Denver, CO, 80225-0047
 phone (303) 236-0964
 fax (303) 236-3508
 email tom_morris@blm.gov

RESOURCE NOTES are intended to be early announcements of technical and informational topics for Bureau of Land Management personnel and some of their customers. Information in this RESOURCE NOTE is based on the opinion and experience of the author and has not been peer-reviewed. Conclusions and opinions expressed herein do not necessarily represent those of BLM. Use of trade names does not imply U.S. Government endorsement of commercial products.

If you have received a copy of or found out about RESOURCE NOTES in an indirect way and would like to be included in future mailings, please send the following:

NAME, TITLE, MAILING ADDRESS and a list of the two or three subject areas that you are most interested in or that most directly relate to your job. Send this information to Phil Dittbener, BLM, RS-140, P.O. Box 25047, Denver, CO. 80225-0047 or phil_dittbener@blm.gov or FAX 303-236-3508.

If you would like to prepare a RESOURCE NOTE for distribution, or you have an idea and author in mind for a good RESOURCE NOTE, please contact Phil Dittbener at 303-236-1833, FAX 303-236-3508 or phil_dittbener@blm.gov with the topic and the name of writer, including an address, phone number, and e-mail address.

Thank you for your interest in RESOURCE NOTES.



National Science &
 Technology Center



Bureau of Land Management