

USING GPS IN GROUND TRUTHING FOR SUPERVISED CROP CLASSIFICATION

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INTRODUCTION

The Yazoo Mississippi Delta Joint Water Management District (YMD) currently uses various technologies in data management. These include Geographic Information Systems (GIS), Global Positioning Systems (GPS) and Image Processing. As part of a new project to classify satellite imagery into crop types for water use calculations, (Stiles and Pennington 1998) various methodologies were used for gathering information used in the classification process. This paper documents these procedures.

METHODS

Dates for gathering information in the field were coincided with the dates the satellite was overhead. Two primary forms of data were gathered. Polygons in the form of field boundaries and points were cast out into the field. Information on the field boundaries was gathered using a Trimble PRO-XR Real Time Differential GPS connected via cable to a Gateway Notebook Computer running MapInfo (GIS) and Blue Marble Graphics Geo Tracker software. This method allowed for a continual display of the current location point overlaid onto background information including roads, streams, county boundaries, and previously digitized irrigated field boundaries. When a site was selected, a polygon was drawn on-screen estimating the field boundary. See Figure 1, Ground Truth Polygons. In addition, several attributes were recorded. These included:

- Site ID
- Crop Type
- Canopy Cover Percentage
- Weed Cover Percentage
- Weed Type
- Field Tillage Condition
- Field Wetness
- Soil Color

An advantage of this method was that no data transfer was required after gathering. When a user left the site, the data was already in the GIS (MapInfo). The polygons were then displayed by crop type in an ER Mapper. An ER Mapper is an image processing application used in the classifying of satellite imagery. New polygons were drawn to reflect more accurate boundary information because field edges could easily be interpreted from the satellite imagery.

The point data was simply a point cast out into the field. See Figure 2, Delta County Map with Ground Truth Points. The Trimble Pro-XR contains a feature that allows the user to record a position away from the GPS antennae while travelling in a vehicle. Only crop type was recorded for each point. Using a TDC handheld data collector attached to the Trimble Pro-XR, a menu displaying all possible Delta crops was displayed allowing for quick data entry. This process led to a large amount of data gathering. Data gathered using this procedure required additional processing steps to be fully incorporated into the GIS. Point data had to be downloaded from the TDC data collector to a PC, then imported into MapInfo. The points were then displayed by crop type in ER Mapper. Training regions were drawn in via heads up digitizing.

SUMMARY

Both procedures documented provide useful information. For time considerations and ease of use, the point data procedure proved to be the most beneficial. Future plans include gathering polygonal information on sites established in 1997. Additionally, a more intense point data gathering effort will be implemented in 1998.

REFERENCES

Stiles, Mark and Dean Pennington. 1998. Estimating Crop Water Use with Satellite Imagery in the Mississippi Delta. In *Proceedings of the 28th Mississippi Water Resources Conference, April 7-8, 1998*, edited by B. Jean Daniel. (In press). Mississippi State University: Water Resources Research Institute.

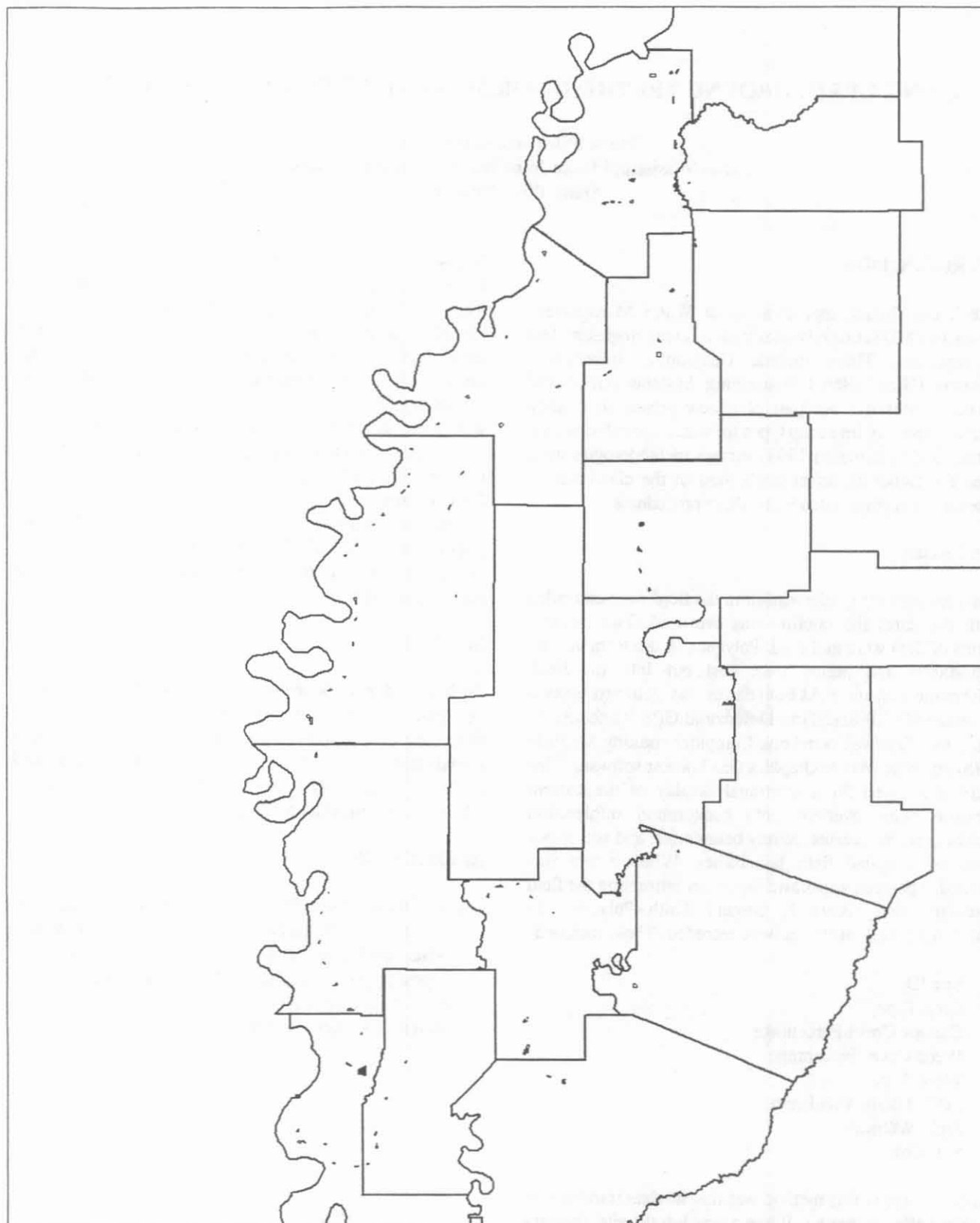


Figure 1. Ground Truth Polygons

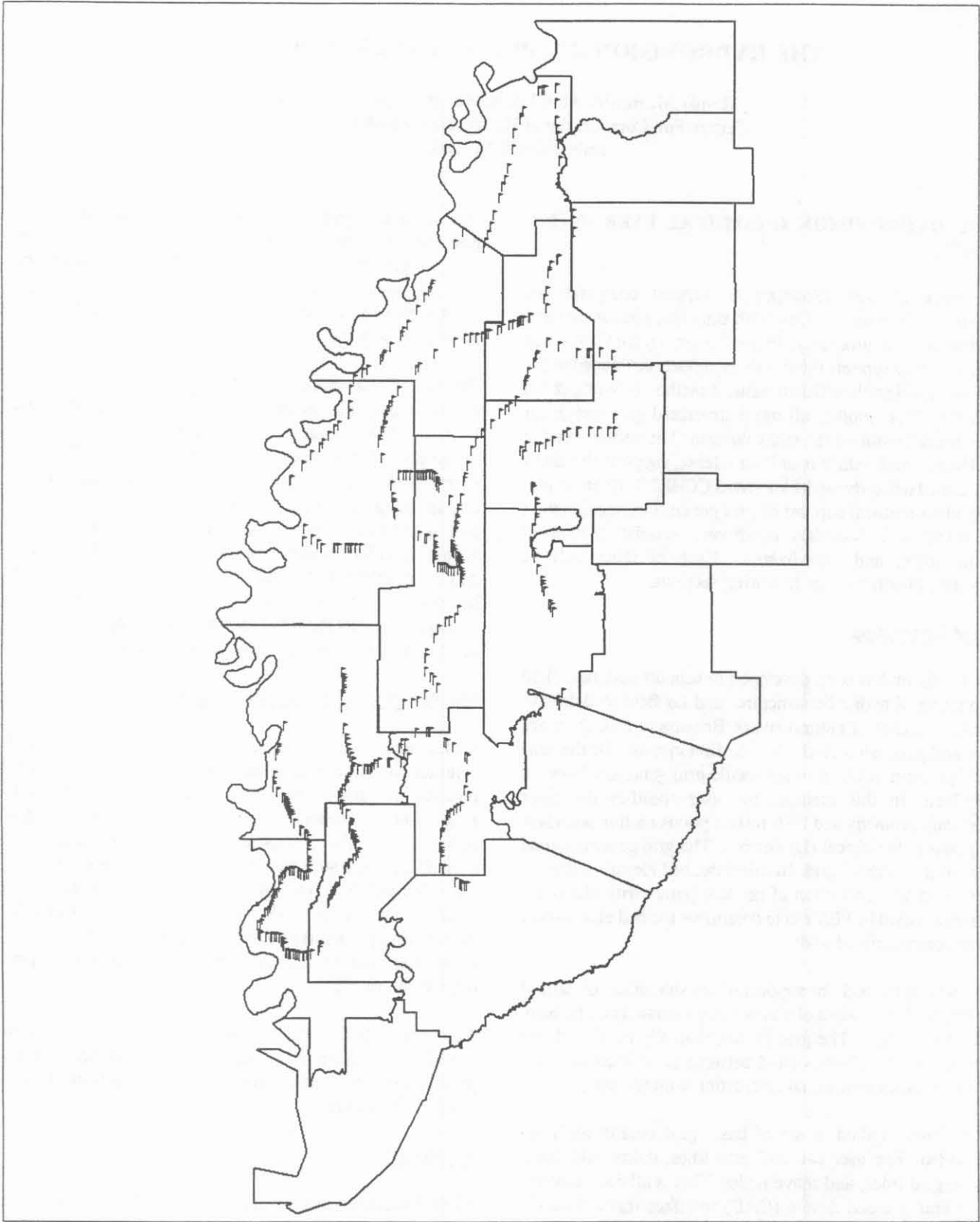


Figure 2. Delta County map with ground truth Points