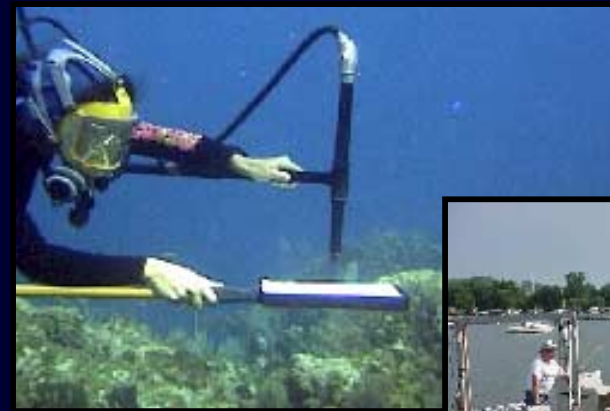


Center for Advanced Land Management Information Technologies  
**CALMIT**

UNIVERSITY OF  
**Nebraska**



**Remote Sensing • Geographic Information Systems • Global Positioning Systems**

## ***Assessing Seasonal Vegetation Response to Drought***

**Lei Ji**

**Department of Geography**

**University of Nebraska-Lincoln**



***AVHRR-NDVI: July 1999***



***AVHRR-NDVI: Jan 1999***

## Introduction

- Drought and drought indices, e.g. Standardized Precipitation Index (SPI)
- Use of AVHRR – NDVI in detecting vegetation vigor and drought
- Relationship between NDVI and SPI

## Objectives

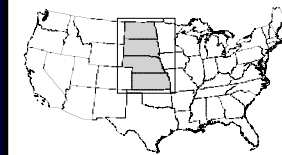
- Determine seasonal NDVI response to moisture
- Determine relationship between NDVI and SPI

## Study Area

## Data

## Methods

- AVHRR–NDVI (1989–2000)
- Standardized Precipitation Index (SPI)



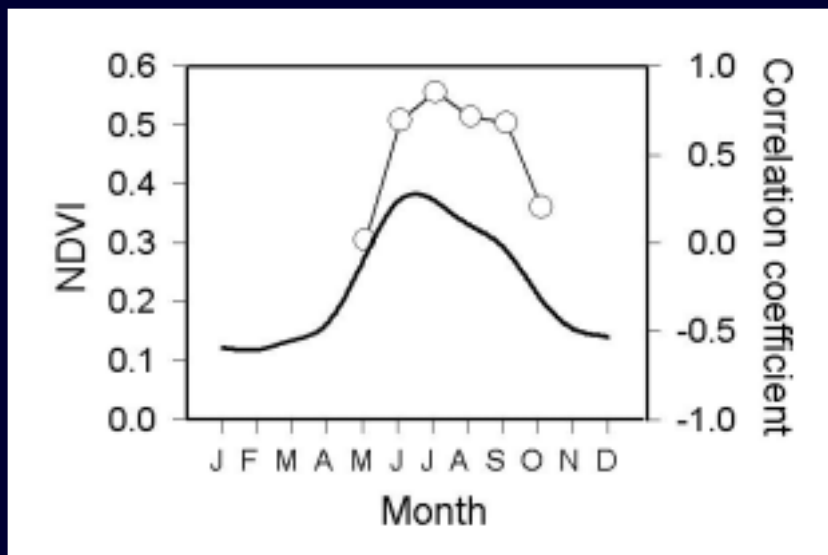
Northern and Central Great Plains

- Time series analysis of monthly NDVI and SPI for grassland and crop by climate division (CD)
- Correlation Analysis of monthly NDVI and SPI
- Regression with seasonal-effect adjustment

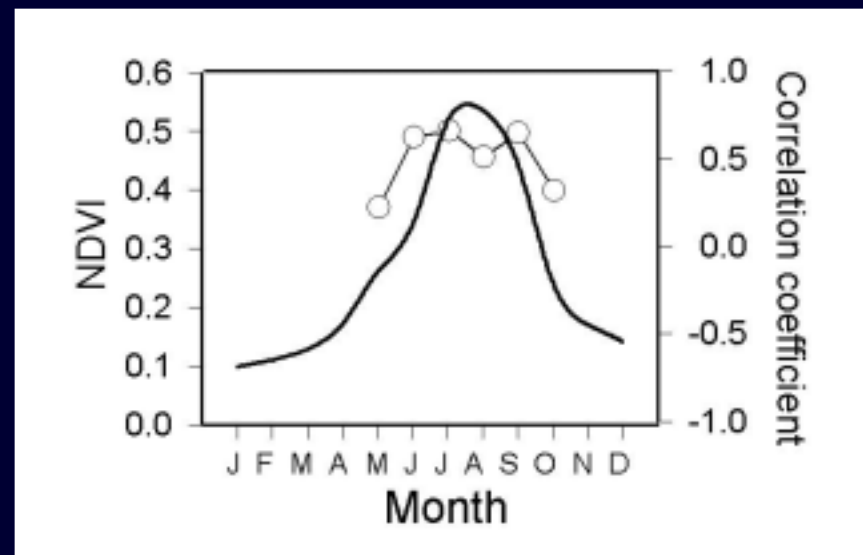


## Results

- Correlation of monthly NDVI and SPI



Grassland  
 Nebraska North-central CD



Cropland  
 Nebraska Northeastern CD



NDVI



Correlation Coefficient

- Regression Model Test

Land Cover	Seasonal Adjusted Regression	Simple Regression
<u>Grassland</u> North-central CD	$p < 0.0001$ $R^2 = 0.674$	$p = 0.0016$ $R^2 = 0.135$
<u>Cropland</u> northeastern CD	$p < 0.0001$ $R^2 = 0.792$	$p = 0.0027$ $R^2 = 0.123$

## Conclusions

- Relationship between vegetation condition and moisture availability is strong
- Relationship varies with growth stage
- Use of NDVI for drought monitoring requires consideration of the *seasonal effect*

# **Effects of Corn Tassel on Canopy Optical Measurements**

**Andrés Viña**

**CALMIT**

**University of Nebraska-Lincoln**

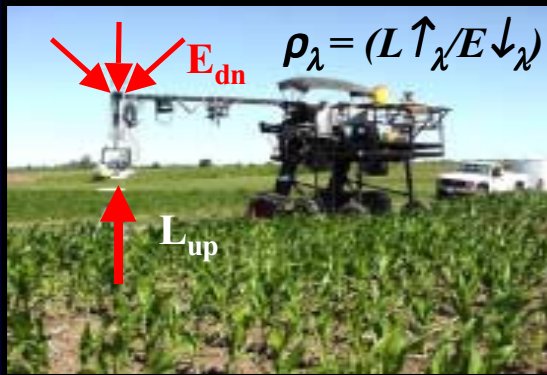
**December, 2002**

## Objective

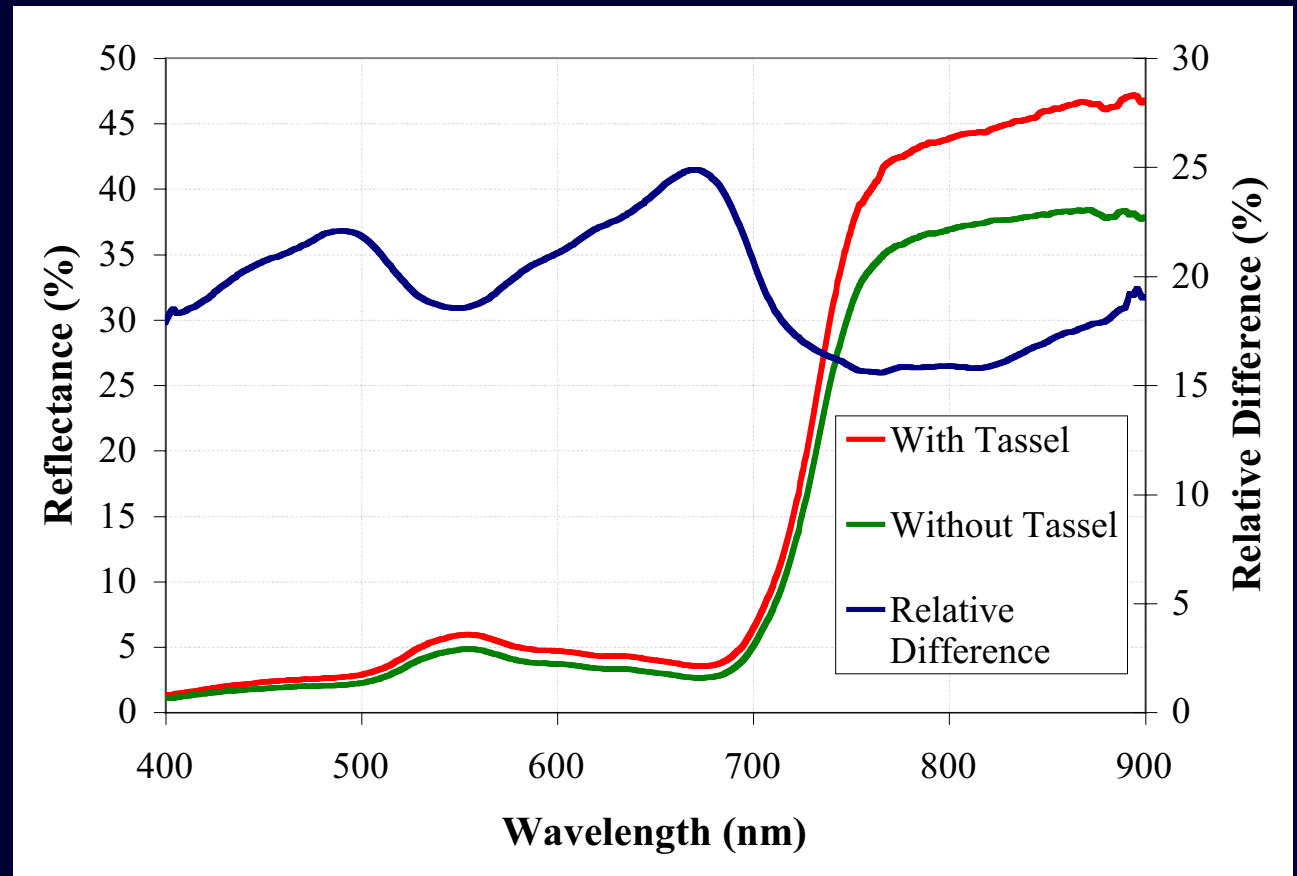
To evaluate the effects of corn tassels (flowers) on canopy optical measurements, specifically:

- Spectral regions of maximal effect
- Vegetation indices
- Leaf Area Index estimation

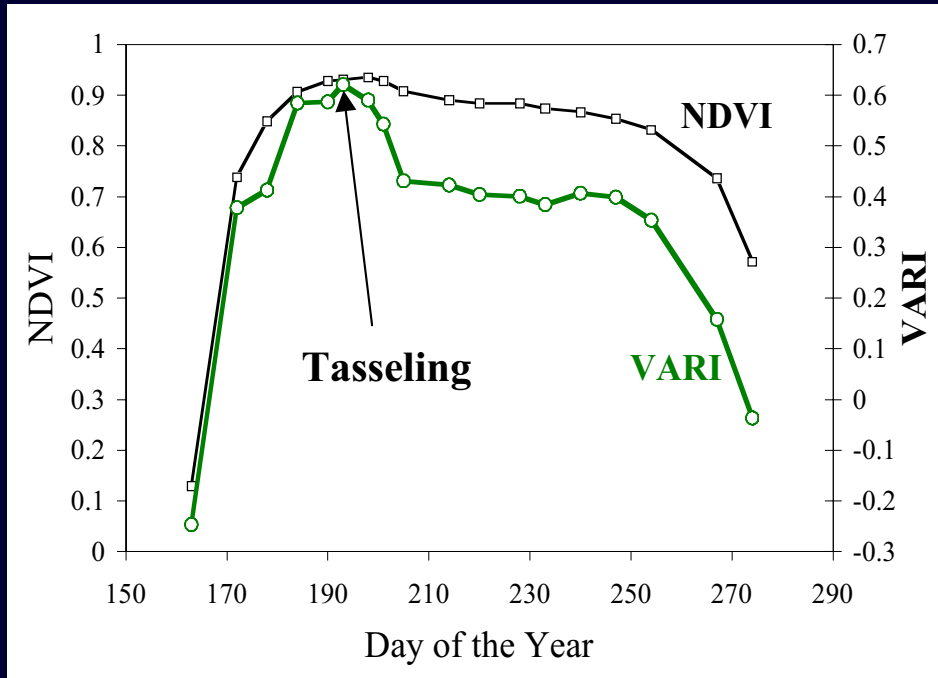




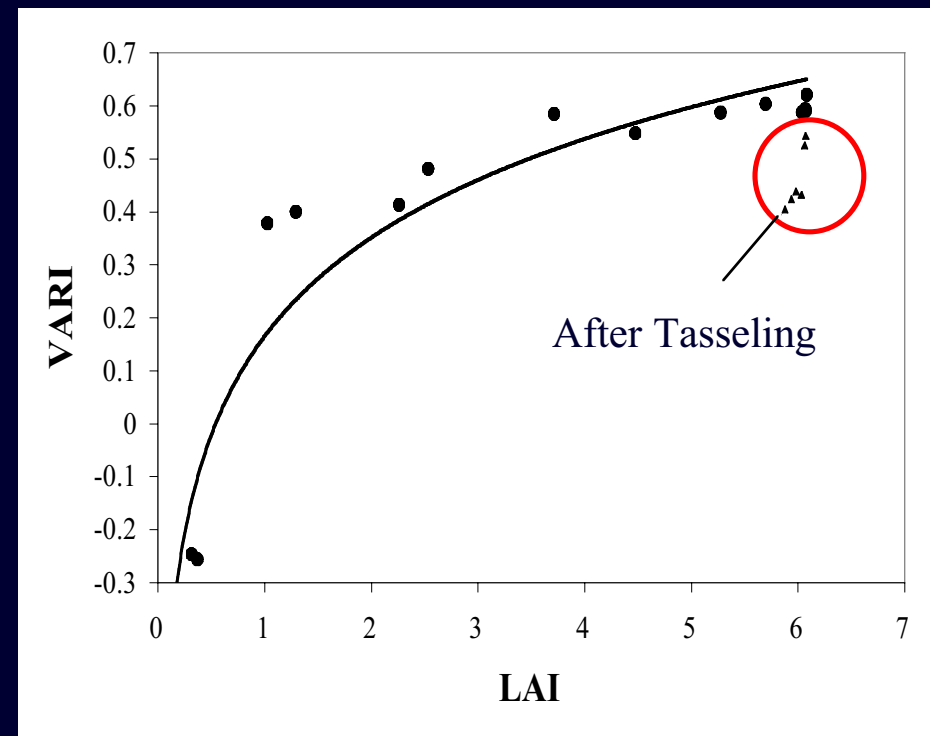
## Results – Reflectance



## Results – Vegetation Indices/LAI



$$\text{NDVI} = (\rho_{\text{Red}} - \rho_{\text{NIR}}) / (\rho_{\text{Red}} + \rho_{\text{NIR}})$$



$$\text{VARI} = (\rho_{\text{Green}} - \rho_{\text{Red}}) / (\rho_{\text{Green}} + \rho_{\text{Red}} - \rho_{\text{Blue}})$$

## Conclusions

- The red region (around 676 nm) showed the maximum relative response to the appearance of tassels.
- NDVI showed little or no sensitivity to the tassel.
- VARI showed high sensitivity to the tassel.
- VARI is a good estimator of LAI, although its predictive capability is reduced when tassels appear.

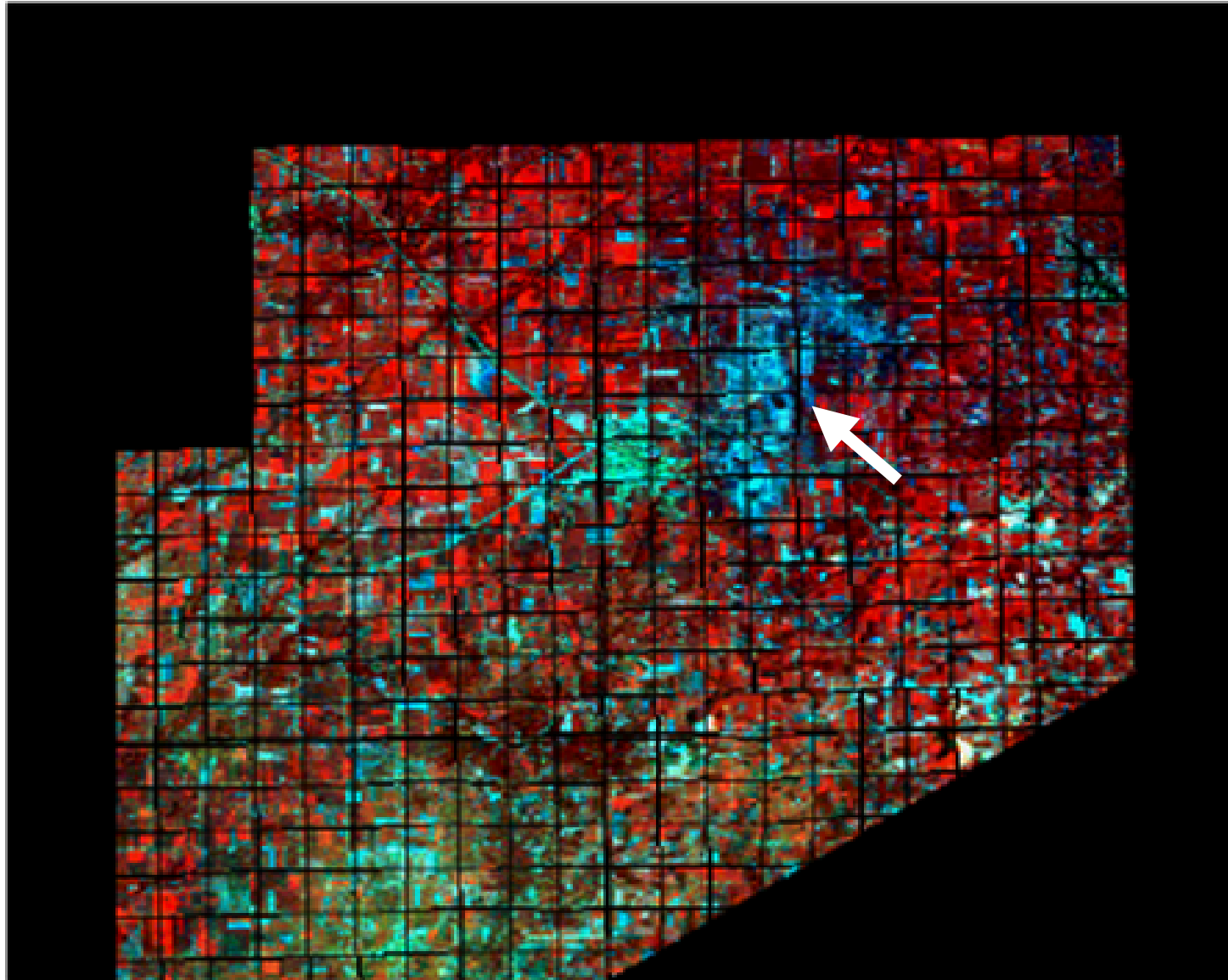
## Commercial Agricultural Applications of Remote Sensing



- **Doug Miller**
- **University of Nebraska - Lincoln**



Landsat July 10, 1994 - Decatur County IN



## Business

- Management
- Efficiency
- Spatial Management
- Precision Agriculture & Irrigation
- Environmental

ed

insect



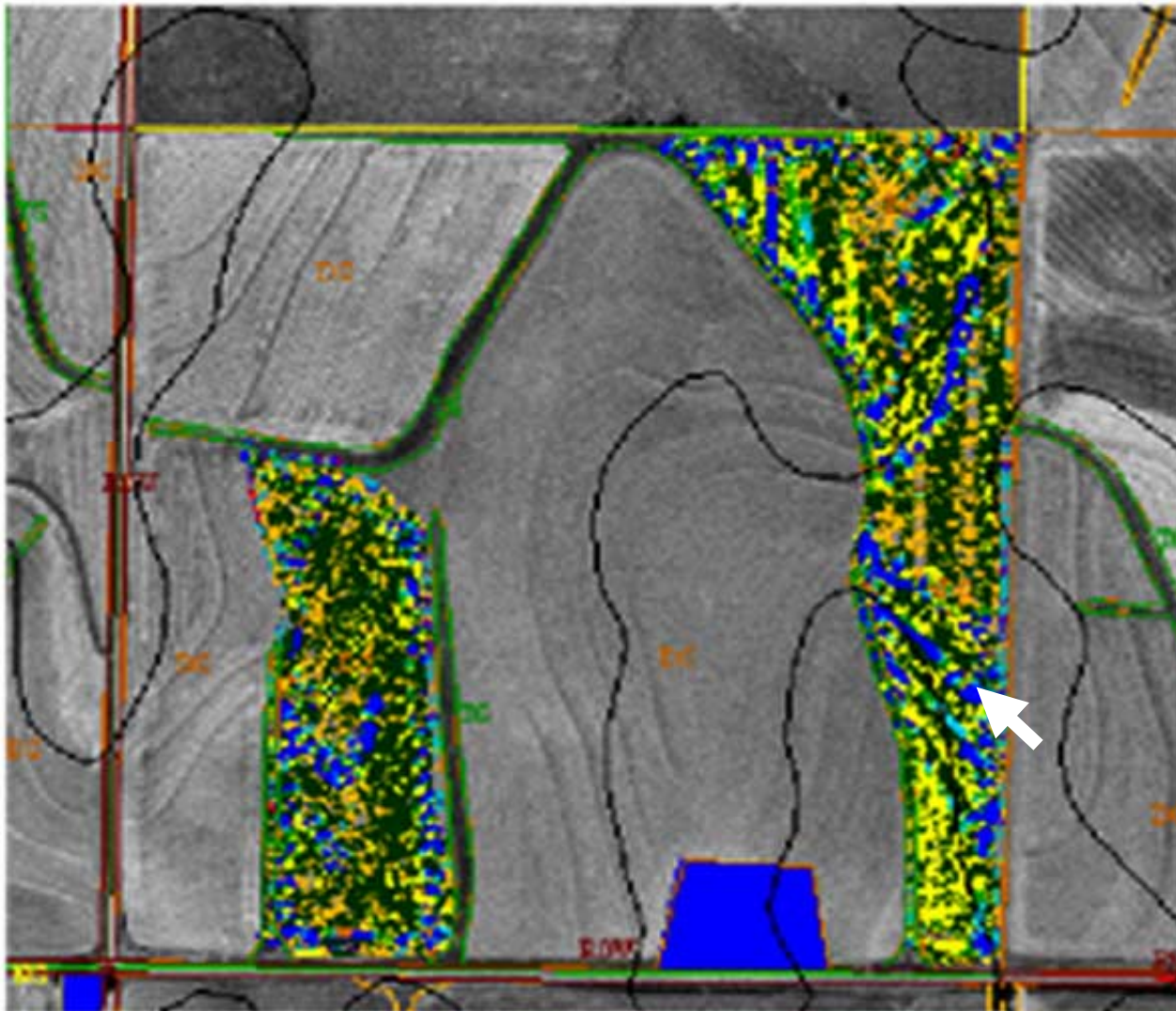


# Product Parameters

GPS Data Collection SE Qtr 16-1-18

**Legend**

Primary Site	Blue
Dry Crop	Orange
Irrigated	Cyan
Tame Grass	Green
Native Grass	Yellow
Woodlands	Black
Waste	Light Orange
Other Site	Grey
Residential	Light Blue
Undeveloped	Dark Blue
Exempt	Red
Right of Way	Brown



**Legend - Corn Bushels per Acre**

47 - 98	Blue
97 - 187	Orange
188 - 277	Cyan
278 - 367	Green
368 - 457	Yellow
458 - 547	Black
548 - 637	Light Orange
638 - 727	Grey
728 - 817	Light Blue
818 - 907	Dark Blue
908 - 997	Red
998 - 1087	Brown



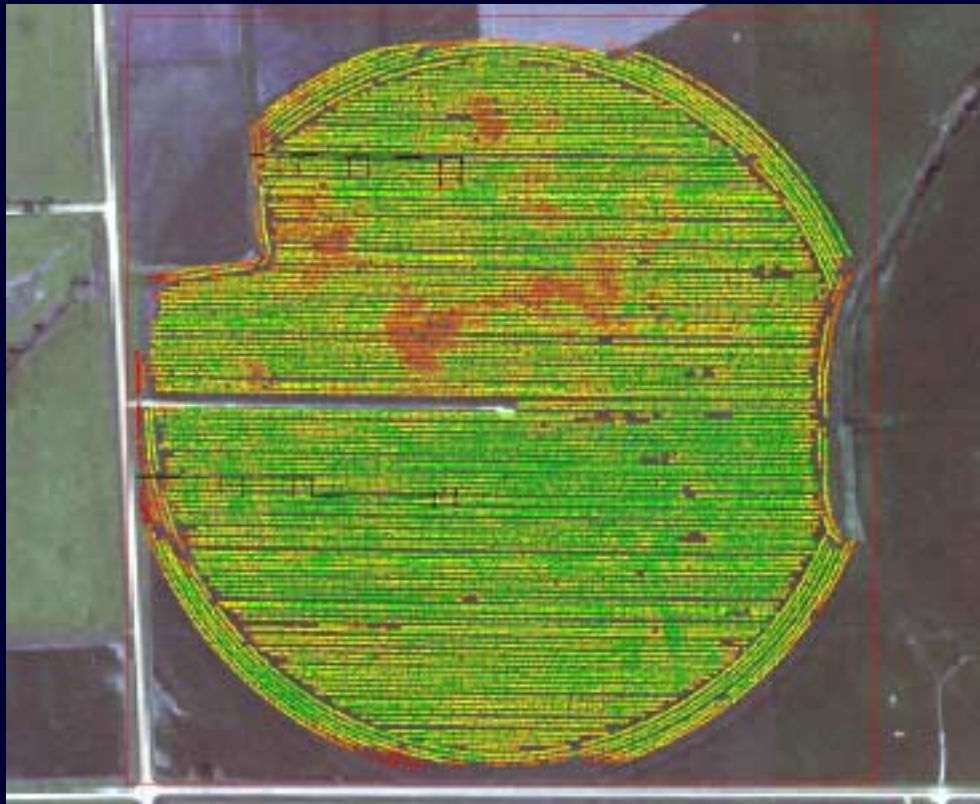


**W**

**Walima Systems**

File    TSA    Tools    View    Models    Weather

Easting	Northing	Value
711467.1	4560270.9	165.6



**Buffer Zone**  m

**Available Attributes**

- DEM
- Soils
- Insect
- Weed
- Variety
- Population
- Tillage
- Nutrient
- LAI
- Biomass
- Harvest Yield

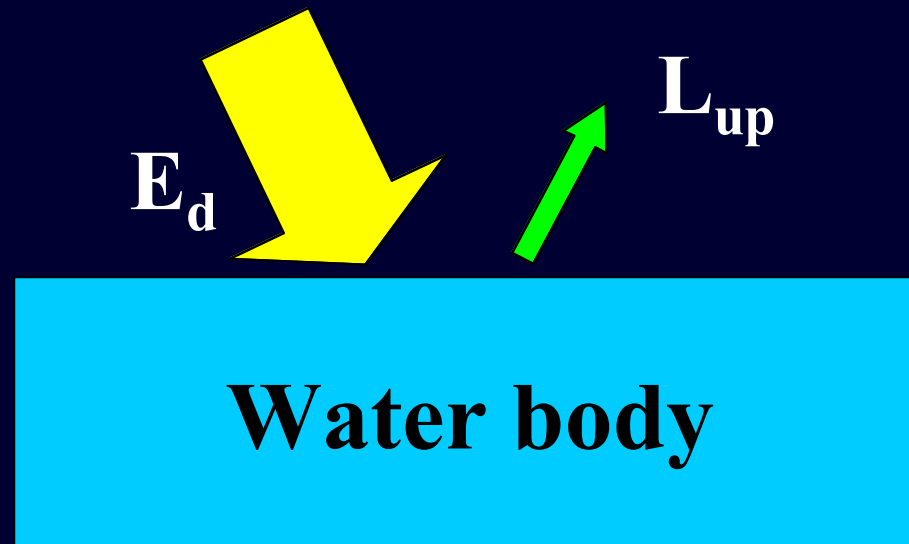
# **ALGORITHMS FOR REMOTE ESTIMATION OF WATER QUALITY**

**Giorgio Dall'Olmo**

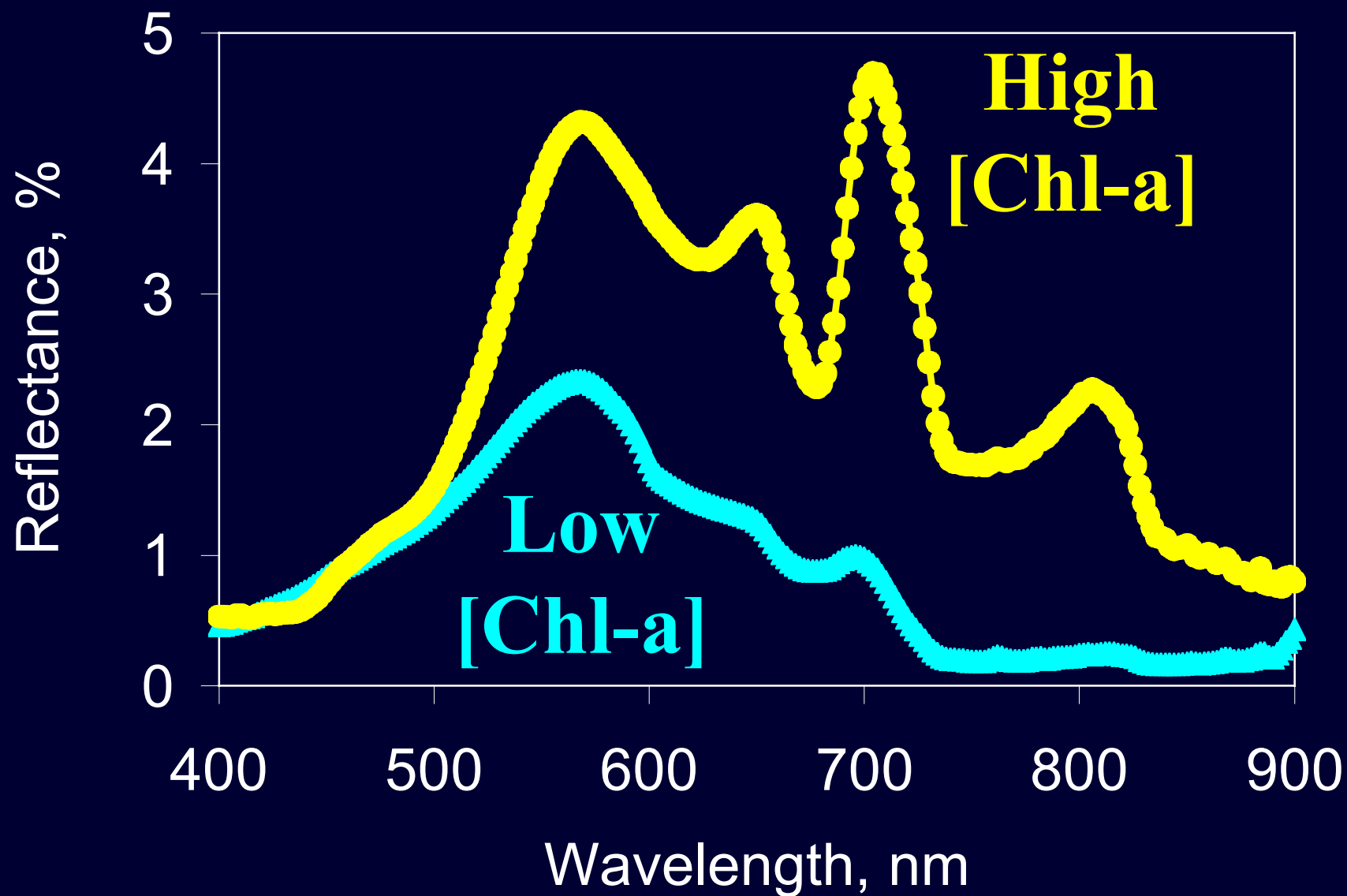
Center for Advanced Land Management Information Technologies,  
School of Natural Resource Sciences,  
University of Nebraska-Lincoln

## Spectral Reflectance

The percentage of light  
reflected by a target



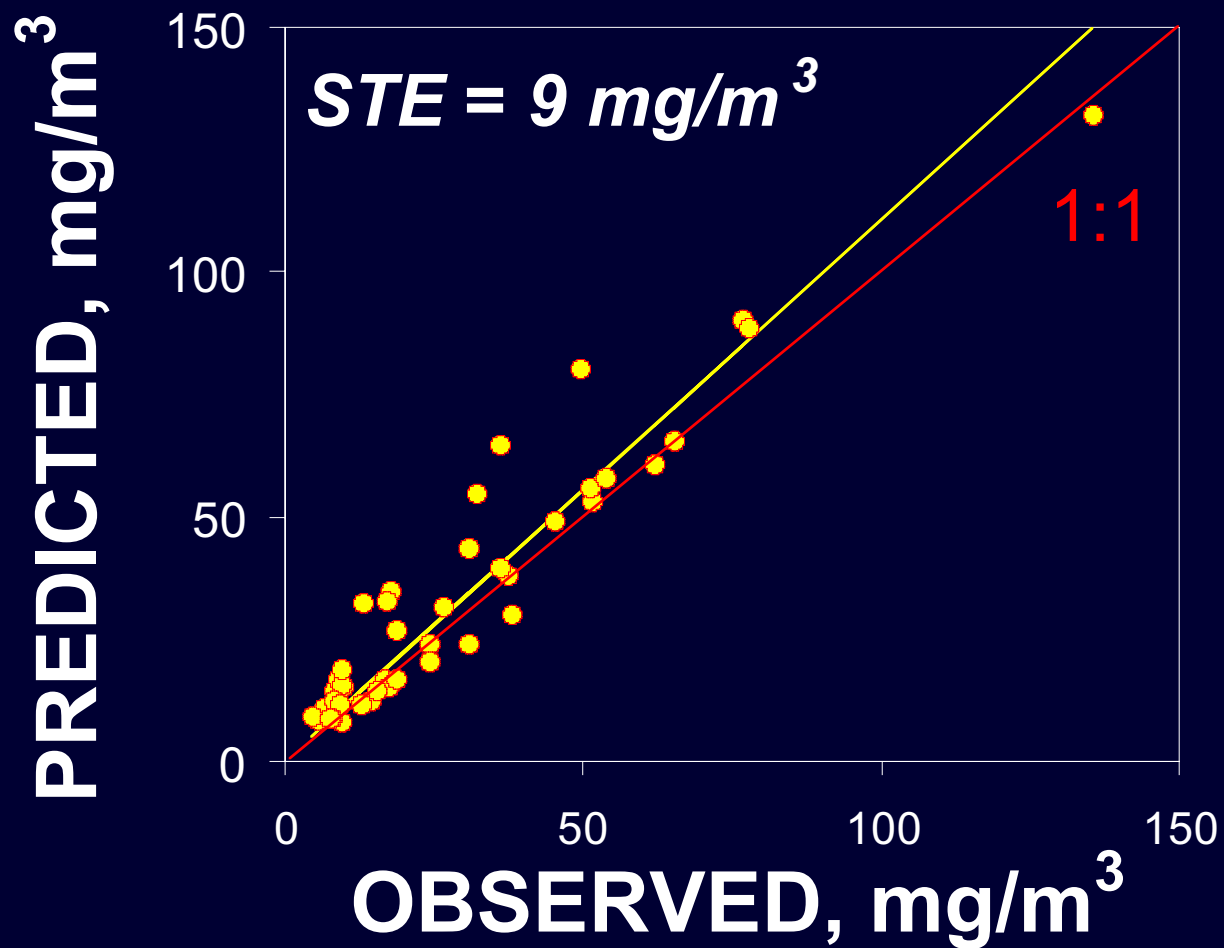




## Spectral Indices

**Combinations of reflectance  
values at different wavelengths**

## Results: Chl-*a* model validation



# Geospatial Technologies for Homeland Security

Jeff Arnold



Featured in *PE&RS* September 2002, Volume 68, Number 9

## Risk Assessment and Preparation



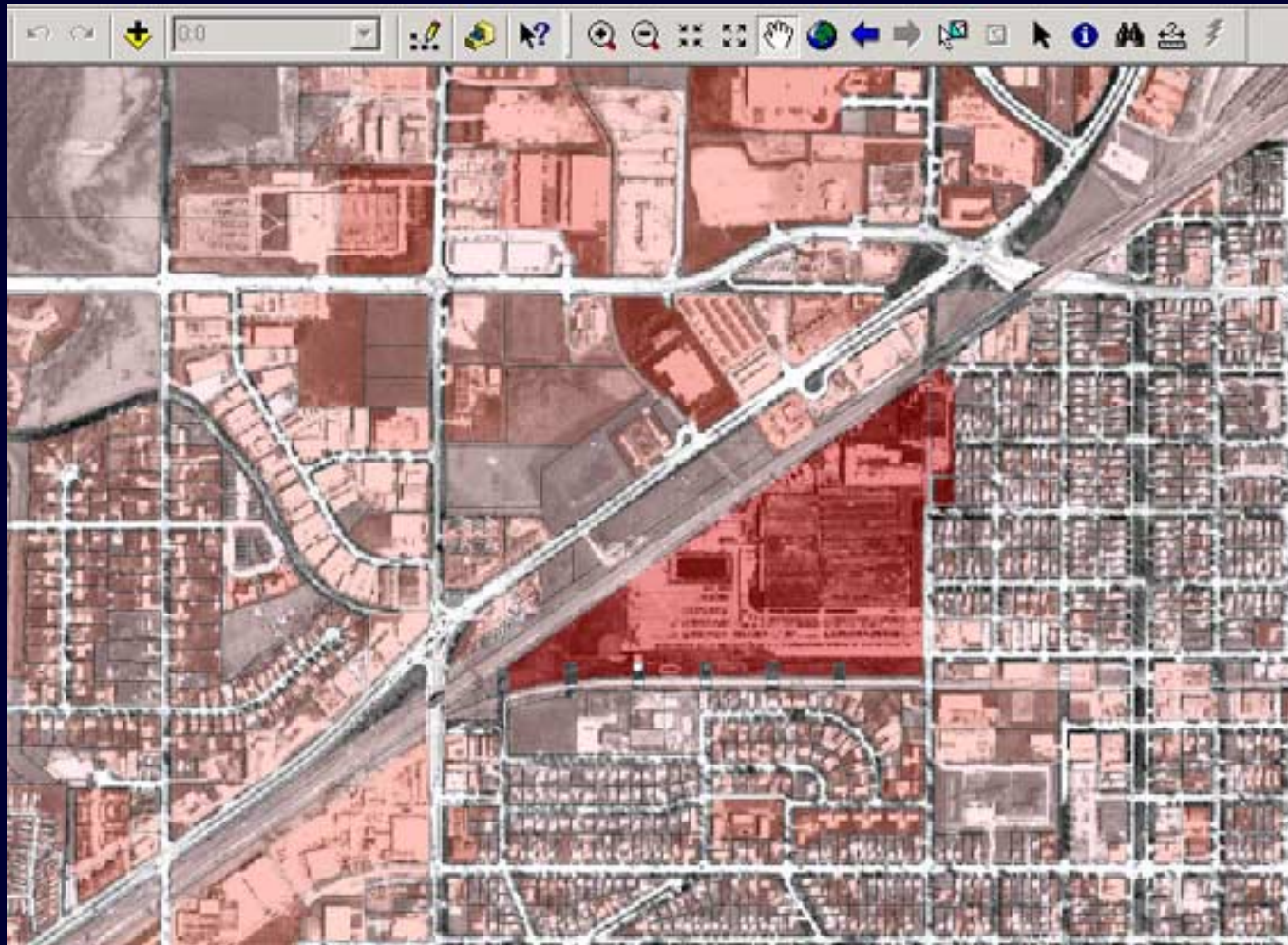
Emergency Services,  
Notification and  
Evacuation Mapping

Critical and Sensitive  
Facilities Inventory

Special Needs  
Population  
Determination



## Response and Recovery



Prioritization of medical response efforts

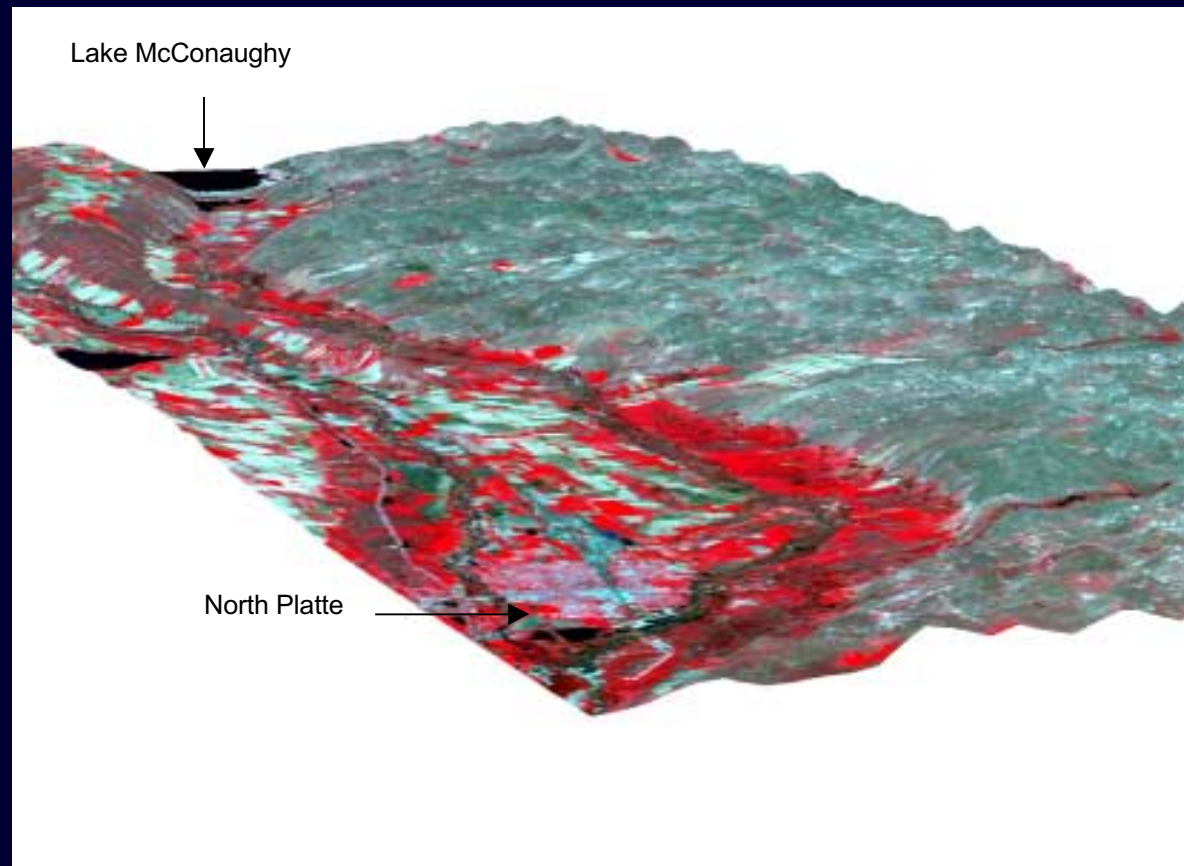


## Information Distribution

The screenshot displays a web-based GIS application interface. At the top, there is a navigation toolbar with icons for Full Map, Zoom In, Zoom Out, Pan, Info, Select, Query, Clear, and Refresh. Below the toolbar is a map showing a grid of agricultural land with a red boundary. A red label 'Agricultural Research and Development Center' is overlaid on the map. A scale bar at the bottom of the map indicates 0 to 1.15 miles. On the right side, there is a legend titled 'Select a facility...' with a list of facilities and a list of map layers. The facilities list includes: Agricultural Research and Development Center, Barta Brothers Ranch, Dalbey-Halleck Farm, Gudmundsen Sandhills Laboratory, Haskell Agricultural Laboratory, High Plains Agricultural Laboratory, Horning Forestry Farm, Panhandle Research and Extension Center, Sioux County Range, and South Central Research and Extension Center. The map layers list includes: Facility Names (checked), Hydrology, Local Roads, Buildings, Parcel, Fields, Wells, Major Roads (checked), Railroads, Soils, and Ples.

On-line maps with query capabilities

## Modeling & Analysis



Digital elevation model indicating areas flooded





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