

The following was presented at DMT'09  
(May 10-13, 2009).

The contents are provisional and will be  
superseded by a paper in the  
DMT'09 Proceedings.

See also earlier Proceedings (1997-2008)  
<http://ngmdb.usgs.gov/info/dmt/>

# Mapping Exercises in Earth Science Courses at Vincennes University

Purpose:

Provide quality field and GIS  
experience in short duration  
exercises

Adam M. Davis



# The Mapping Exercises in GIS & Geology courses

## GIS course

- Illustrate specific aspects of GIS
  - 3 period exercises
  - ½ semester exercise

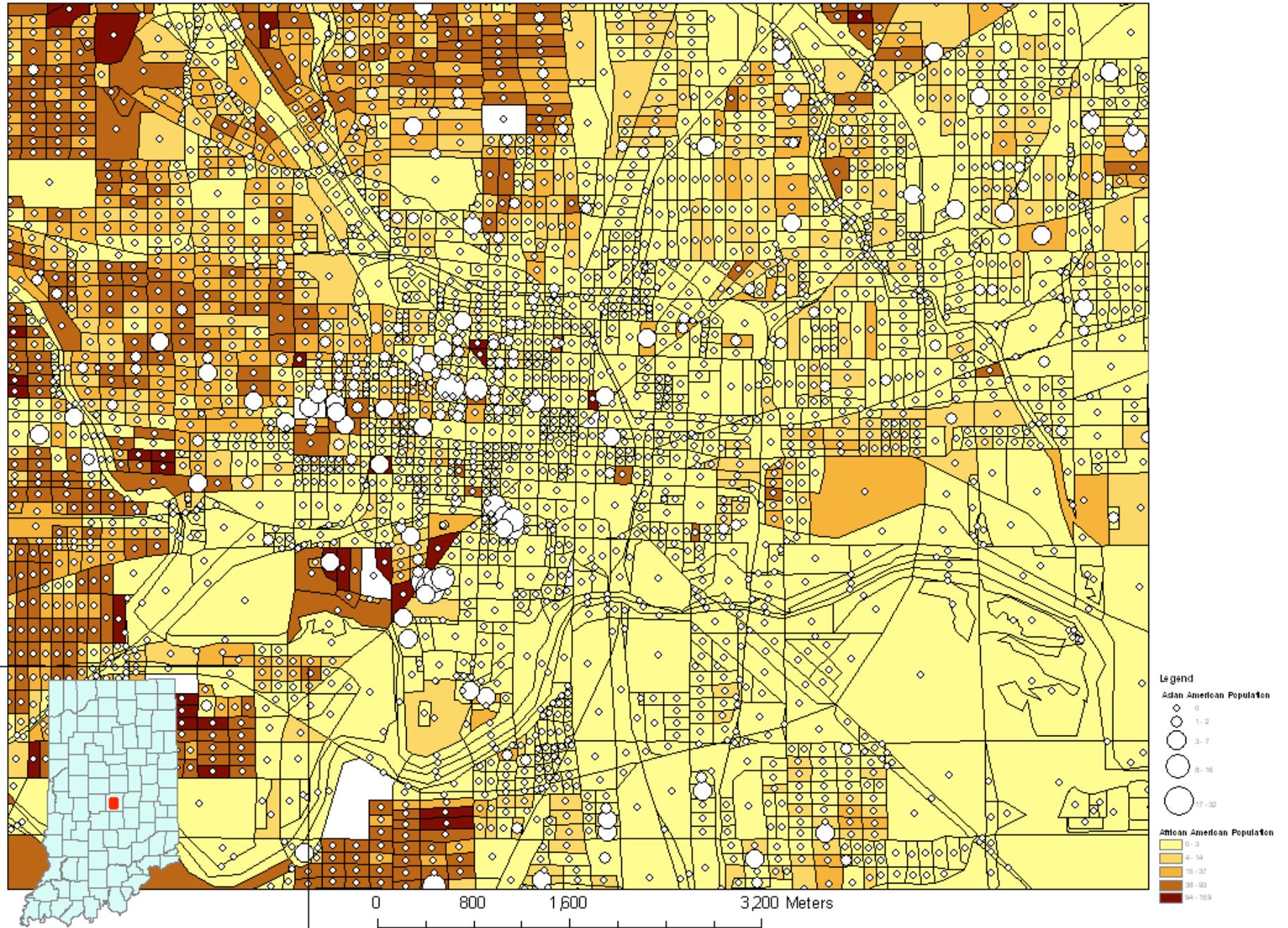
## Physical Geology and Earth Materials courses

- Teach field mapping concepts in one lecture/lab or field introduction
- Get students familiar with units in one or two lectures and/or a tour in the field
- Involve efficient, focused field data collection – 3 hour lab, 5 hour transect.
- GIS days (1-2 lab periods) with instruction sheet, rotating meetings between student groups and instructor
  - The ArcGIS functions necessary for the targeted task of the student group (e.g. Adding XY data and Polygon editing)

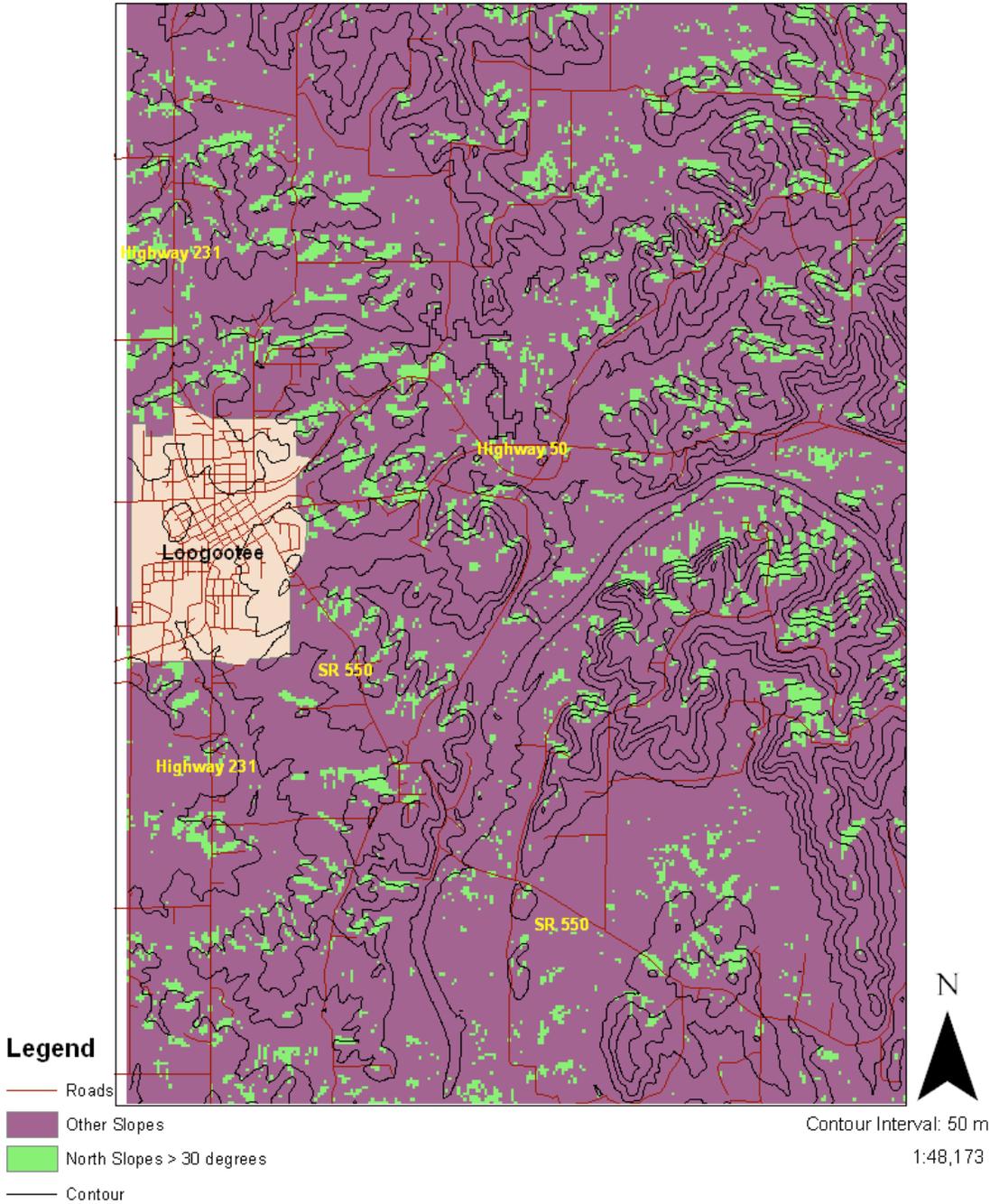
Examples of short map projects that illustrate  
GIS and cartographic principles  
in the VU GIS class

# Population of Asian and African Americans in Indianapolis

Clayton Peach

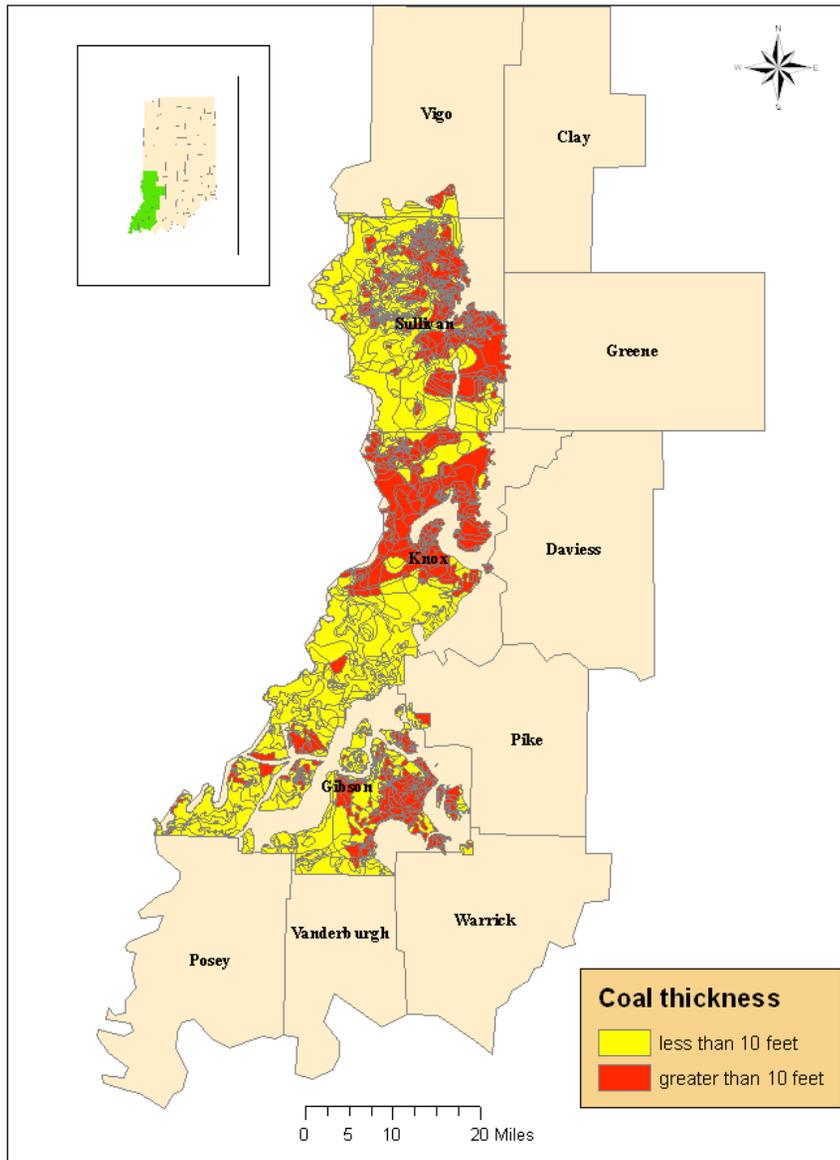


### Potential Seep Locations in Loogootee Area

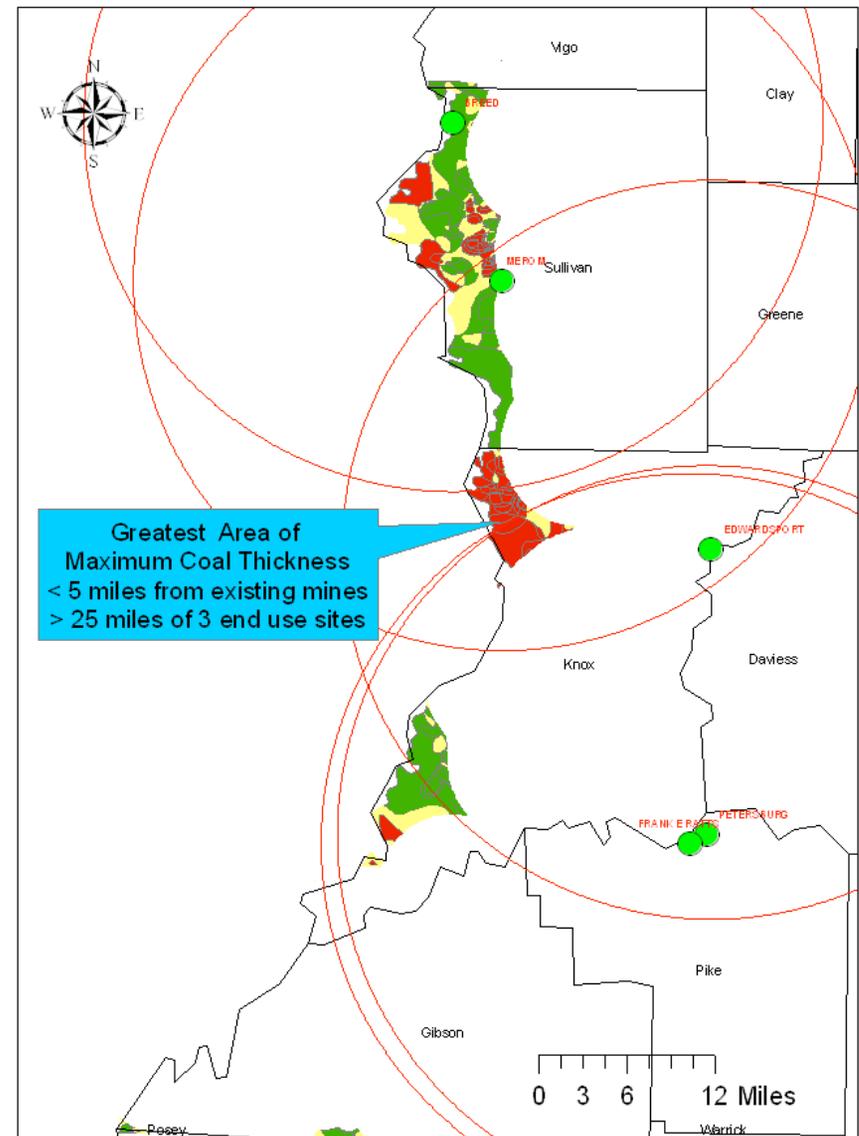


# ½ semester projects with more involved analysis

## Combined Coal Thickness



## Proposed Site for New Coal Mine



Projects with 1 or 2 field days  
and 1 or 2 GIS days

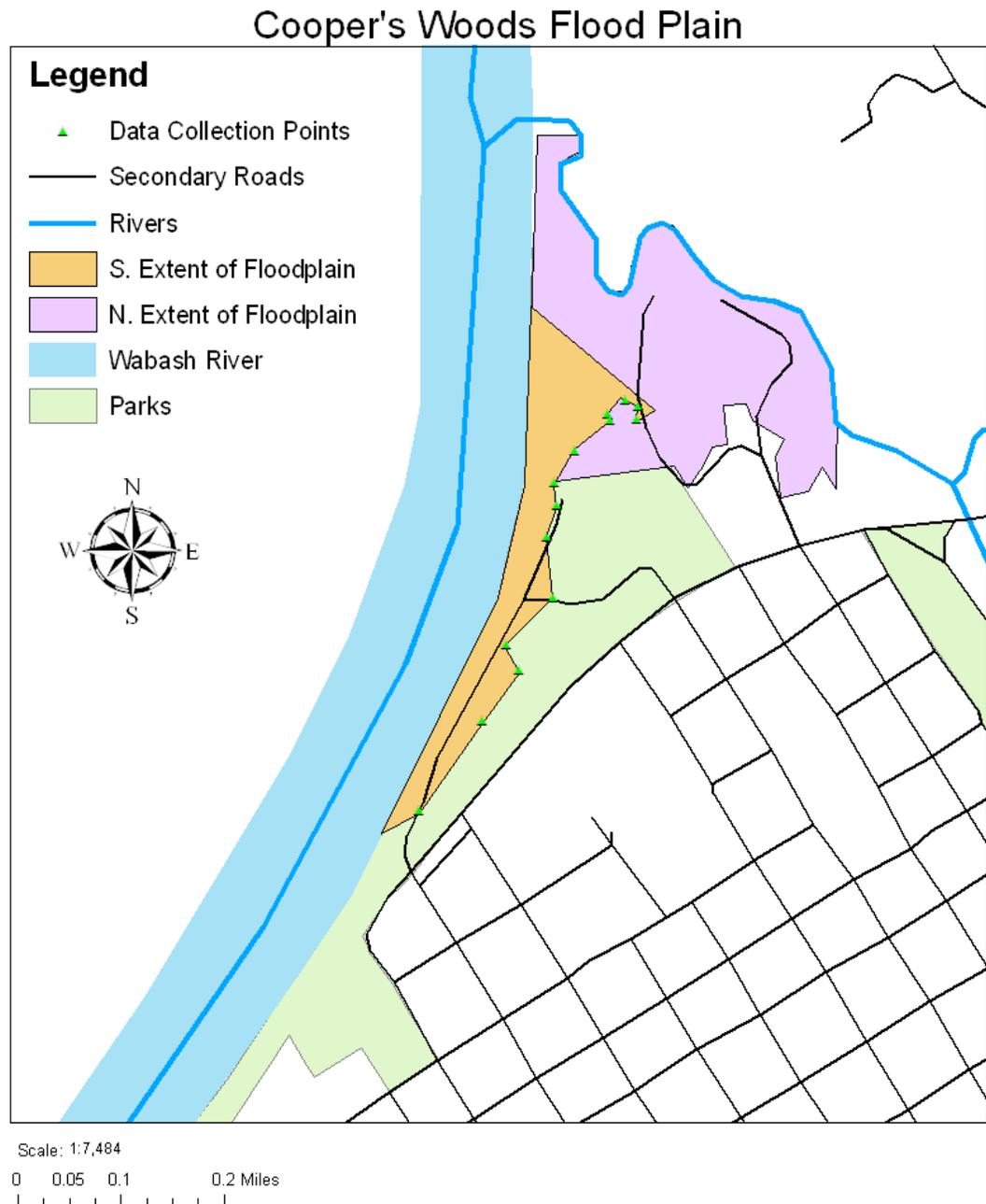
Course:  
Introductory Physical Geology

## Field work

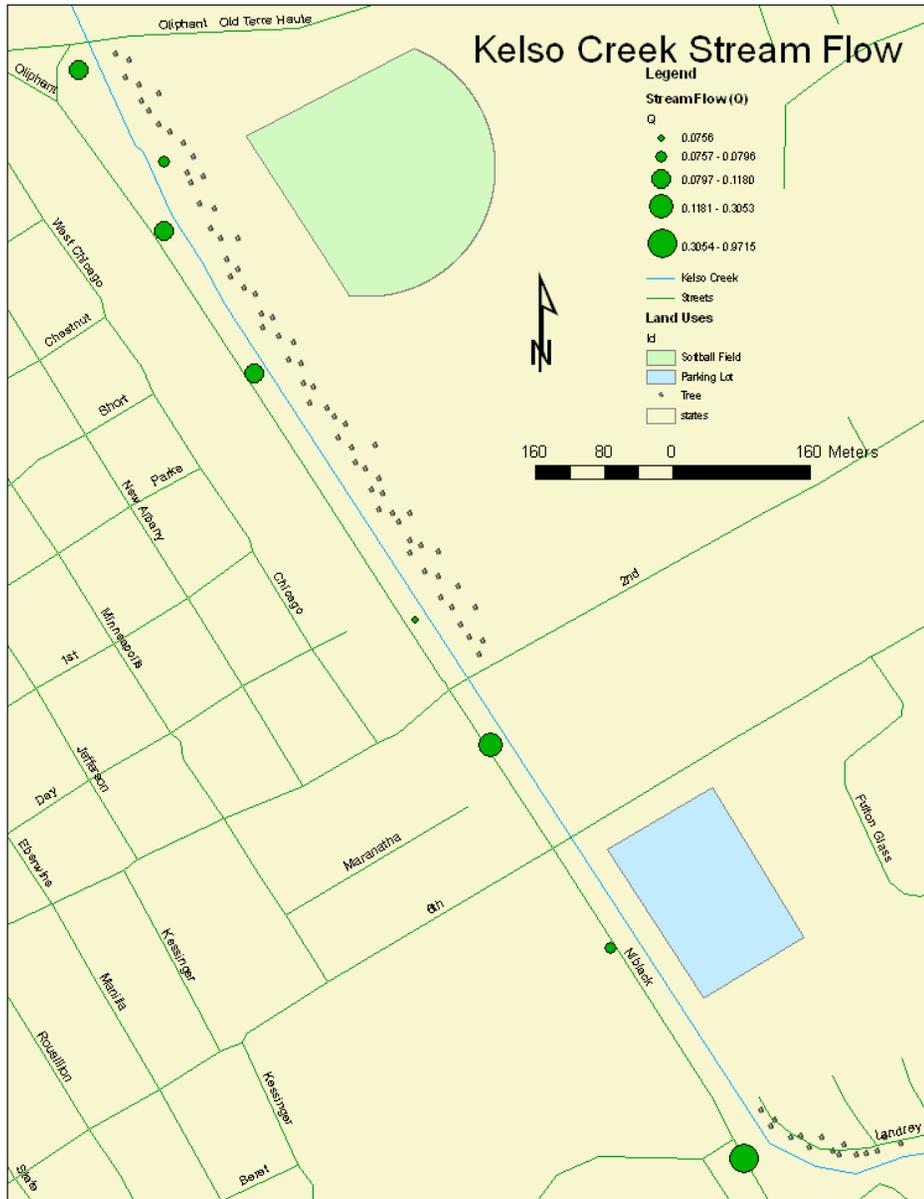
- Tracing Floodwater extents along the Wabash River

## GIS lab work

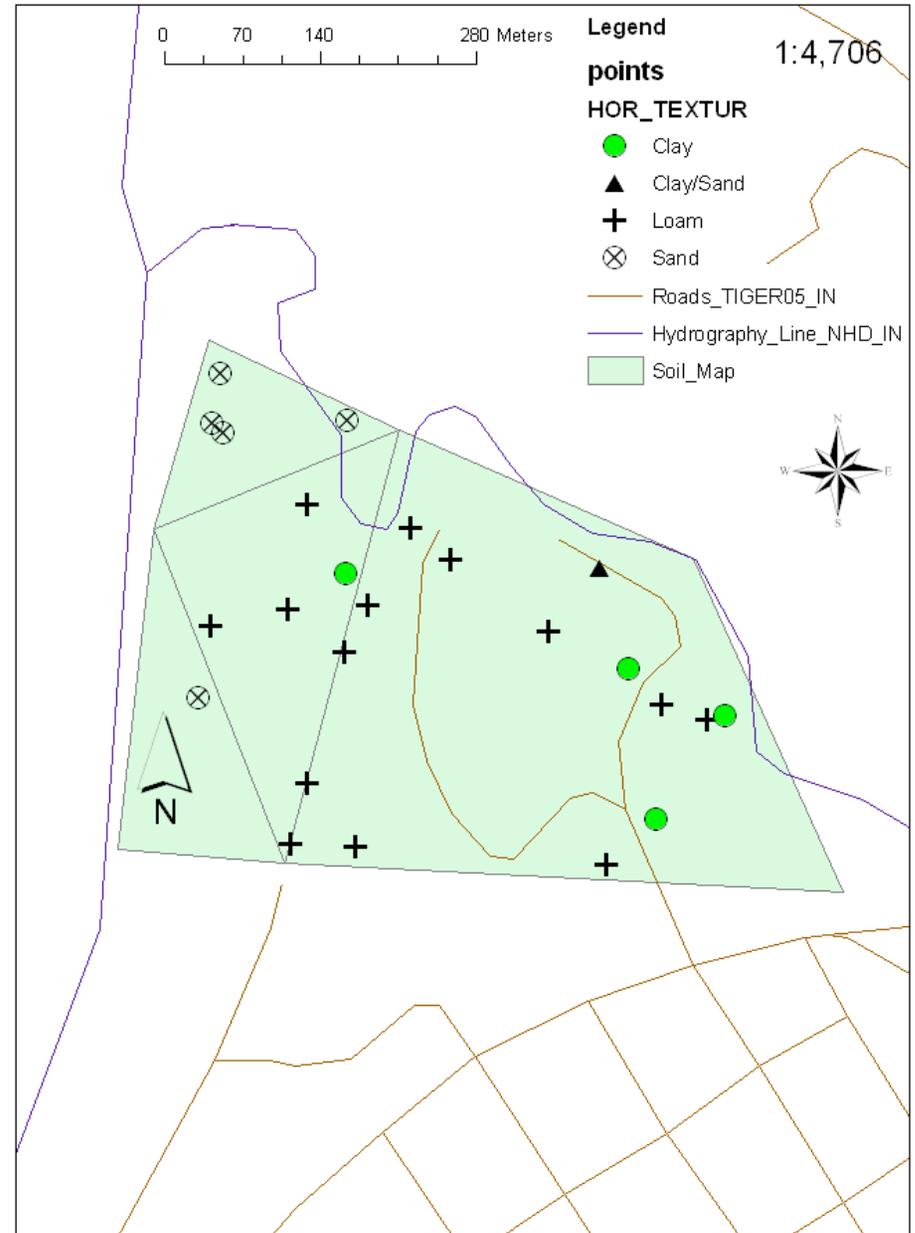
- Bringing GPS points into ArcGIS
- Drawing and editing polygons



# Stream flow



# Soils



# **An example targeted exercise**

## **Earth Materials Class Project**

- St Francois Mountains Missouri

### **Problem**

- Mapping a geologic contact between Pre-Cambrian granite and volcanic unit

# Base map and pre-information

- Previous geologic maps
- The problem that the class will try to solve
  - Finding a contact
- How to walk transects
- Rock ID and description refresher

# GENERALIZED GEOLOGIC MAP OF MISSOURI

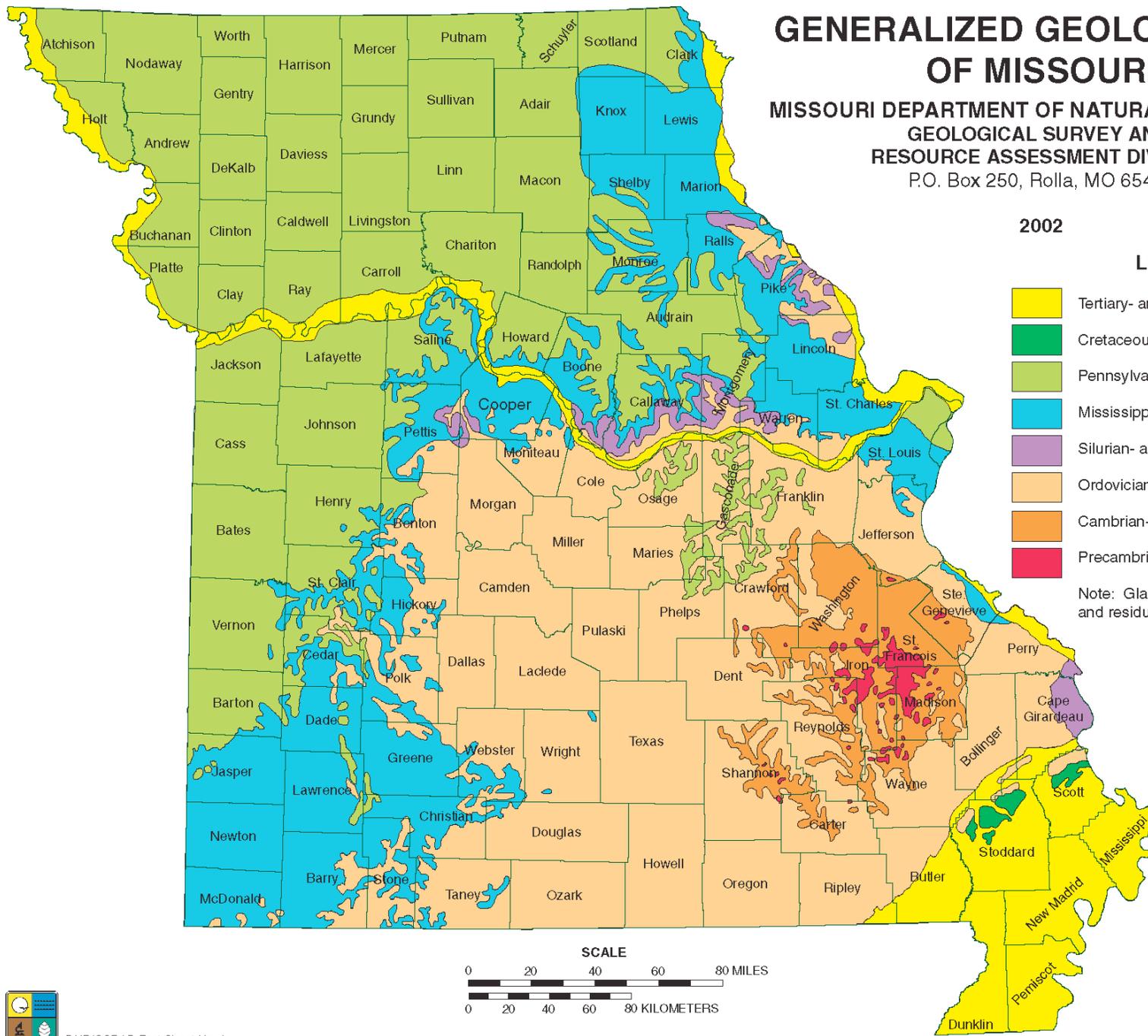
MISSOURI DEPARTMENT OF NATURAL RESOURCES  
 GEOLOGICAL SURVEY AND  
 RESOURCE ASSESSMENT DIVISION  
 P.O. Box 250, Rolla, MO 65402

2002

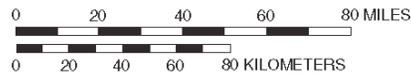
## LEGEND

-  Tertiary- and Quaternary-Age Materials
-  Cretaceous-Age Bedrock
-  Pennsylvanian-Age Bedrock
-  Mississippian-Age Bedrock
-  Silurian- and Devonian-Age Bedrock
-  Ordovician-Age Bedrock
-  Cambrian-Age Bedrock
-  Precambrian-Age Bedrock

Note: Glacial drift, loess and residuum not shown.



### SCALE



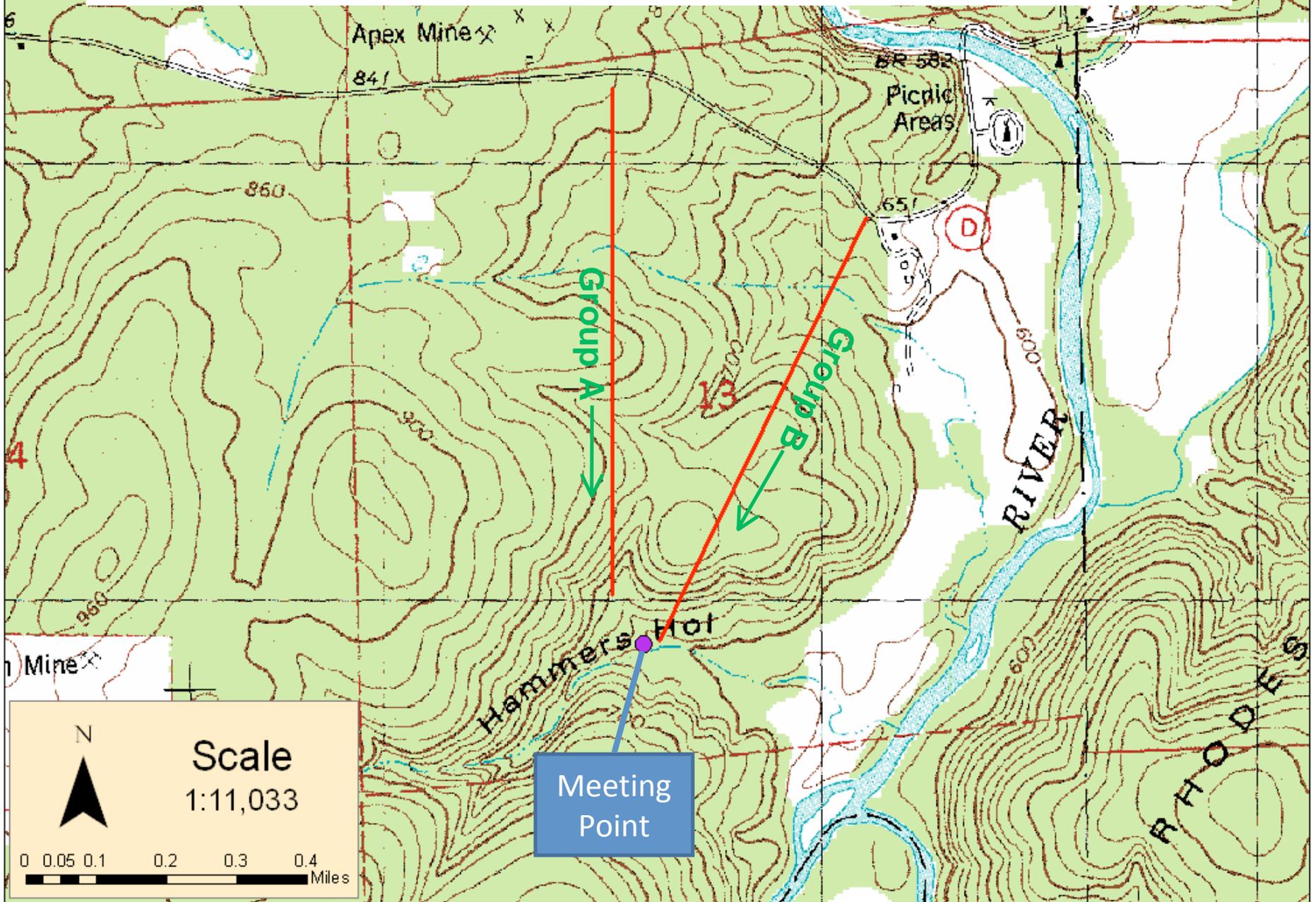
# Full field day

- Introduce units in morning
- lunch
- Introduce the transect
- Groups do transects with faculty bouncing around between groups
- Rendezvous, field conclusions, next steps





# Base map with planned transects





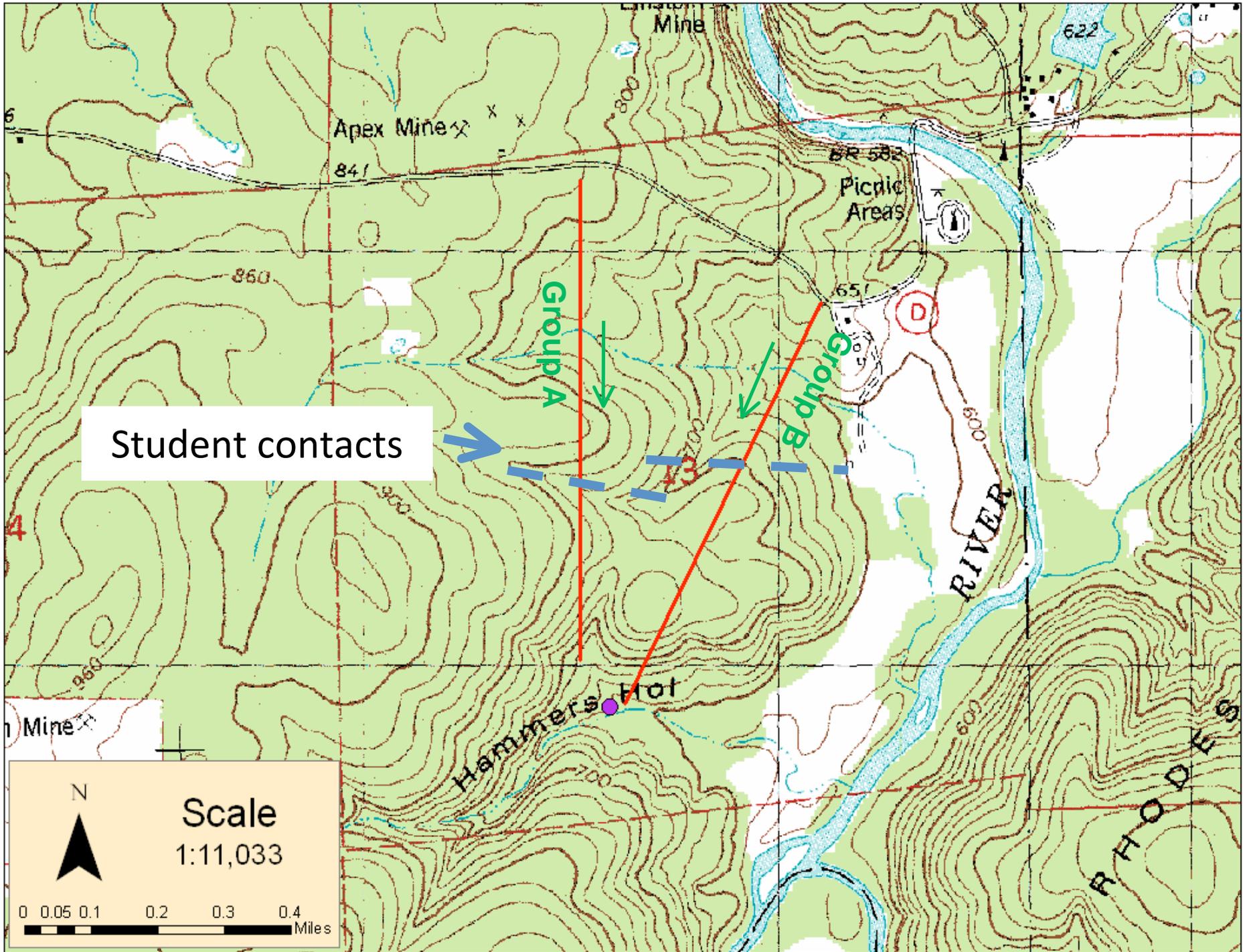
# Displaying points and Drawing contact in ArcView

- Students draw in contact based on notes, points
- The ArcGIS session is focused but still involves trial and error learning
  - Students receive enough instructions to bring up the base, add their GPS points and draw a contact, and add map elements to layout
  - A mix of letting them struggle and talking them through it.

# Preparing your data for GIS

utm_x	utm_y	Rock_type	Unit
07-----	4-----	granite	PCsmf
		rhyolite	PCrc

- Craft your Rock Descriptions
  - Outcrop style, texture and variability, grain size, minerals



# Plans to improve the VU mapping emphasis

- Submission of course maps to ARCNews.
- Have posters resubmitted
- Contribute data to versioned geologic databases(GISs)
  - Ideally the work updates/refines existing geologic maps
  - We need a mechanism to get refined contacts into a GIS that contains the pre-existing map data
  - to push our data toward the data hub