

# GIS On A Budget: Simple Applications for Real World Solutions



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Calaveras County Environmental Health

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# Topics Covered

- 🌐 What is GIS
- 🌐 Tools of The Trade
- 🌐 Creating a Simple GIS Project
- 🌐 Field Viewing and Editing



# Geographic Information System

## GIS – What Is It?

### **Geographic information system (GIS)**

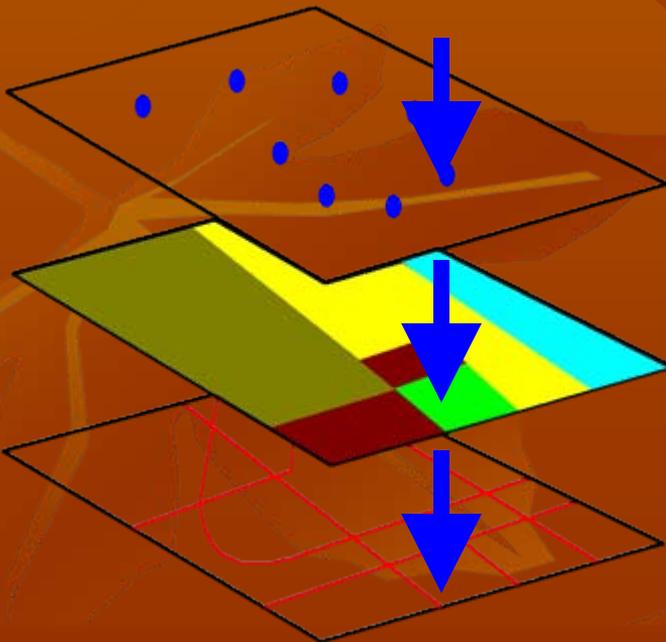
data represents real world objects such as roads, land use, elevation, parcels, etc. with digital data, found in a local database called attributes.



# Geographic Information System

## - GIS -

- GIS links **spatial information (location)** with **descriptive information (attributes)** and creates a **map (layer)**

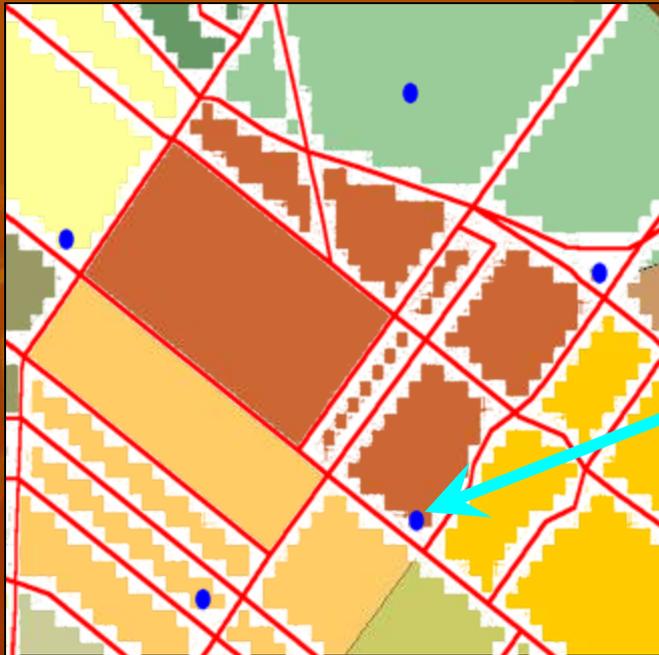


- In GIS you can overlay these layers to create specific maps.
- For any point on these maps all information stored as attributes are available to see

# Geographic Information System

## What do we get?

- GIS creates a map with the **spatial information (location)** in the selected layers.



- Using the “Information”-tool ( **i** ) the **descriptive information (attributes)** can be accessed.
  - Transfer Station #03 (1254 Main, 5 container capacity, Thu-Mon 9-5, incl. Haz.Mat.)
  - Main arteries within 500': S. Main St., Church St.
  - Medium density residential (R3, 2.5 persons/household, 7500 people)

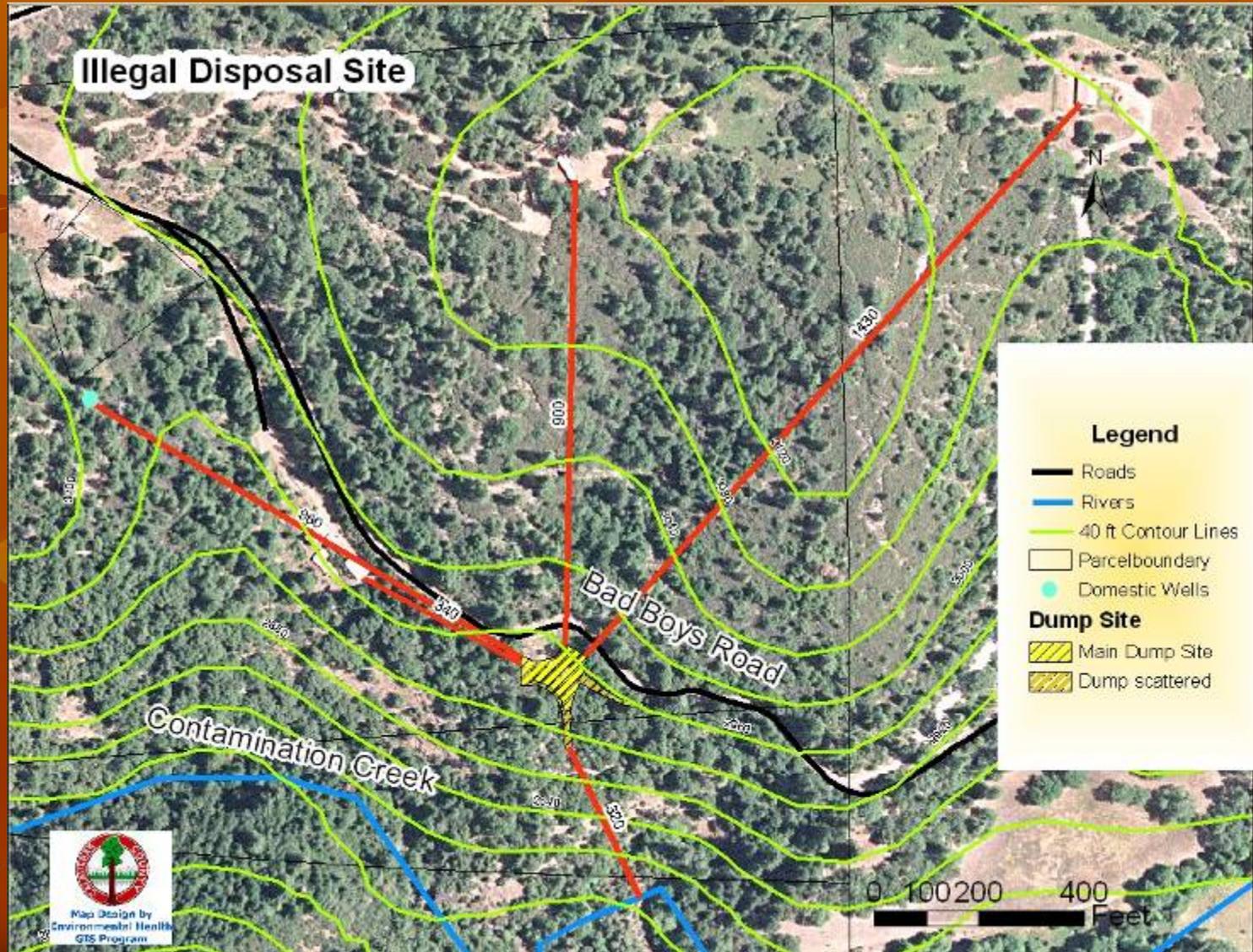
# Geographic Information System

## What do we get?

Site assessment of  
illegal dump sites,  
Facilities, etc.



# Visualization of Dump Sites



# Parcel information

The screenshot shows the ArcReader application window titled "EH\_AerialTiff\_RelativePath - ArcReader". The interface includes a menu bar (File, Edit, View, Tools, Window, Help), a toolbar with navigation and tool icons, and a map area displaying an aerial view with pink parcel boundaries. Several roads are labeled: "MEADOW OAKS DR", "INSPIRATION CT", "CRESTVIEW DR", and "KITTYPHAWK CT". Red triangles are scattered across the map. A "Layers" panel on the left lists various map features, with "Parcels" checked. An "Identify Features on the Map" dialog box is open in the foreground, showing the "Parcels" layer selected. The "Identify from:" dropdown is set to "<Top-most layer>". The "Location" field displays coordinates: "6,453,034.05 / 2,242,670.82 Feet". Below this is a table of fields and values for the identified parcel.

Field	Value
ADDRESS1	2737 LARAMIE GATE CT
ADDRESS2	PLEASANTON CA 94566
ADDRESS3	
ADDRESS4	
APN	48050017
APPR_ACRES	22
ASMTDESC	VALLEY HILLS ESTATES
BENEFIT_BA	VSBB
BOOK	48
COMMAREA	BU
COMMAREANA	Burson
COMMUNITY	BU
EXEMPTIONA	0
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# So How Do We Do It?

There are almost as many ways to implement GIS, as there are options within GIS. The sky's the limit!

# Basic Tools of the Trade



# Basic Tools of the Trade

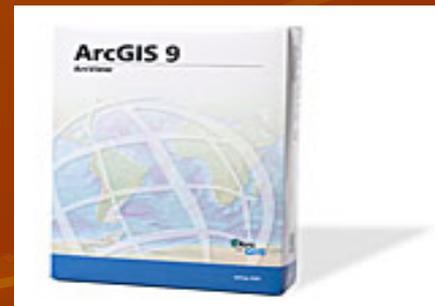
Computer or Laptop



GPS Unit



GIS Software





# ESRI GIS Software

(Industry Standard)

ArcMap 9

One user, costs \$1,500/license  
(publishing extensions extra)

ArcReader

FREE GIS Viewer

ArcPad

Many users, costs \$500/license

Visit [www.esri.com](http://www.esri.com) for online training seminars.

# Getting Started - Creating a GIS Project

## Step One

### Load data into a database

From as simple as a spreadsheet to complex with multiple tables

Don't let the creation of a spreadsheet stop you from using GIS



Microsoft Access or SQL are the most common  
(ask your IT department for help)

# Microsoft Access database

Waste Tire Database

File Edit View Insert Format Records Tools Window Help Adobe PDF

Type a question for help

MainForm

Local ID: WTG-001 TPID: 1294537-01 SWISS: Search for Name: Go! Search for TPID: Go!

Advanced Automotive & Tire

Operational Status: Active

Mail: 5113 Commercial Way Hathaway Pines CA 95233

Contact: Greg Phone: (209) 795-7665

Click if Mail and Site are identical

Site: 5113 Commercial Way Hathaway Pines CA

Property APN: 30010053 Owner: Steven Sibert

Click if Address is same for Owner

Mail: P.O. Box 6 Hathaway Pines Ca 95233

Phone:

DD DMS

Lat: 38.1660059 38 9 57.621 Long: 120.4176514 119 85 3.5450

DD to DMS DMS to DD Get Reports

Record: 1 of 93

Business Type

- Generator
- Hauler
- End-Use

Business Role

- New Tire Dealer
- Used Tire Dealer
- Auto Repair
- Auto Dismantler
- Car Dealer
- Waste Tire Hauler
- Towing
- Fleet/Trucking
- Agricultural
- Government
- Permitted SW Facility
- Illegal Closed Facility
- Illegal Tire Facility
- Major Waste Tire Facility
- Minor Waste Tire Facility
- Other:

Inspections Local ID: WTG-001

Inspection Report Number: I4-1007311

Name: Marty Date: 9/9/2004

FacilityInfo : Table

ID	LocalID	LocalNumID	TPID	SWISS	Name	Contact
1	WTG-001		1294537-01		Advanced Automotive &	Greg
2	WTG-002		1292899-01		Al's Tire Service	Al Duncan
3	WTG-003		1043473-01		Arnold Tire	Anthony Bentor
4	WTG-004		1091815-01	05-AA-0009	Avery Tire Center	Ken Douglas
5	WTG-005		1074201-01		Bear Mountain Auto	Delcom Hypolite
6	WTG-006		1307132-01		Calaveras Tire Center	John Shaffer
7	WTG-007		17303537-01		The Car Doctor	John Cudia
10	WTG-010		1302939-01		Keith's Auto. &Tire	Keith
11	WTG-011		11285312-01		Nash Chevron	Mike Nash
12	WTG-012		121100613-01		Valley Springs Tire and	Bill and Tammy
13	WTG-013		13303121-01		Mike's Tire and Auto	Mike
15	WTG-015		151201403-01		Toms Sierra Co. Inc.	
18	WTG-018		181326803-01		United Parcel Service	Troy Hansen
20	WTG-020		201302384-01		Angels Auto Service Ce	Paul Muller
22	WTG-022		221322106-01		Art's Auto Center	Art Soares
23	WTG-023		231051606-01		Forty Niner Subaru - Izu	
29	WTG-029		291322118-01		Sunset Automotive	Jack Tallia
32	WTG-032		32		Joe's Services	
33	WTG-033		331307361-01		California Auto Recyclin	Gary Bercham
34	WTG-034		341287622-01		Valley Springs Tow and	Frank C. Neith
35	WTG-035		351296669-01		East Bay Municipal Utili	Steve Abernathy
36	WTG-036		361321523-01		Gambi Disposal, Inc.	Mark
37	WTG-037		371319556-01		Pacific Gas & Electric	Jerry or John
38	WTG-038		381326587-01		Sam Berri Towing	Sam Berri
40	WTG-040		40		Mike's Towing and Trans	
41	WTG-041		41		Busi Towing and Truck S	
42	WTG-042		421101538-01	05-AA-0023	Rock Creek SW Facility	Cynthia Knapp
43	WTG-043		431284233-01	05-AA-0025	Red Hill SW Transfer St	Cynthia Knapp
44	WTG-044		441451594-01	05-AA-0013	Calaveras County Wise	
45	WTG-045		451307245-01		Calaveras County Code	
46	WTG-046		461271716-01		Altaville Mtce / Caltrans	Ben
47	WTG-047		471271883-01		Cabbage Patch Mtce / C	Dave Baumann
48	WTG-048		481271728-01		Camp Connell Mtce / Ca	Dave Baumann
49	WTG-049		491093454-01		CHP-San Andreas	Paul Steck
50	WTG-050		501271906-01		West Point Mtce / Caltr	Reynold Hysel

Datasheet View

NUM

## Step Two

Build a working shapefile in ArcView



Data set used by ESRI ArcView geographic software; represents a set of geographic features such as streets, notable locations, boundaries, etc;

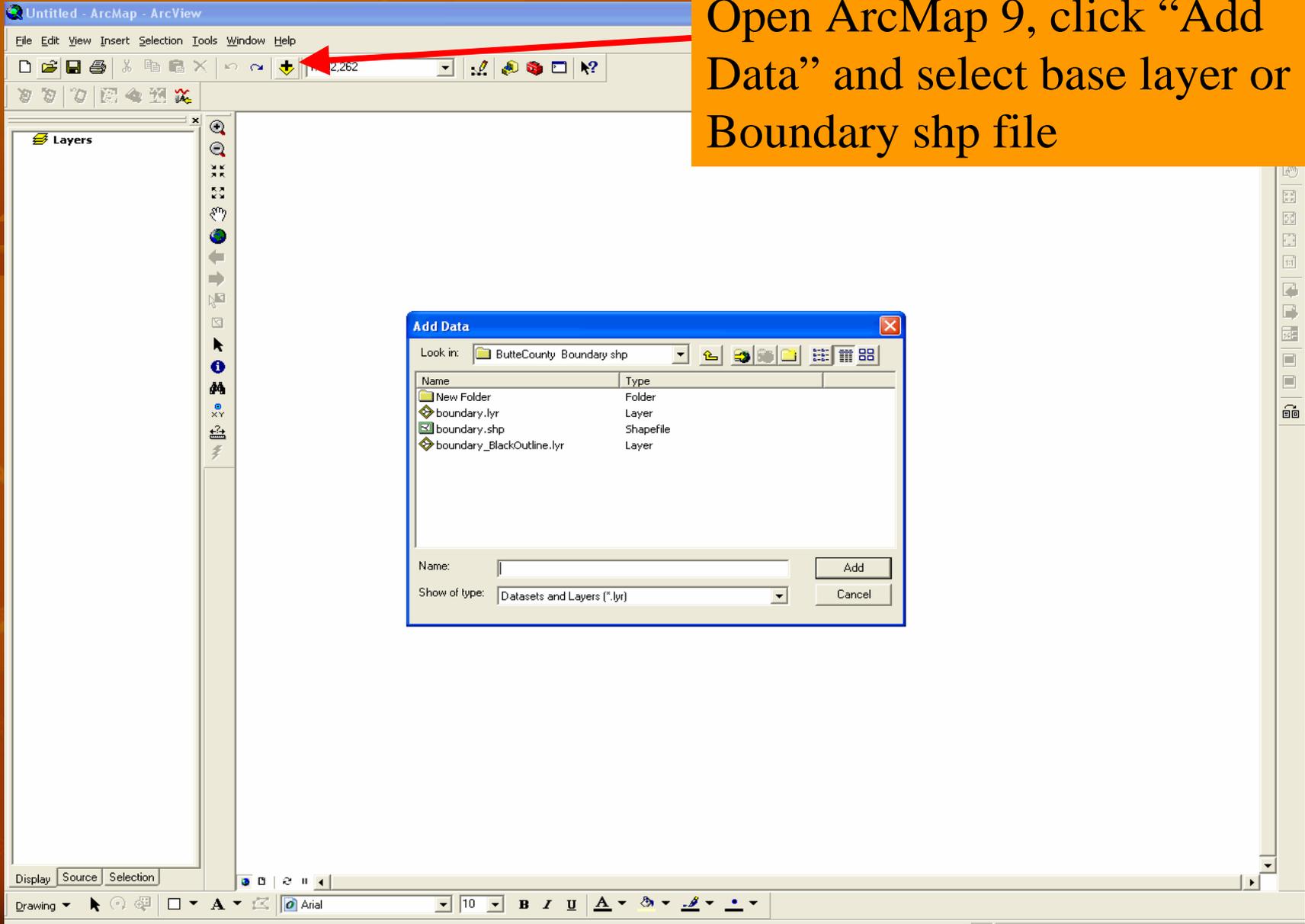
Each object in a shapefile represents a single geographic feature and its attributes.

The following 9 slides depict the ease of creating a working GIS Database



# Step Two

Open ArcMap 9, click “Add Data” and select base layer or Boundary shp file

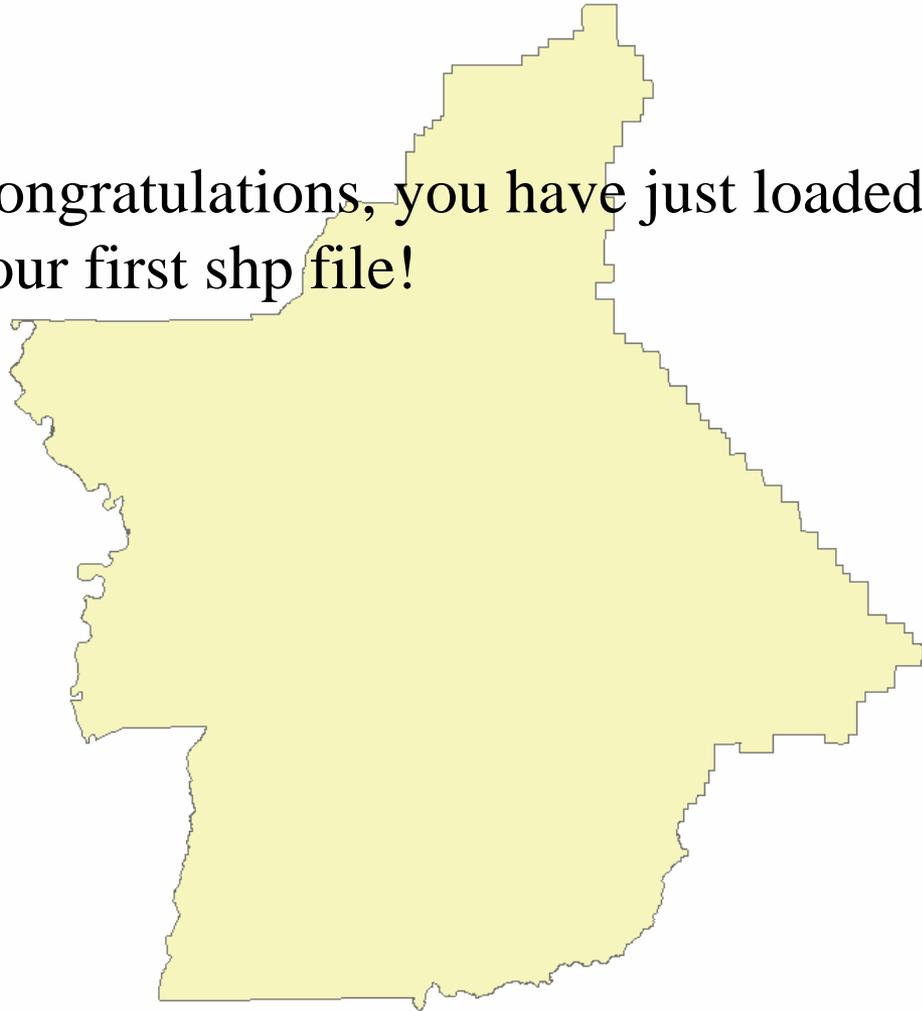




Layers

- boundary

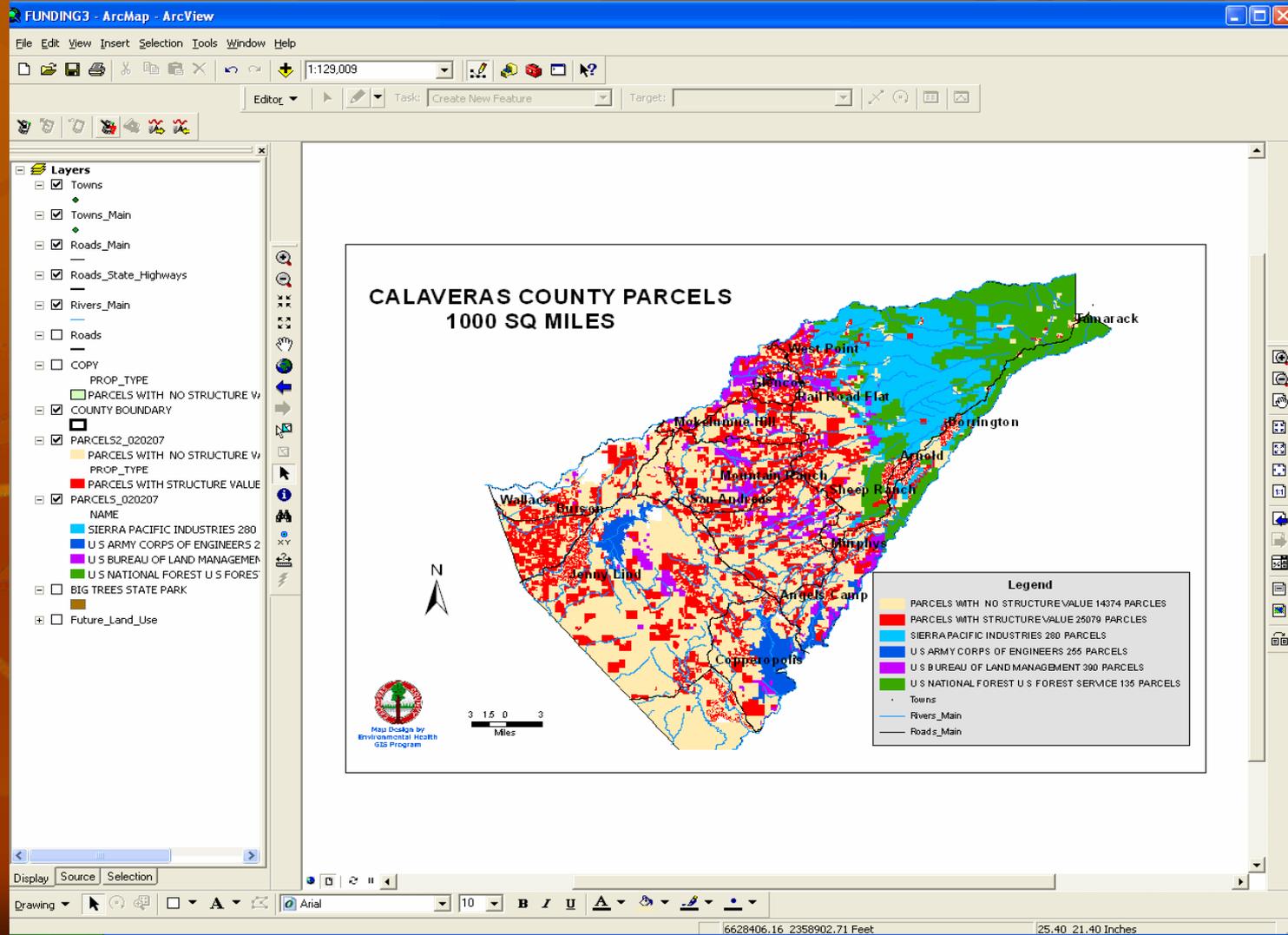
Congratulations, you have just loaded  
your first shp file!



# Steps Three-Seven

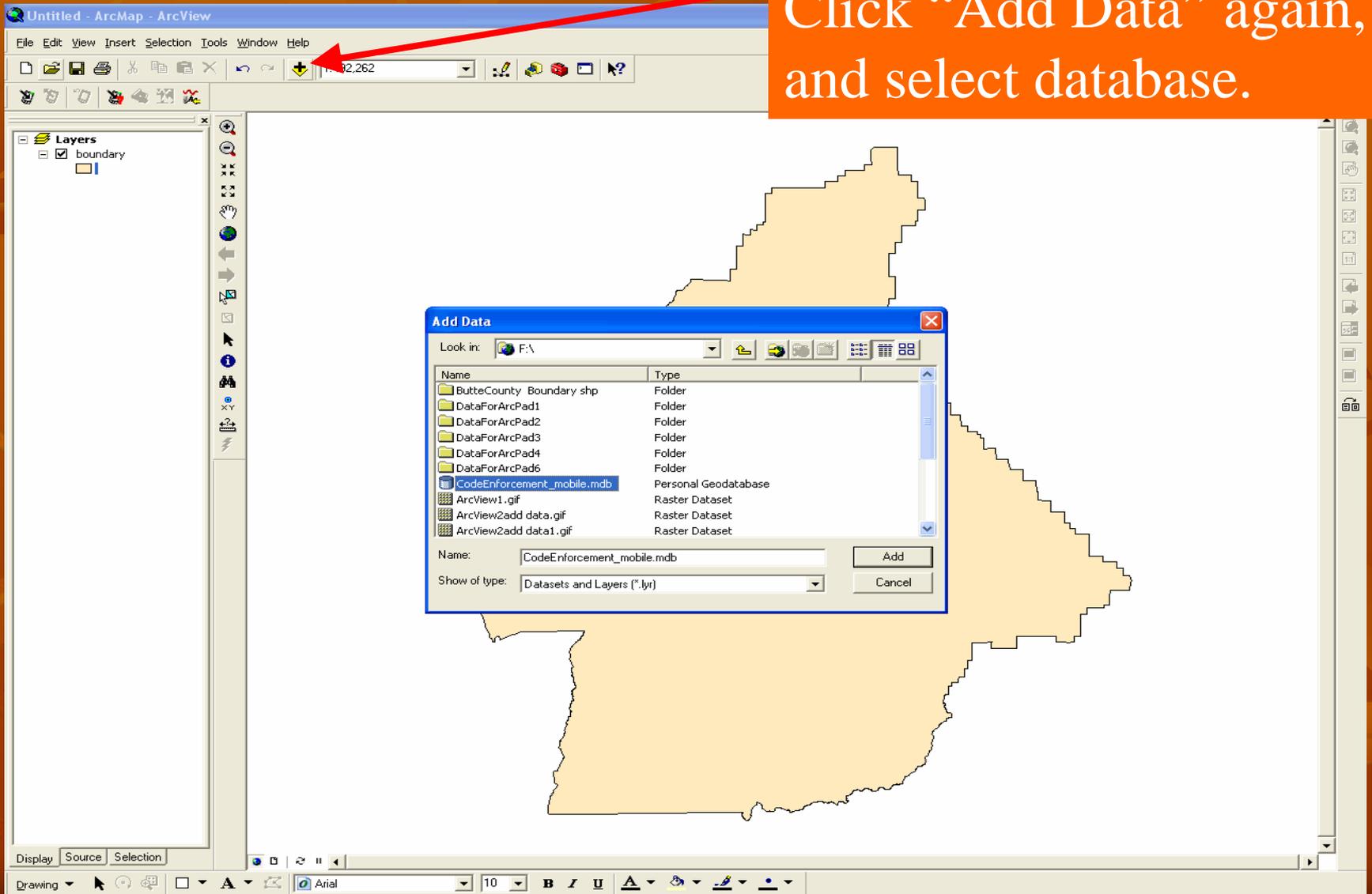
## Create working shapefile, with site data

Example of  
layers and data  
in ArcView



# Step Three

Click "Add Data" again,  
and select database.



# Step Four

The screenshot shows the ArcMap interface with the 'Add Data' dialog box open. The dialog box is titled 'Add Data' and shows a list of tables and feature classes from a geodatabase. The 'tblTires' table is selected, and its name is entered in the 'Name' field. A red arrow points from an orange callout box labeled 'Select table(s)' to the 'tblTires' table in the list.

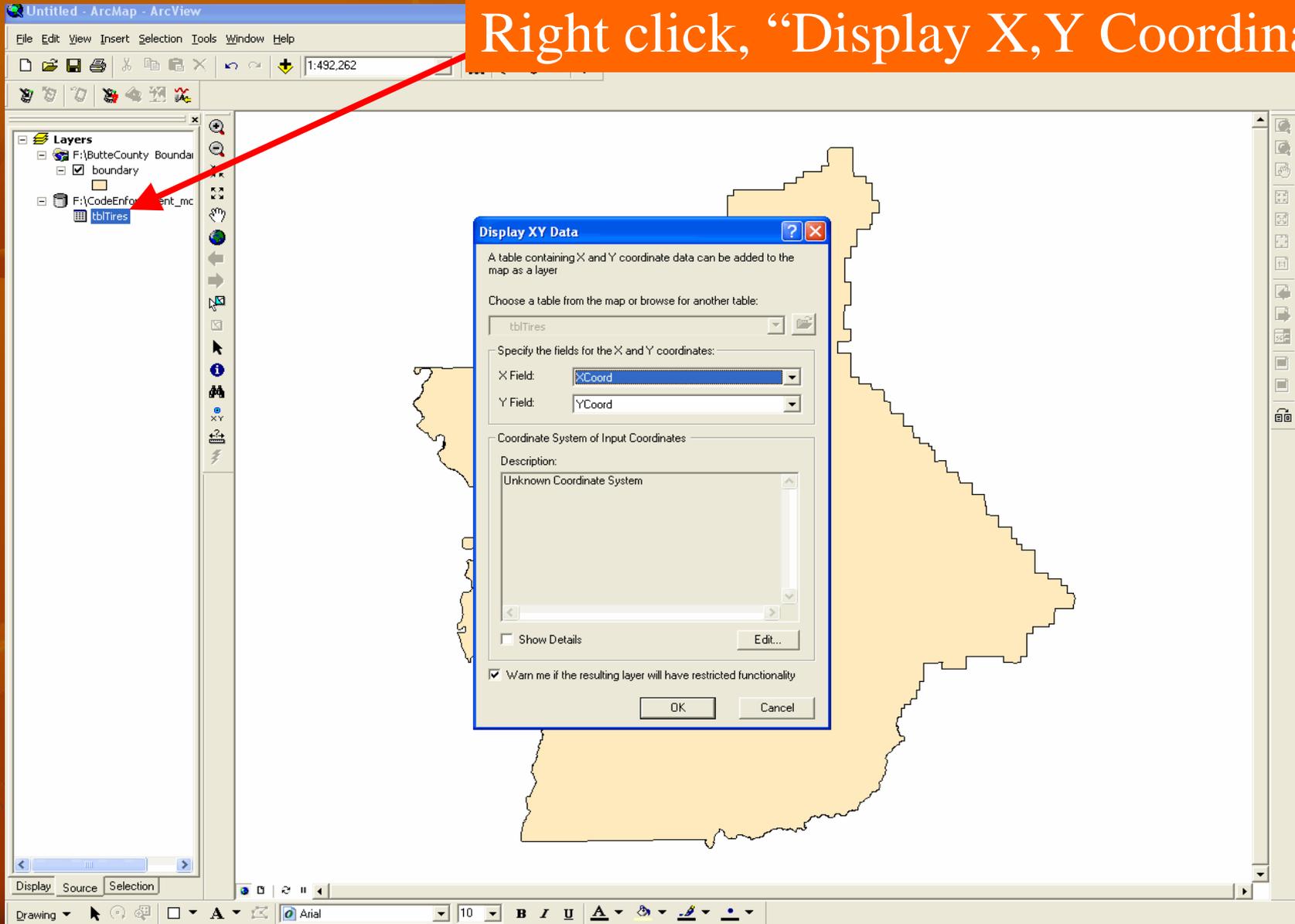
Name	Type
tblCommunityCleanup	Personal Geodatabase Table
tblkupCitation	Personal Geodatabase Table
tblkupStatus	Personal Geodatabase Table
tblQuery	Personal Geodatabase Table
tblTires	Personal Geodatabase Table
tblUtility	Personal Geodatabase Table
Tire_geodata	Personal Geodatabase Feature Class
f:Tires	Personal Geodatabase Table
Users	Personal Geodatabase Table

Name:  Add

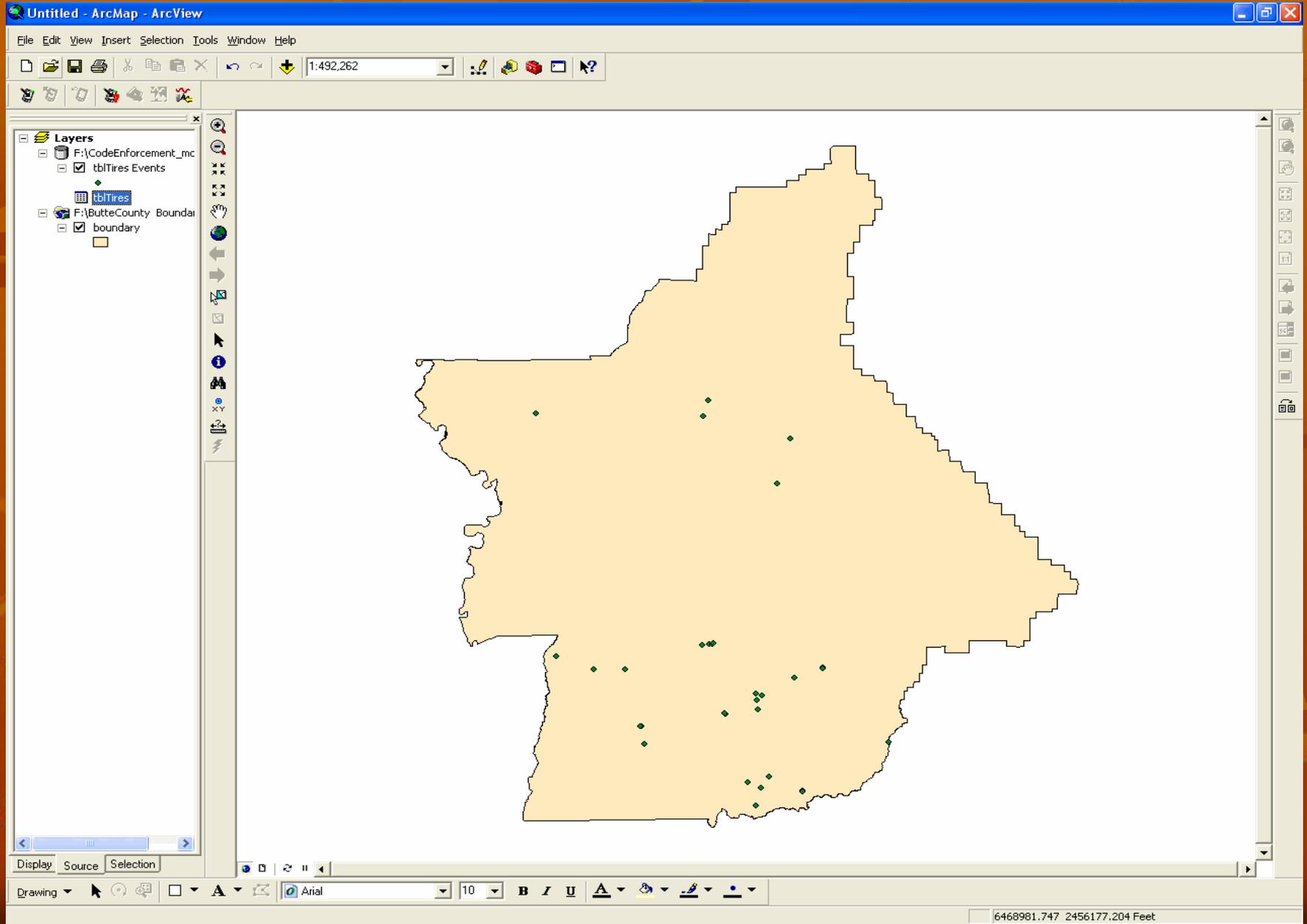
Show of type:  Cancel

# Step Five

Right click, “Display X,Y Coordinates”

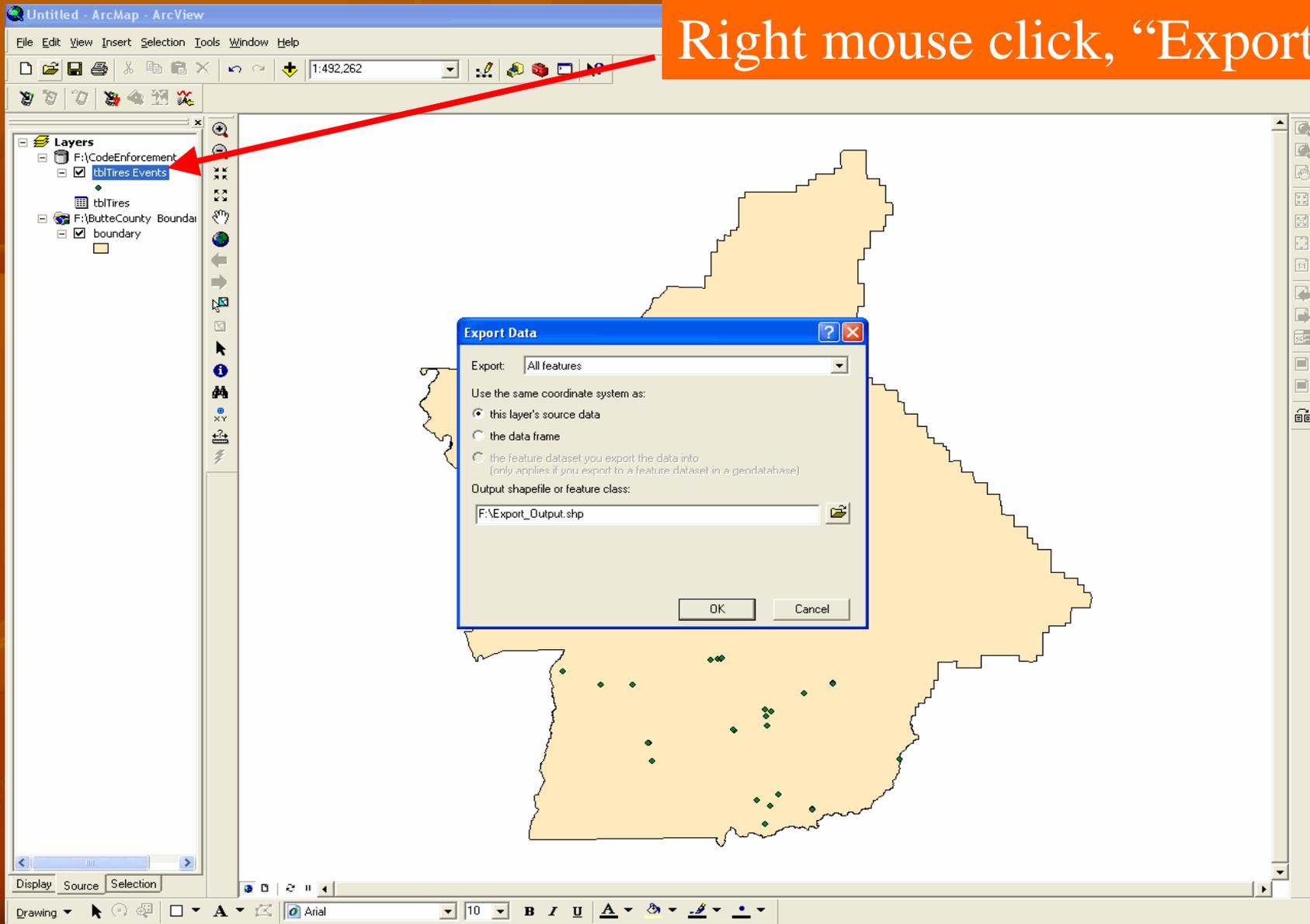


# Here's what it looks like

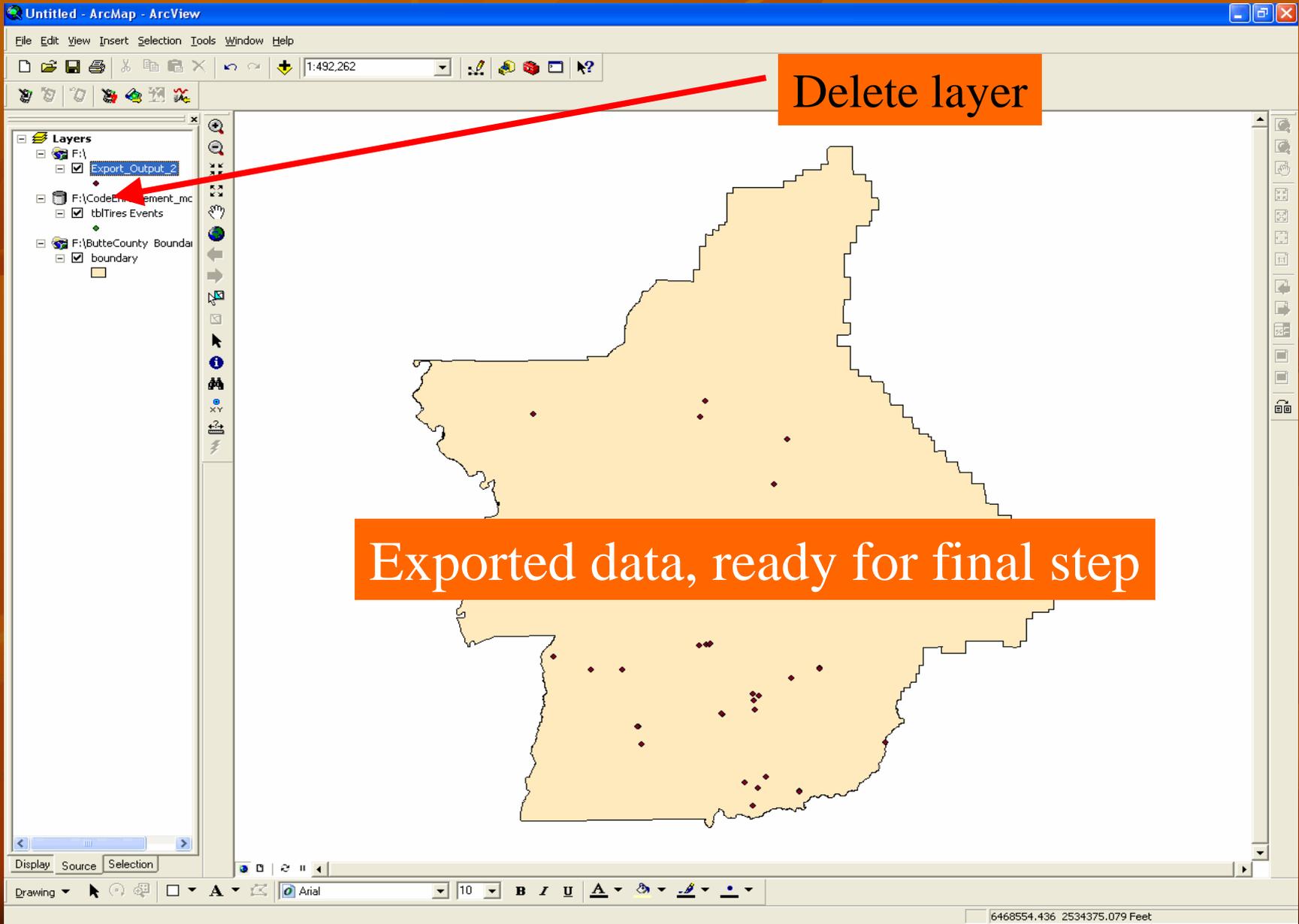


# Step Six

Right mouse click, "Export data"



# Step Seven

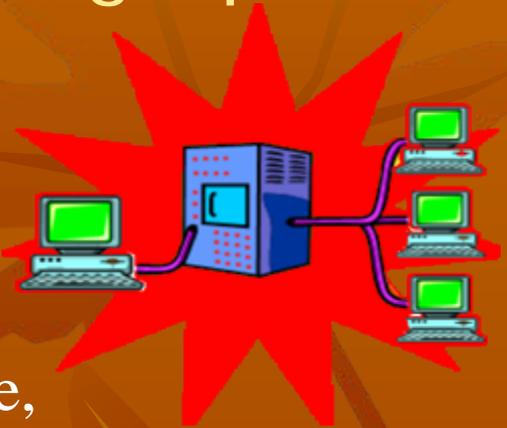


Delete layer

Exported data, ready for final step

# Final Steps – Field Data and Viewing Options

1. Save as a project in ArcMap for future editing,
2. Export shapefile to ArcPad and a mobile device,
3. Publish map layers for ArcReader using “Publisher” extension in ArcView
  - Perfect for field use when electronic GPS coordinates are not essential



Visit [www.esri.com](http://www.esri.com) for more information on editing options

# ArcPad

## Major Pros

Low cost GIS software (\$500)

Used on many handheld GPS devices

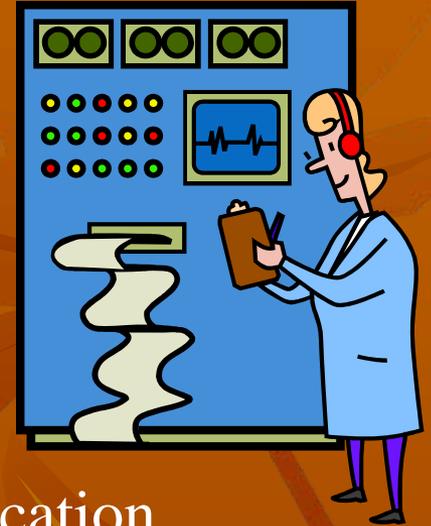
View real-time GPS Coordinates and log location with brief descriptions

## Major Cons

Cannot pull data from table – Data must come from ArcMap

Not a stand alone product

Can only view data from one table



# Logging GPS Coordinates in ArcPad

X Marks the spot

The screenshot shows the ArcPad interface with a map of a rural area. A red 'X' mark is placed on the map, with a red arrow pointing to it from the text 'X Marks the spot'. A red text label 'Redraw Interrupted by User' is positioned above the 'X'. A 'Feature Properties' dialog box is open, displaying a table of properties and values.

Property	Value
ID	abc
APN	abc
TYPE	abc
LONG	abc
LAT	abc
CHARAC	abc
CAP_TYPE	abc

At the bottom of the window, the status bar shows the coordinates 6517801.9 2251705.8 ft US, a scale of 1:16600, and the time 2:35 PM. The Windows taskbar at the very bottom shows the 'start' button and the active window 'Untitled - ArcPad'.

# ArcReader

## Major Pros

FREE GIS viewing software

Can turn on and off layers

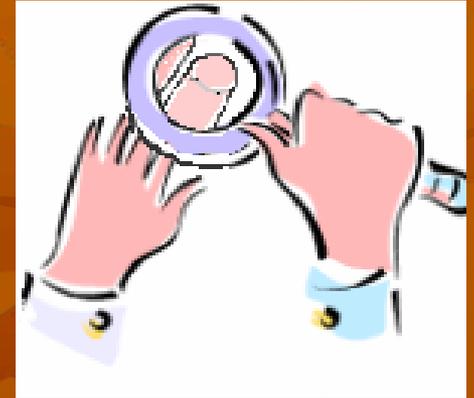
Can view multiple attributes of individual points

Can view changes made to mobile database

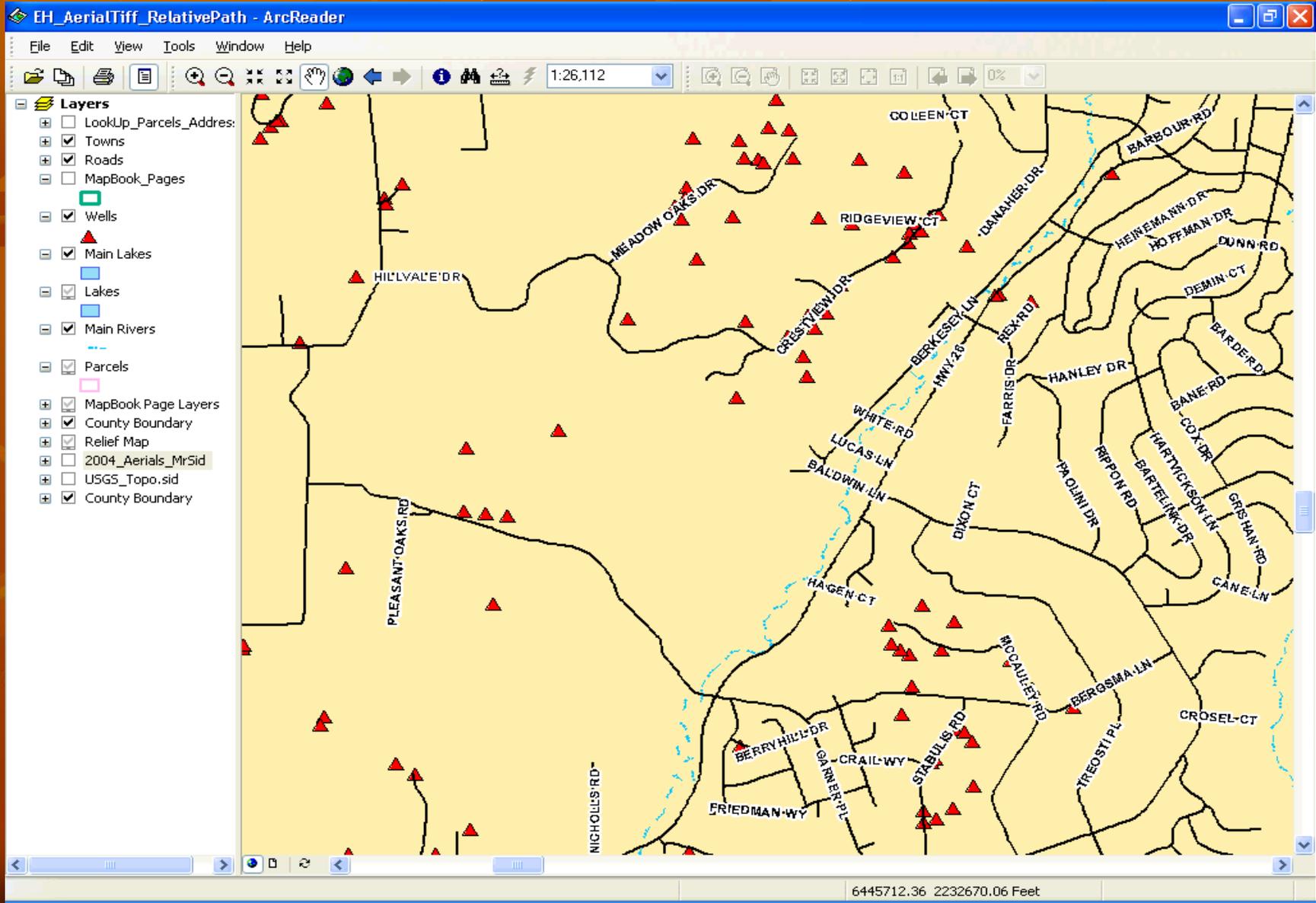
## Major Cons

No real-time GPS

Must be published from ArcMap(\$\$)



# A Published ArcReader Application (non-editable)





Thank You

Questions will be taken at the end of the session