

Introduction to ArcMap

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ArcMap is a Map-centric GUI tool used to perform map-based tasks

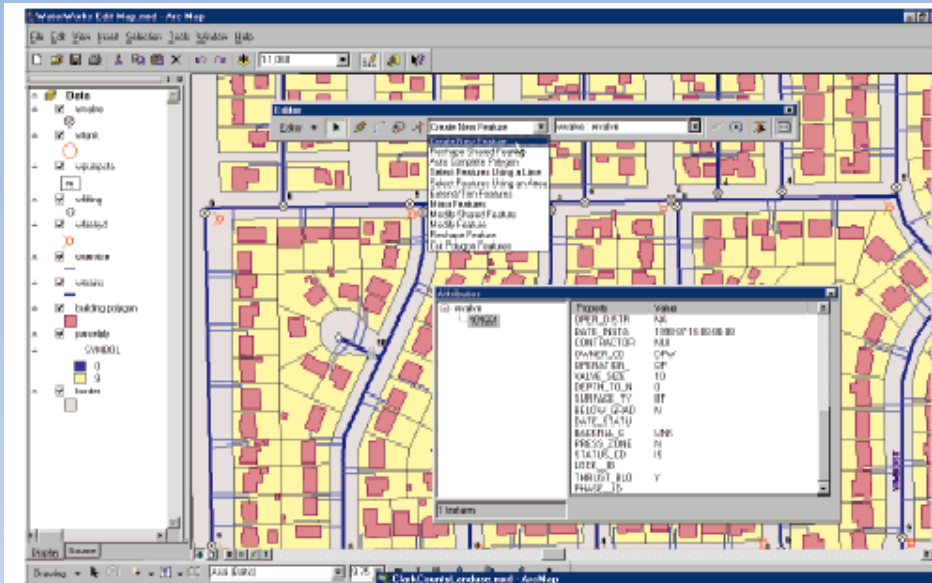
- Mapping
 - Create maps by working geographically and interactively
- Display and present
 - Export or print
 - Publish on WWW
- Edit
 - Update data
 - Modify features
- Query
- Chart
- Reporting
 - Embed maps in reports

ArcMap is a Map-centric GUI tool used to perform map-based tasks

- Analyze
 - Visualize information
 - See patterns
 - Reveal hidden trends
 - Show relationships between features
 - Solve problems
 - Where is
 - How close
 - How much
 - What if
- Develop custom mapping applications based on ArcMap components

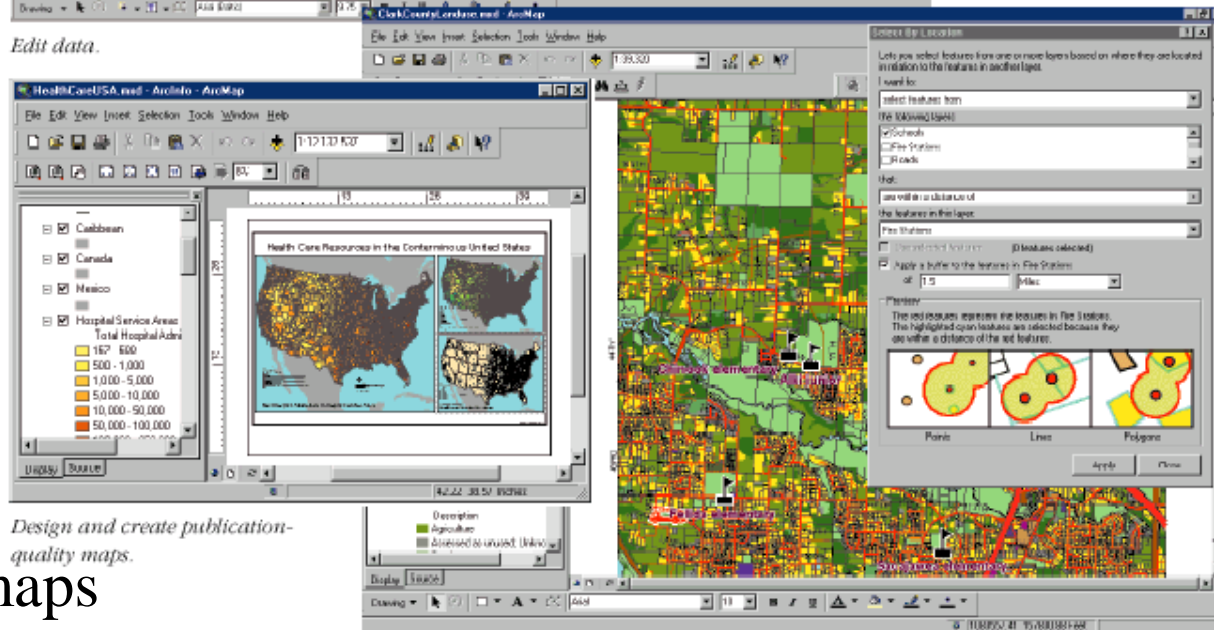
ArcMap

View
and
edit
data



Analyze data
(Geoprocessing)

Edit data.



Design and create publication-quality maps.

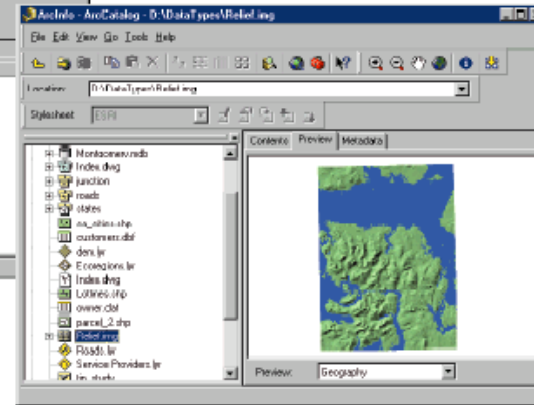
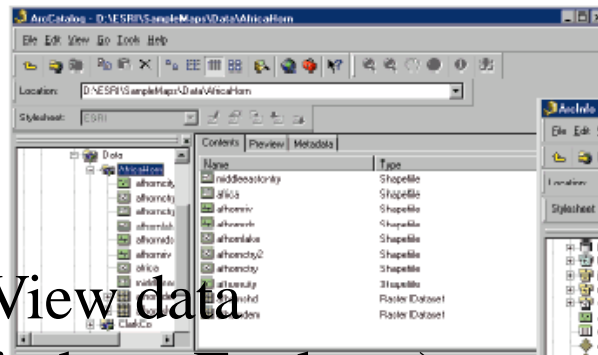
Create maps

Analyze data.

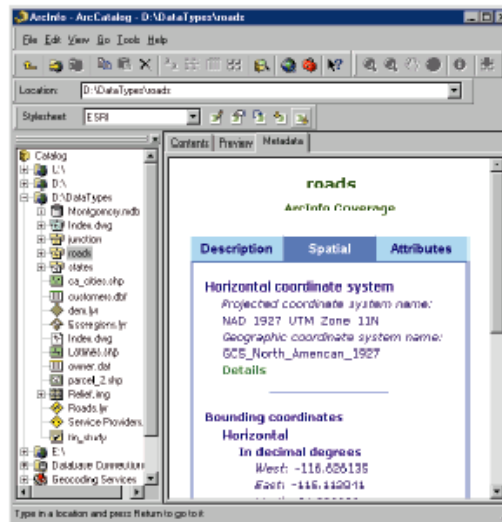
Arc Catalog

Graphical
previews

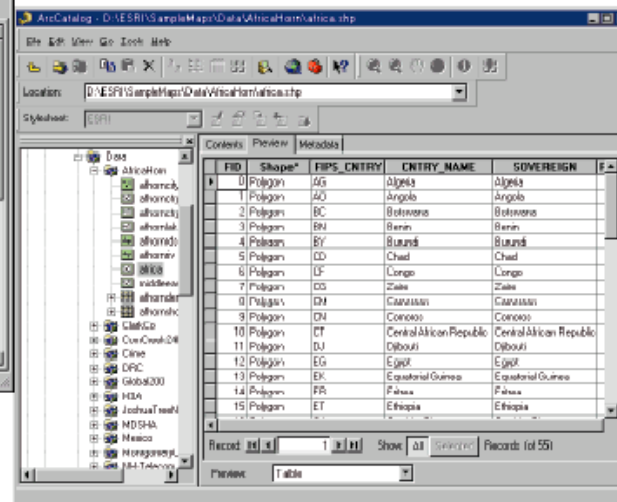
View data
(like Windows Explorer)



Preview geographic information.



View and edit metadata.

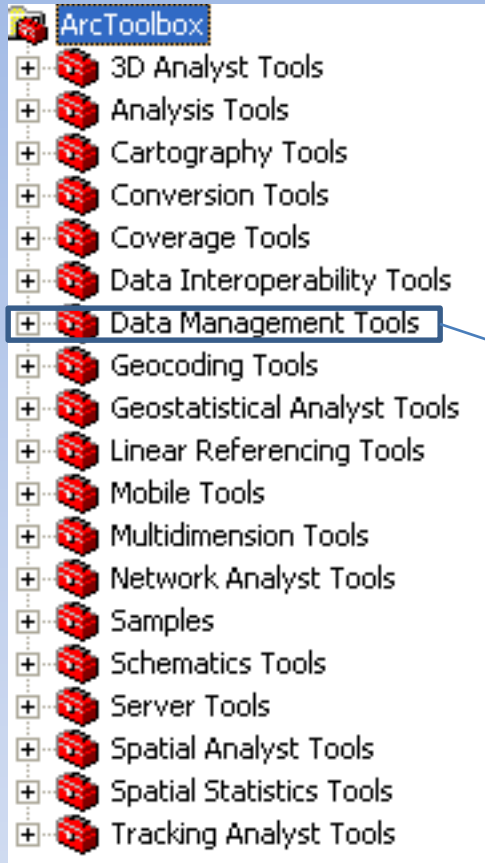


Work with tables.

Metadata

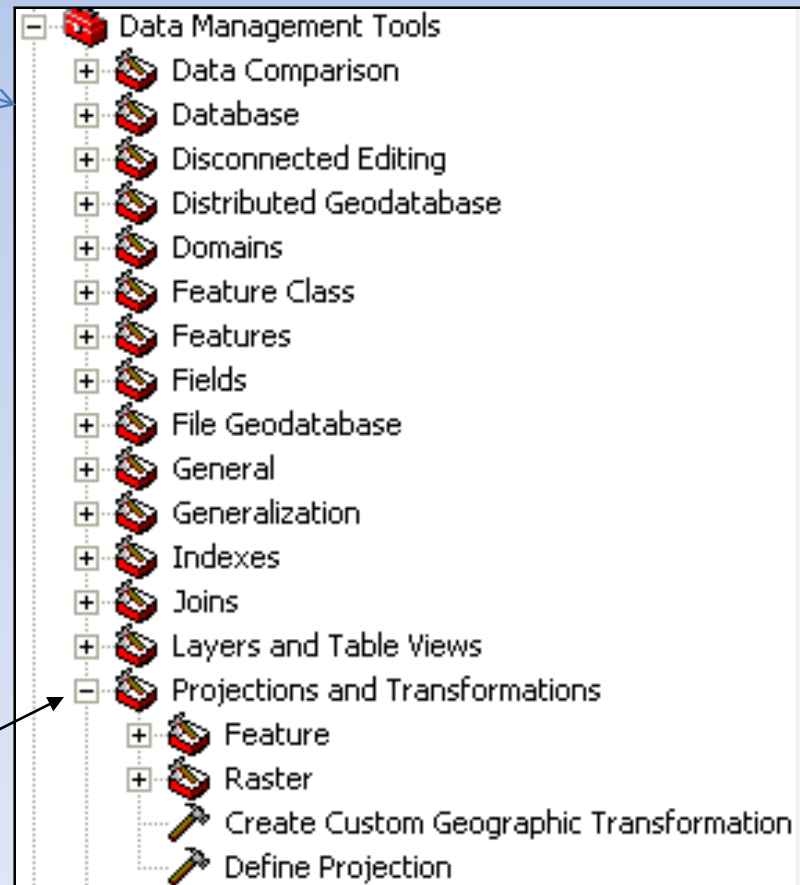
Tables

Arc Toolbox



Tools for commonly used tasks

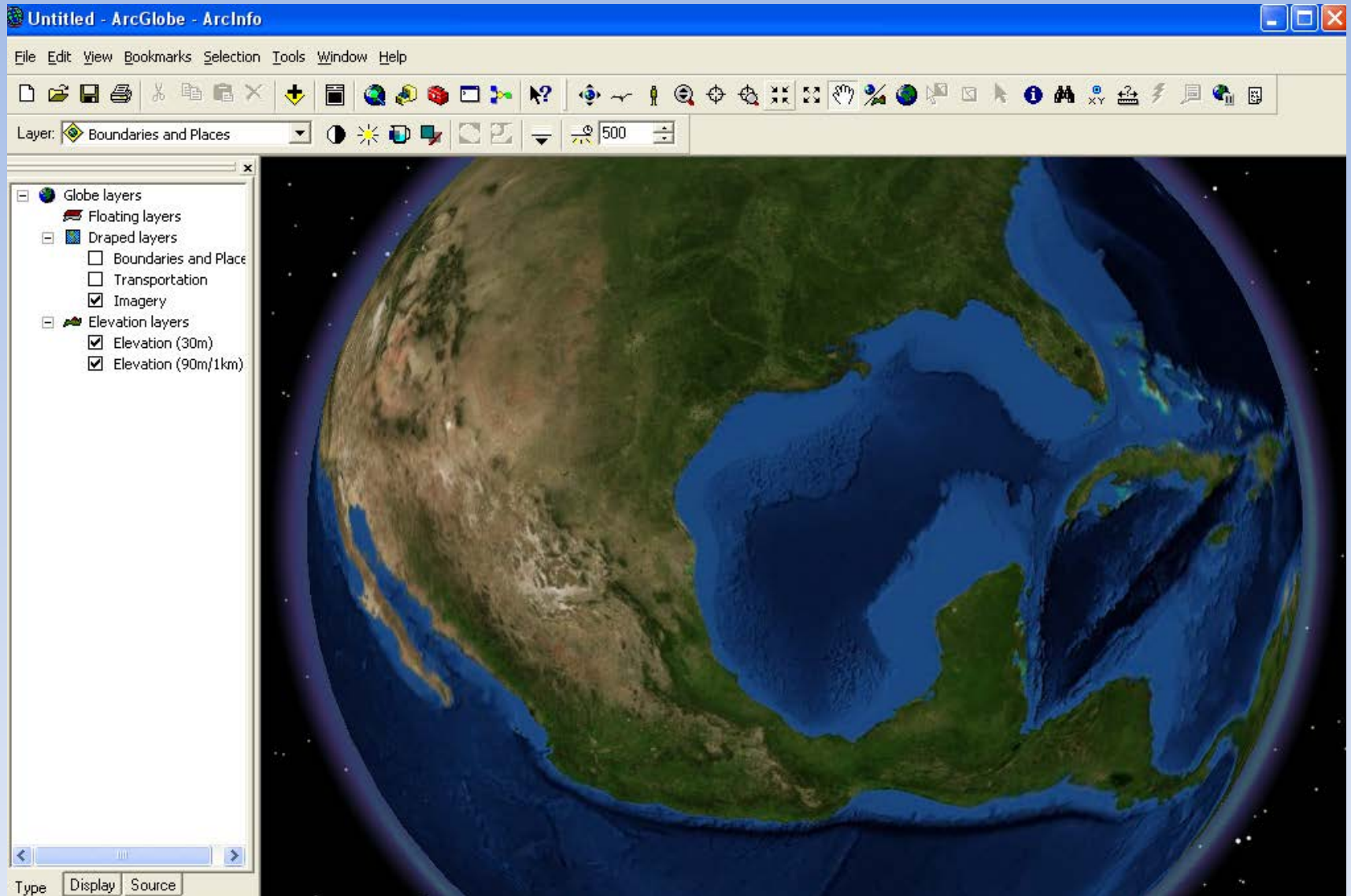
Map Projections

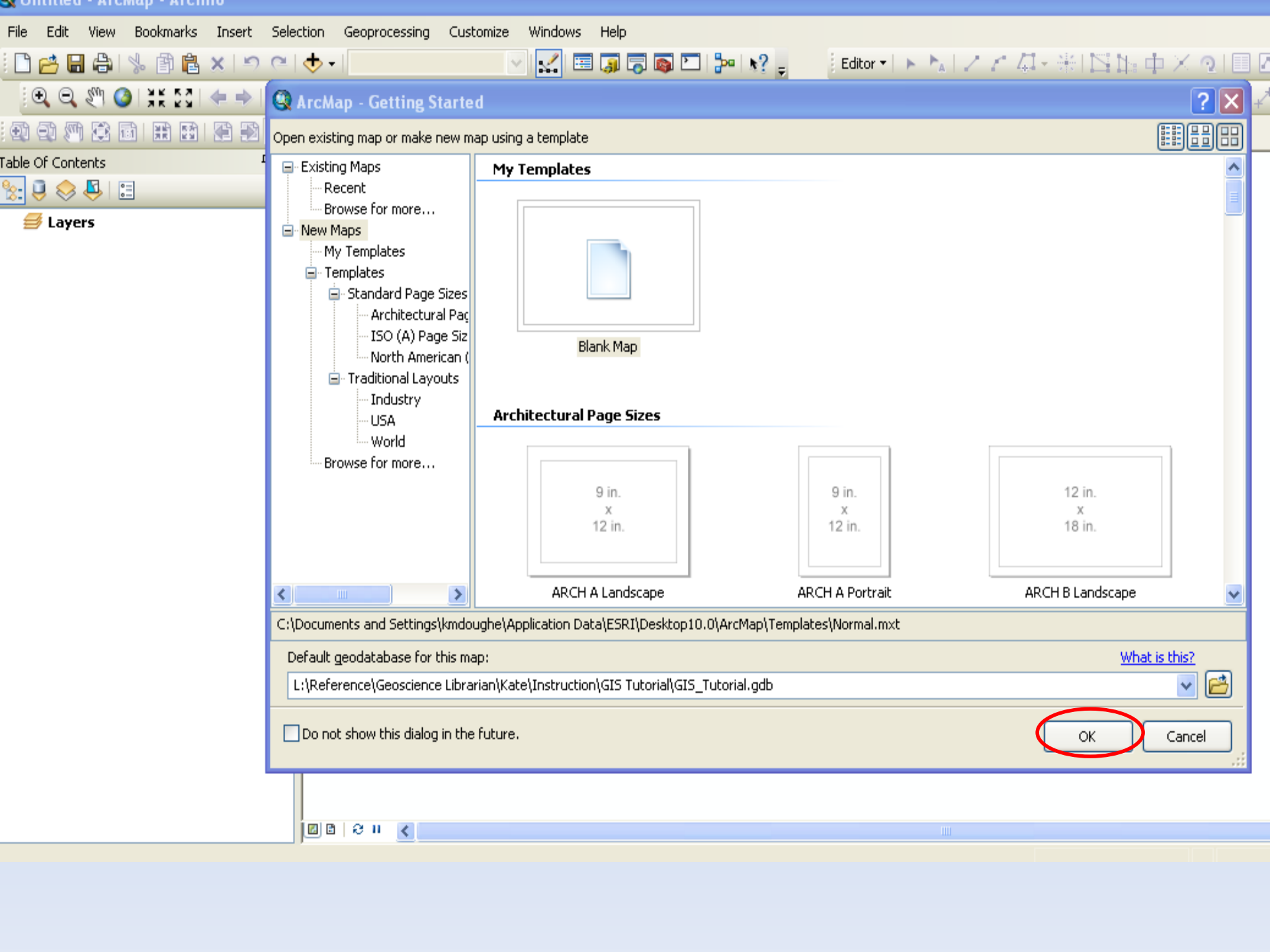


- An alternative display to ArcMap
- Design to rapidly display **image files** and to zoom in rapidly from a global view to a local view
- Works on a **spherical earth** (not spheroidal)



Arc Globe





Terminology

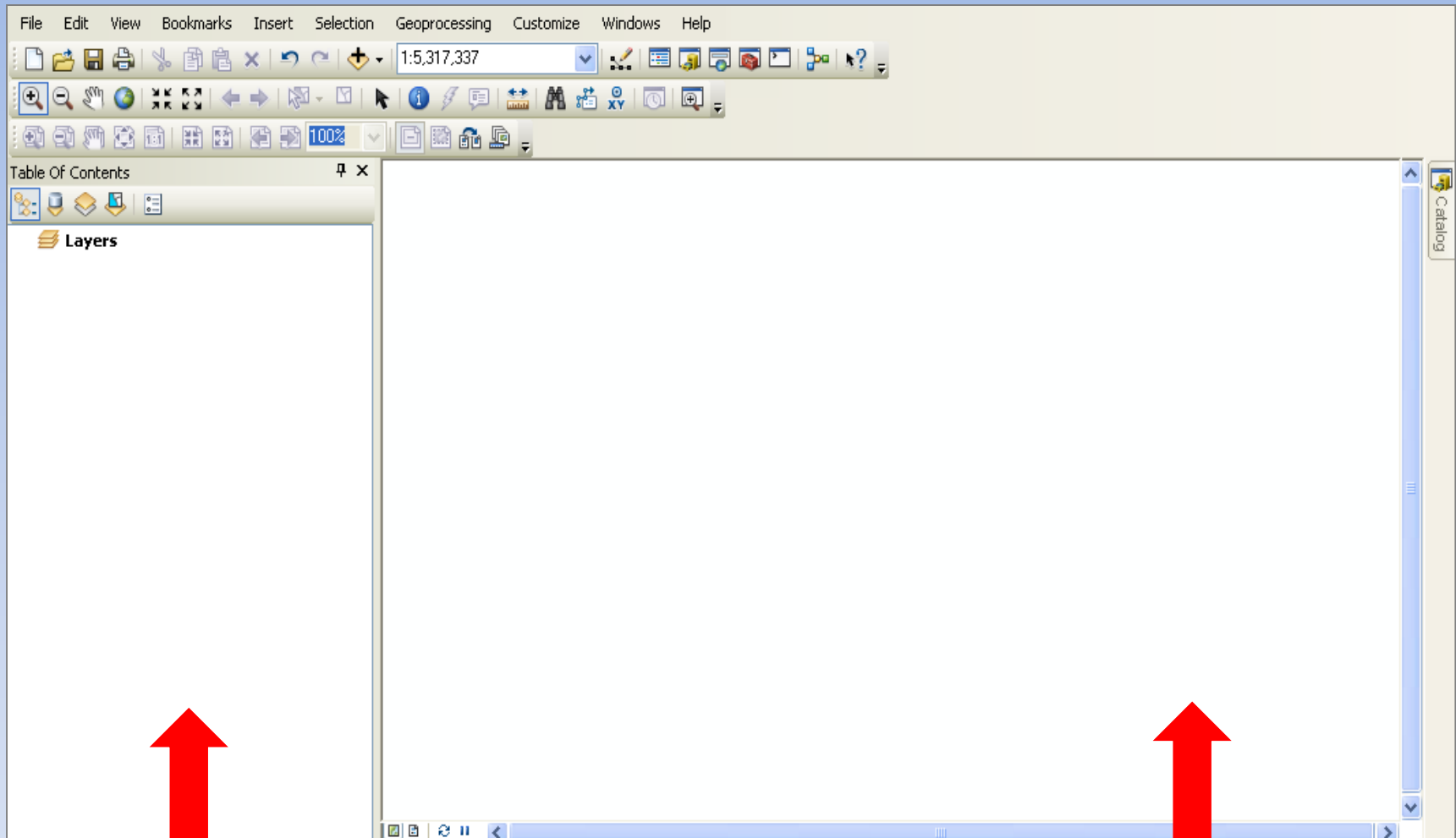
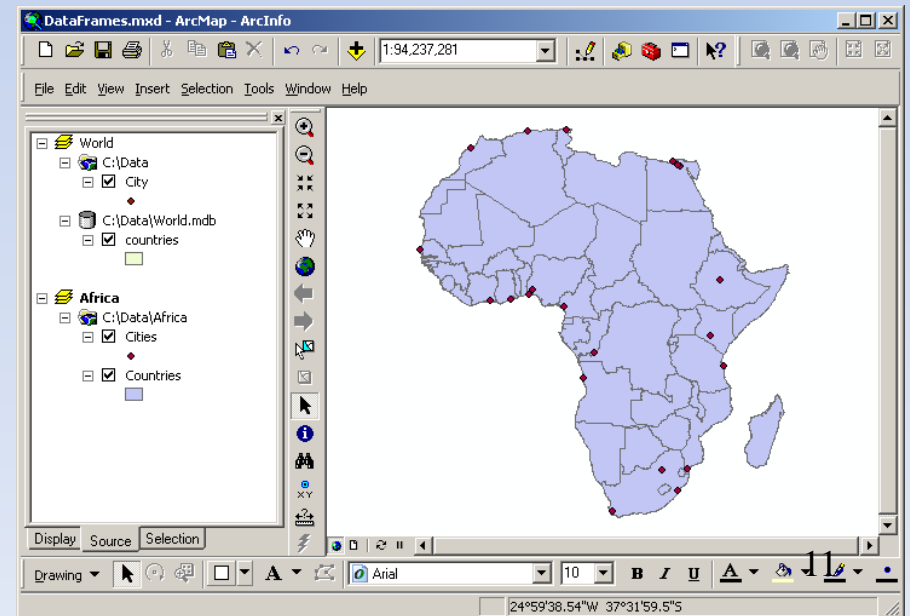
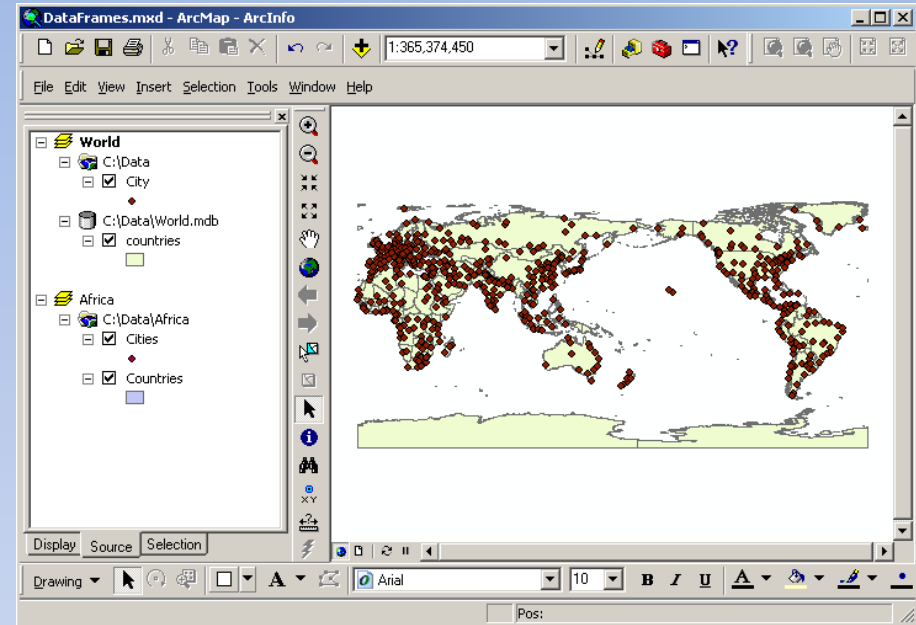


Table of contents that shows the doc's layers.

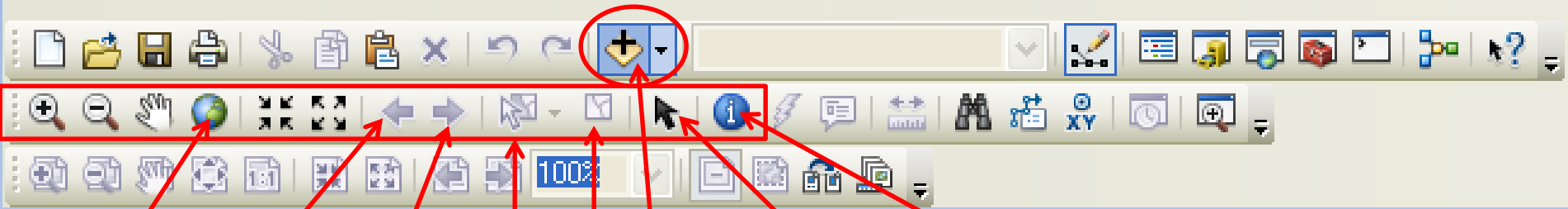
The "data frame" that displays the spatial data.

Terminology

- Data Frame
 - Contains layers of map data
 - Can have multiple data frames
 - Each data frame has properties
-
- Data View
 - Default view where you do your mapping, analysis, etc.
 - Can only see one data frame at a time
 - Right-click/Activate or click/Alt



- Is both a data editor as well as map generator
- Provides two different ways to view a map on the fly
 - Data view
 - Layout view



Go to full map extent

Go to previous extent

Go to next extent

Select features (by hand)

Clear selected features

Add data

Select elements (to move or edit)

Identify feature

Adding Data

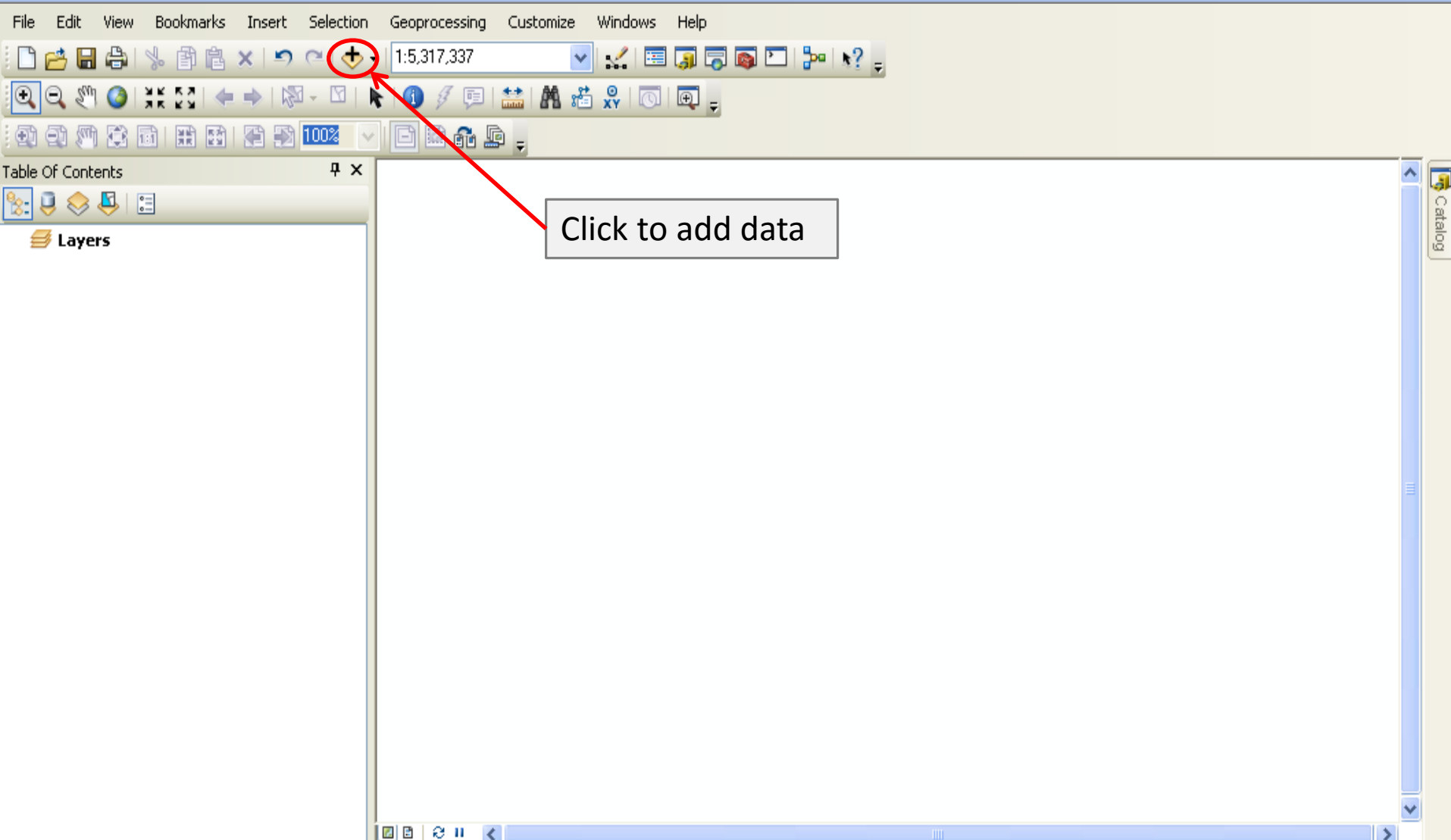




Table Of Contents [icon] [icon] [icon] [icon] [icon]

Layers [icon]

Add Data

Look in: Home - My Documents\ArcGIS [dropdown] [home icon] [up icon] [down icon] [list icon] [add icon] [folder icon] [drive icon] [server icon]

- Home - My Documents\ArcGIS [Connect To Folder]
- Folder Connections
- Toolboxes
- Database Servers
- Database Connections
- GIS Servers
- Tracking Connections
- Coordinate Systems

Name: [text box] [Add]

Show of type: Datasets and Layers [dropdown] [Cancel]

1:165,507,393

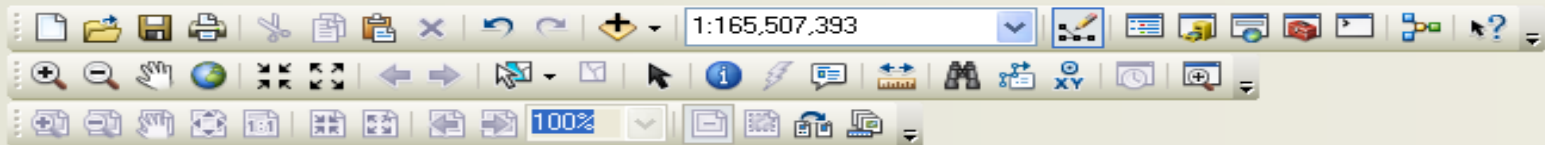
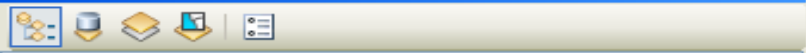
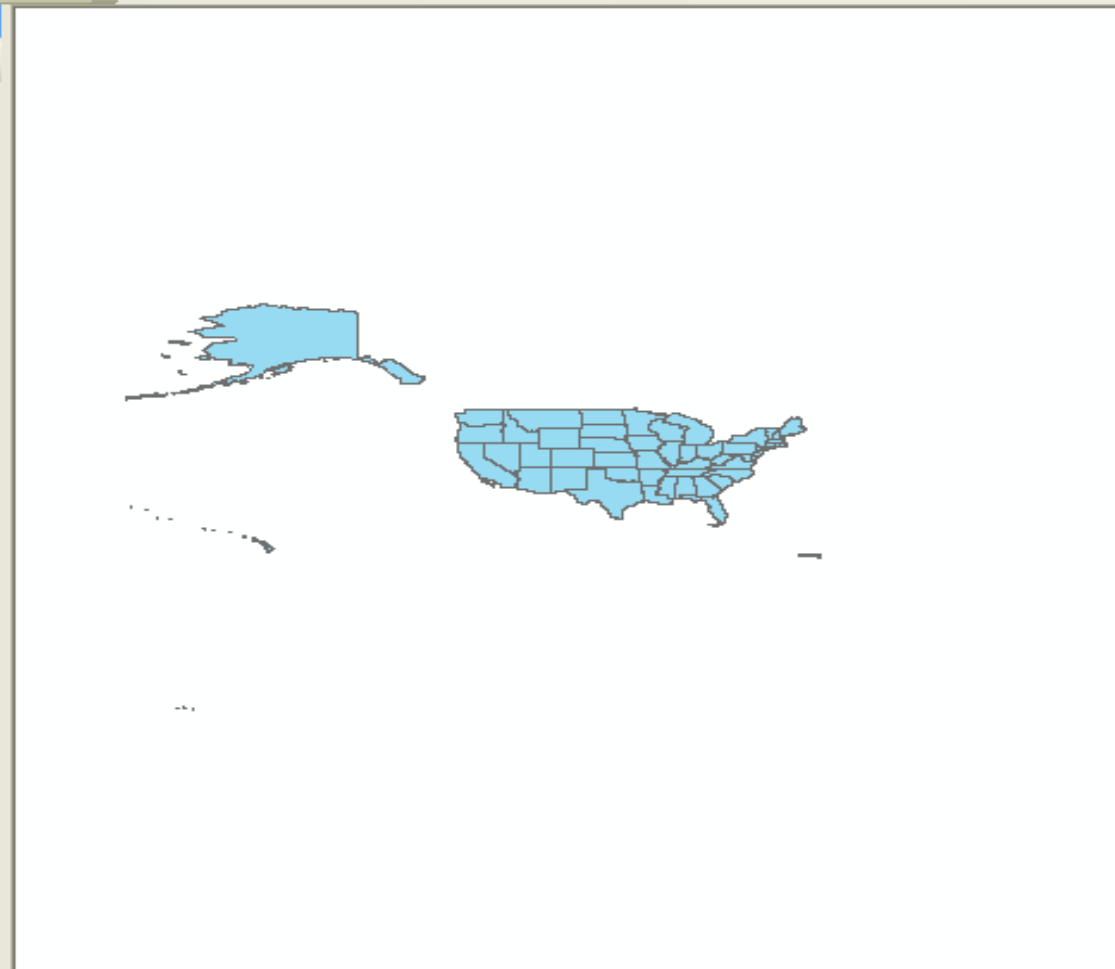


Table Of Contents



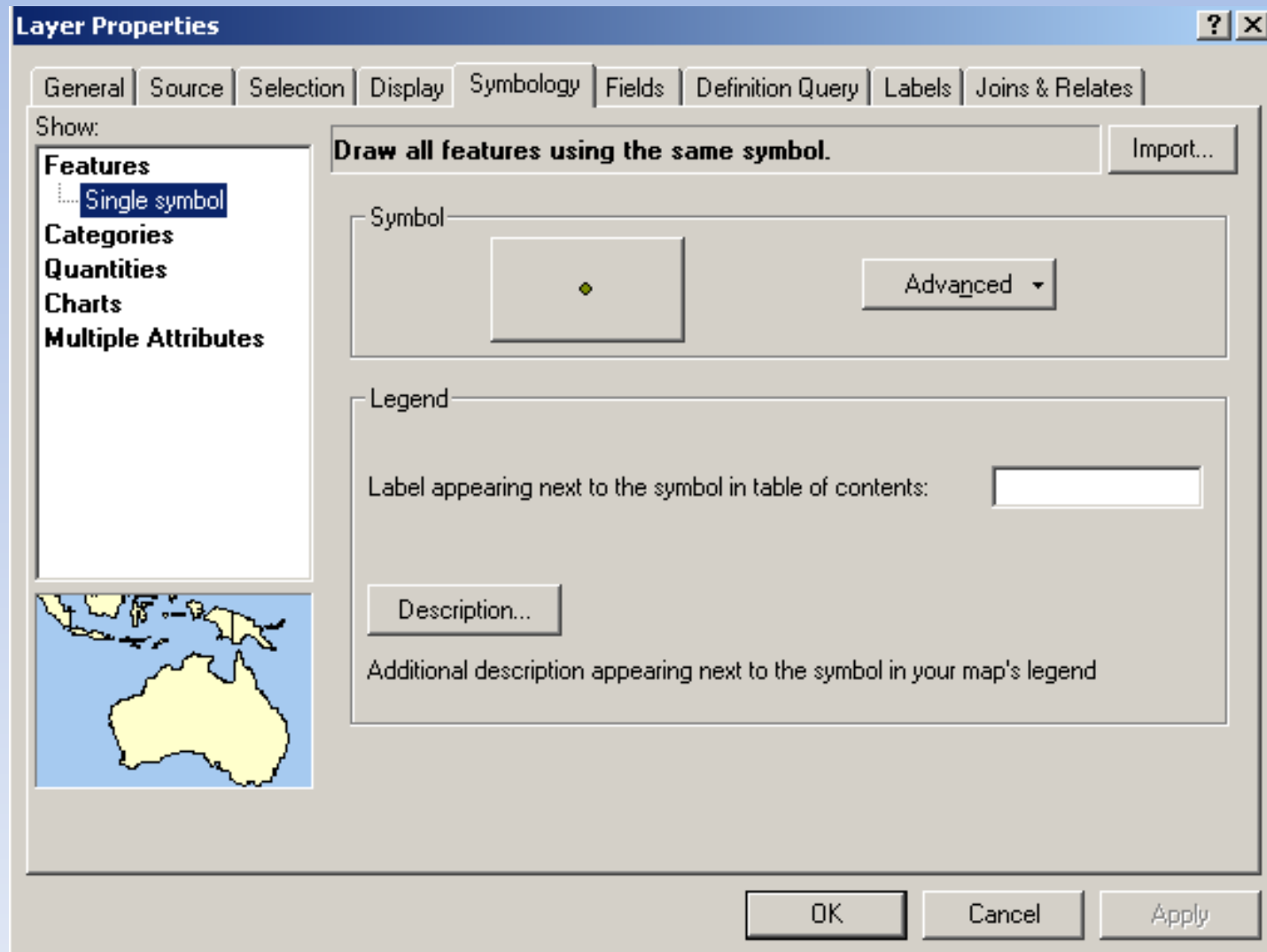
Layers

- tl_2012_us_state

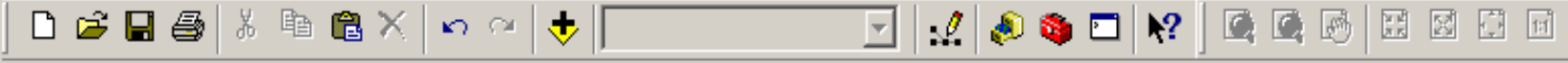


- **General Map**
 - Variety of information of equal importance
 - Not targeting a specific audience (e.g. topographic map)
 - Subtle Symbology
- **Thematic Map**
 - Focussed
 - Importance of information can vary on the map
 - Symbology can dominate
 - Qualitative (no importance in terms of size) vs quantitative (size differences)

Symbology – Single Symbol



Untitled - ArcMap - ArcInfo



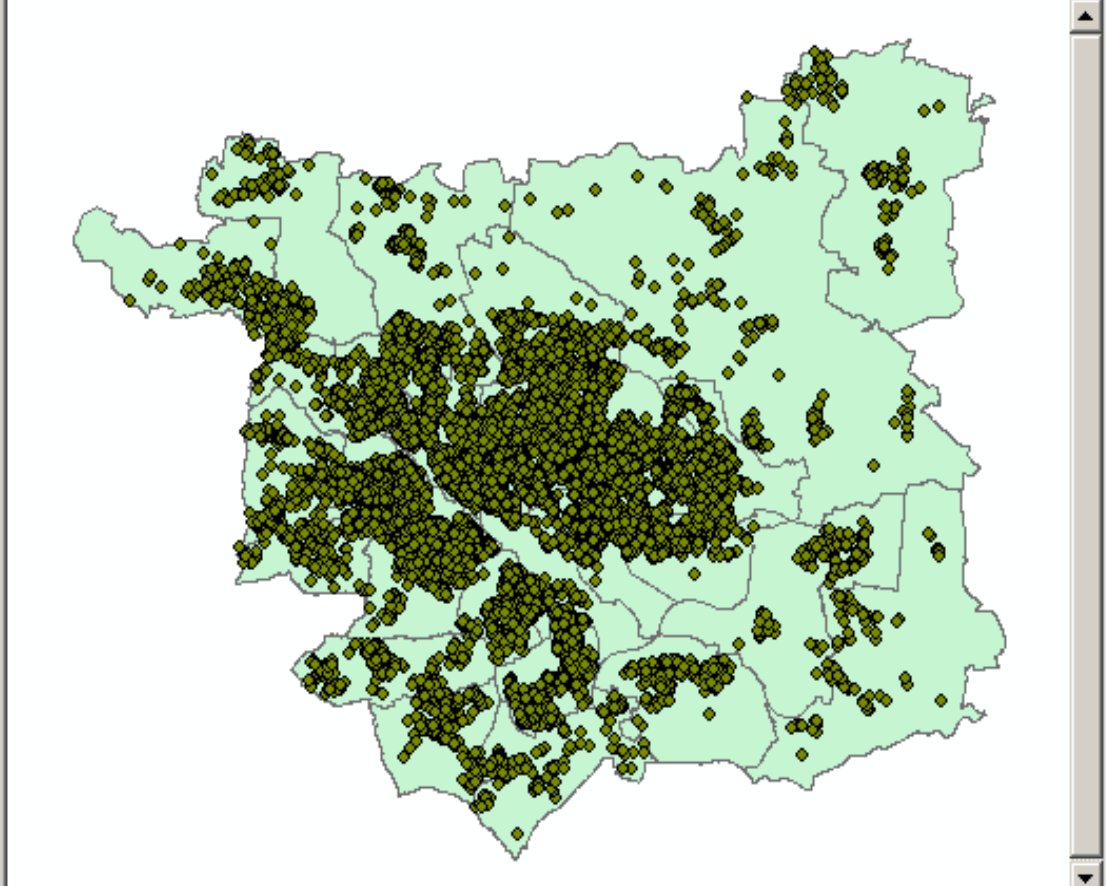
File Edit View Insert Selection Tools Window Help



Layers

- Burg
- LeedsWards2003

Display Source Selection



Drawing [Navigation icons] Arial 10 B I U [Text formatting icons]

415373.391 421898.589 Unknown Units

Symbology - Categories

Layer Properties [?] [X]

General | Source | Selection | Display | **Symbology** | Fields | Definition Query | Labels | Joins & Relates

Show:

Features
Categories
Unique values
Unique values, many to one
Match to symbols in a layer
Quantities
Charts
Multiple Attributes

Draw categories using unique values of one field. [Import...]

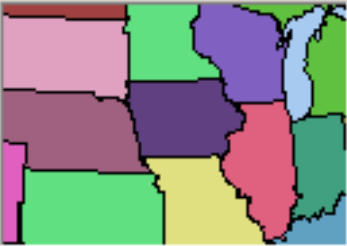
Value Field: supergroup

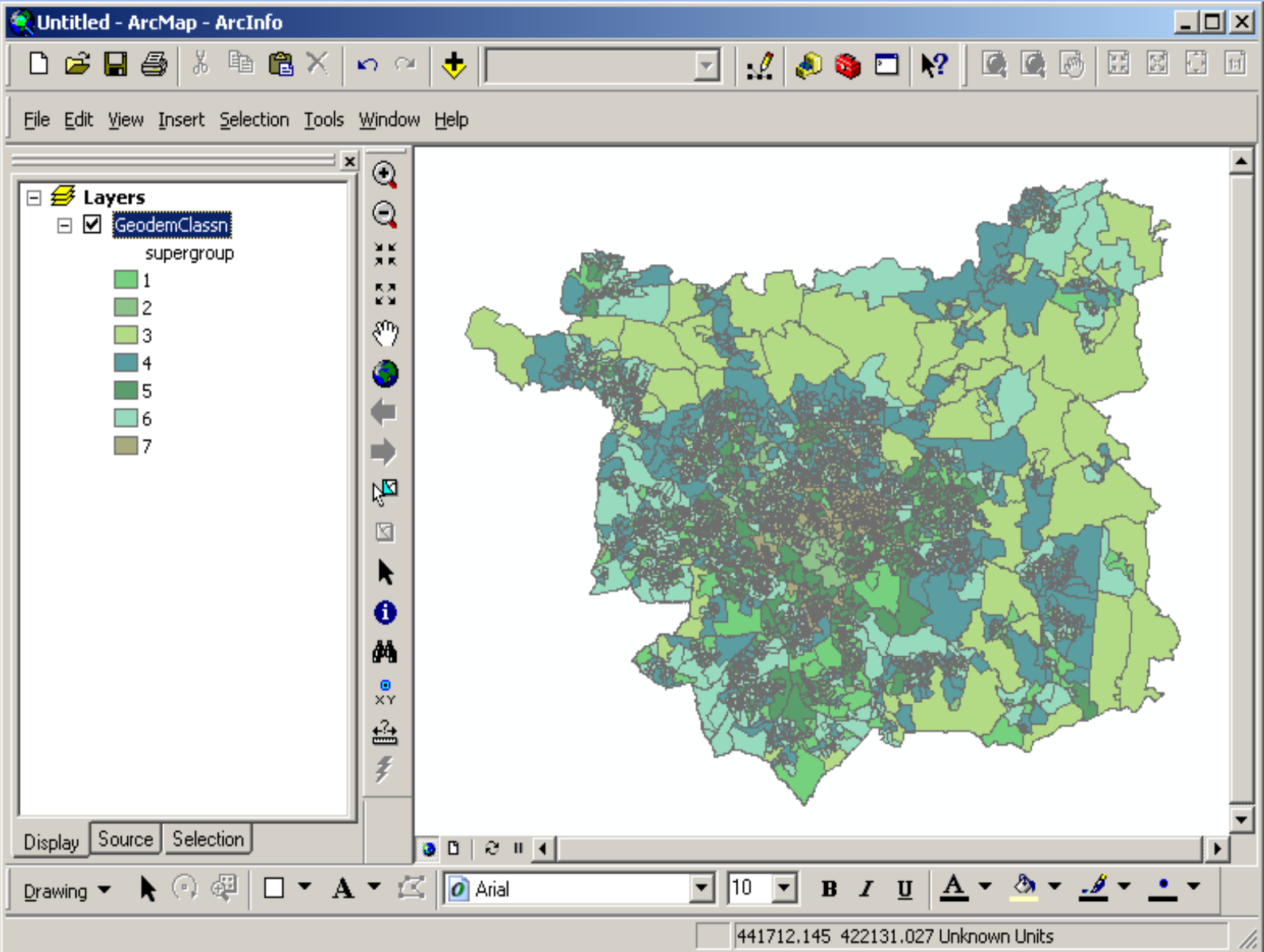
Color Ramp: [Color Ramp]

Symbol	Value	Label	Count
[Symbol]	<all other values>	<all other values>	0
	<Heading>	supergroup	2440
[Symbol]	1	1	349
[Symbol]	2	2	211
[Symbol]	3	3	63
[Symbol]	4	4	530
[Symbol]	5	5	443
[Symbol]	6	6	571
[Symbol]	7	7	273

[Add All Values] [Add Values...] [Remove] [Remove All] [Advanced ▾]

[OK] [Cancel] [Apply]





Graduated Colour

Layer Properties [?] [X]

General | Source | Selection | Display | **Symbology** | Fields | Definition Query | Labels | Joins & Relates

Show:

- Features
- Categories
- Quantities**
 - Graduated colors**
 - Graduated symbols
 - Proportional symbols
 - Dot density
- Charts
- Multiple Attributes

Draw quantities using color to show values. [Import...]

Fields: Value: PercAge65p

Classification: Natural Breaks (Jenks)

Normalization: none

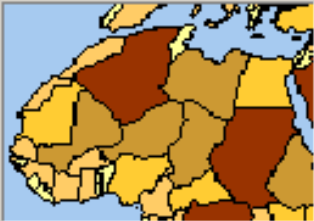
Classes: 5 [Classify...]

Color Ramp: [Color Ramp]

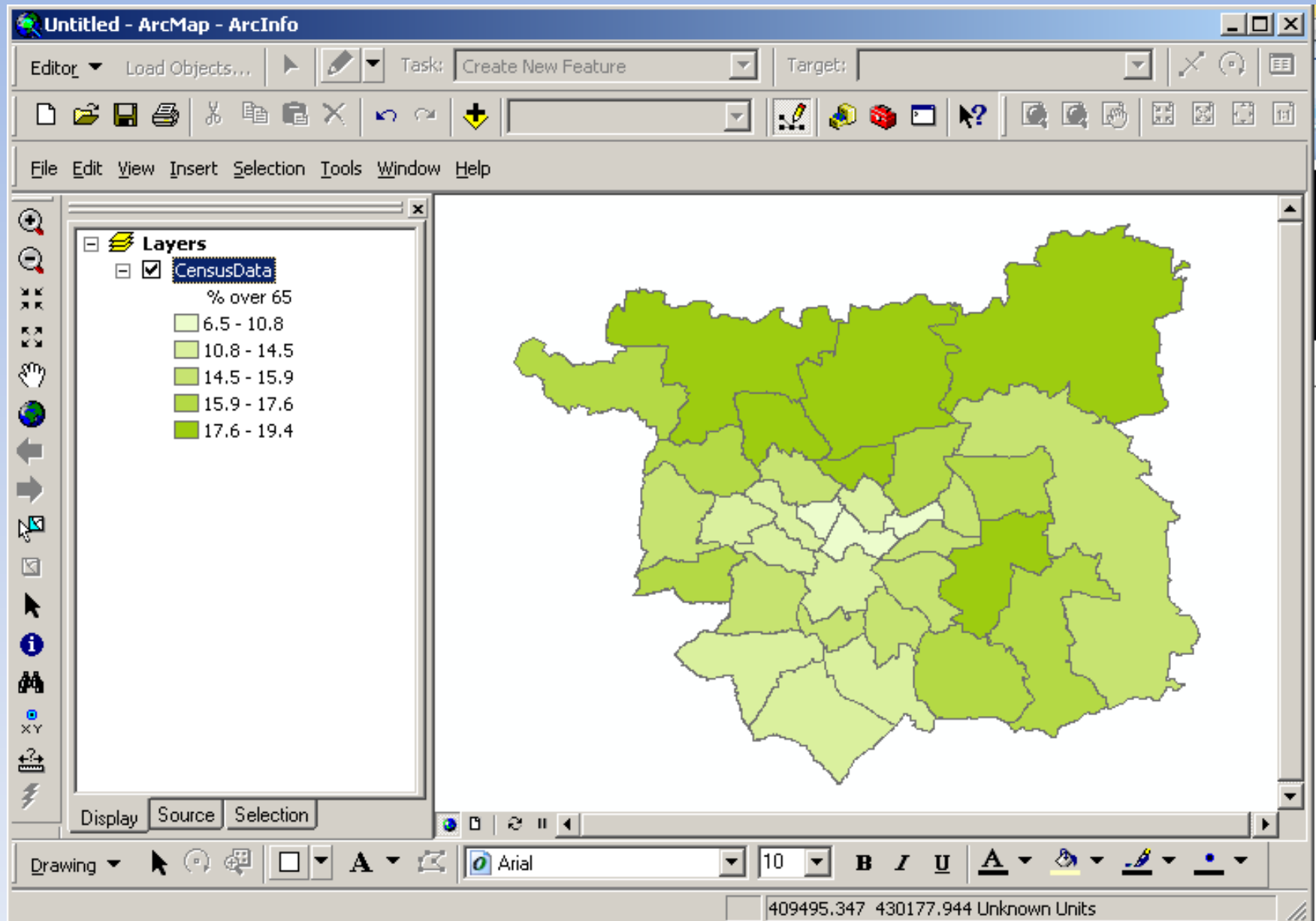
Symbol	Range	Label
[Lightest Green]	6.5 - 10.8	6.5 - 10.8
[Light Green]	10.8 - 14.5	10.8 - 14.5
[Medium-Light Green]	14.5 - 15.9	14.5 - 15.9
[Medium Green]	15.9 - 17.6	15.9 - 17.6
[Darkest Green]	17.6 - 19.4	17.6 - 19.4

Show class ranges using feature values [Advanced]

[OK] [Cancel] [Apply]



Graduated Colours



Choropleth Maps

- uses ranges or graduated colours to map data for administrative areas
- Derived from the Greek words *choros* = space and *pleth* = value
- Shading is used to denote an increase or decrease in a value
- Should technically only plot standardised values (e.g. percentages, ratios) or the maps may be misleading
- Problems of MAUP/ecological fallacy

Graduated Symbols

Layer Properties [?] [X]

General | Source | Selection | Display | **Symbology** | Fields | Definition Query | Labels | Joins & Relates

Show:

- Features
- Categories
- Quantities**
 - Graduated colors
 - Graduated symbols**
 - Proportional symbols
- Charts
- Multiple Attributes

Draw quantities using symbol size to show relative values. [Import...]

Fields: Value: POP2000
Normalization: none

Classification: Manual
Classes: 5 [Classify...]

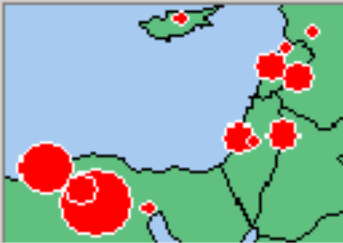
Symbol Size from: 4 to: 18

Symbol	Range	Label
•	8035 - 500000	less than 500000
•	506132 - 1000000	500001 - 1000000
•	1144646 - 2000000	1000001 - 2000000
•	2896016 - 4000000	2000001 - 4000000
•	8008278	greater than 4000000

Show class ranges using feature values [Advanced]

[Template]

[OK] [Cancel] [Apply]



Manually Adjusting Categories

Classification [?] [X]

Classification
Method: **Manual** ▼
Classes: **5** ▼

Data Exclusion
Exclusion ... **Sampling ...**

Columns: **100** ▼ Show Std. Dev. Show Mean

Classification Statistics

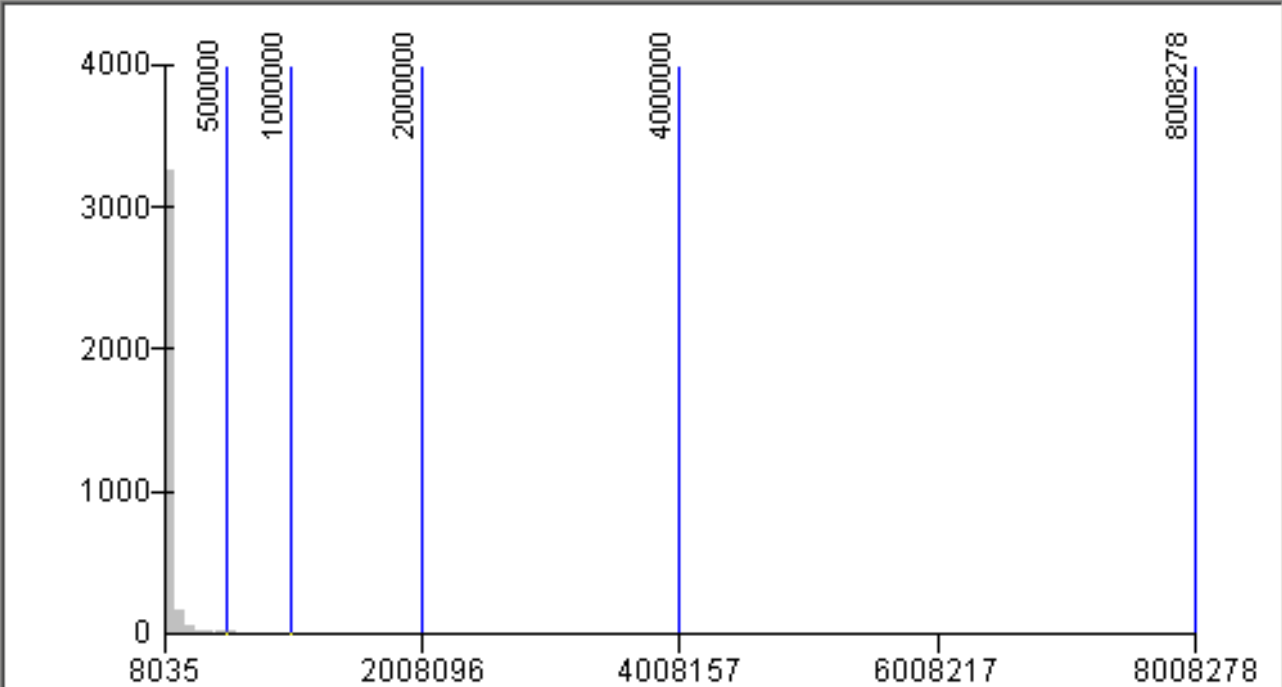
Count:	3533
Minimum:	8035
Maximum:	8008278
Sum:	164524074
Mean:	46568
Median:	21486
Standard Deviation:	178006

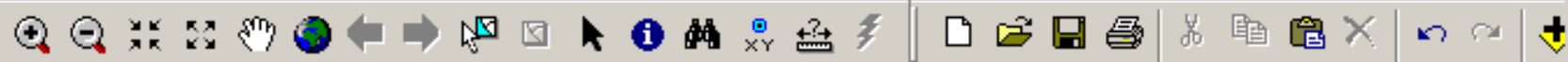
Break Values **%**

500000
1000000
2000000
4000000
8008278

Snap breaks to data values

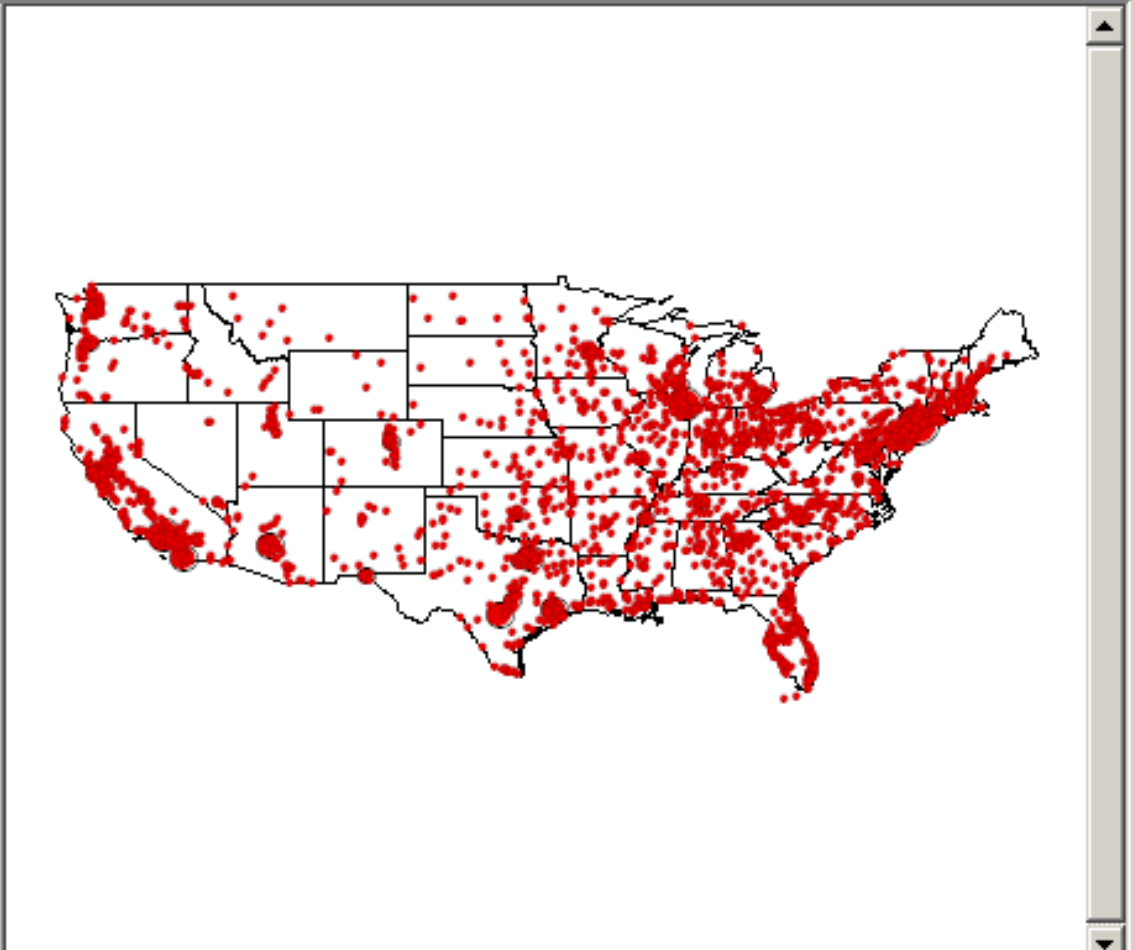
OK
Cancel



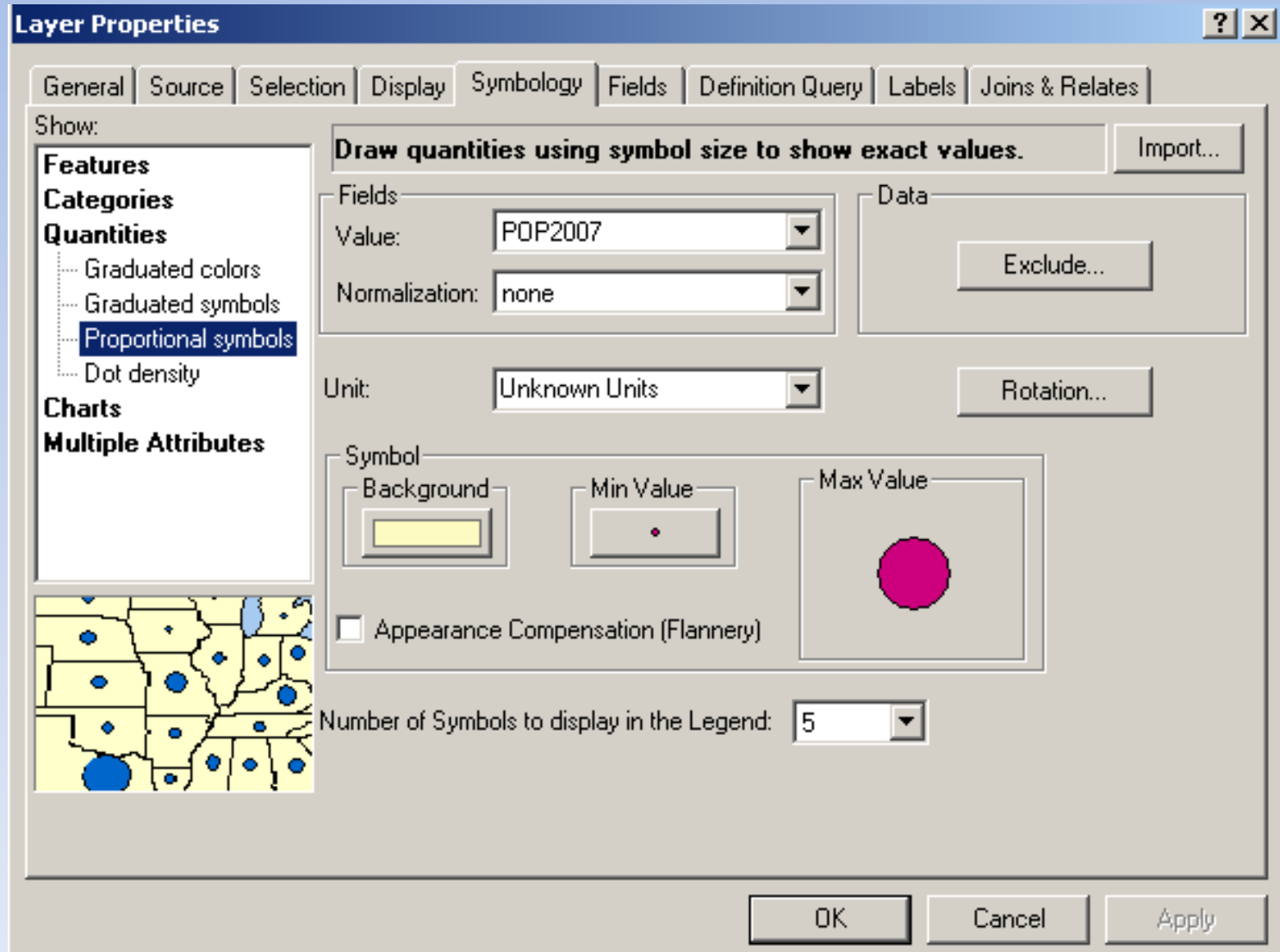


Layers

- Cities
 - POP2000
 - less than 500000
 - 500001 - 1000000
 - 1000001 - 2000000
 - 2000001 - 4000000
 - greater than 4000000
- States
 -



Proportional Symbols

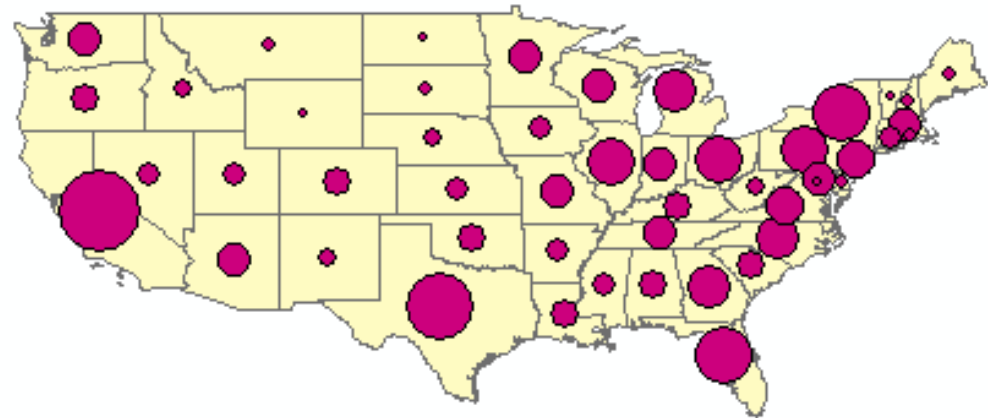


Untitled - ArcMap - ArcInfo

File Edit View Insert Selection Tools Window Help



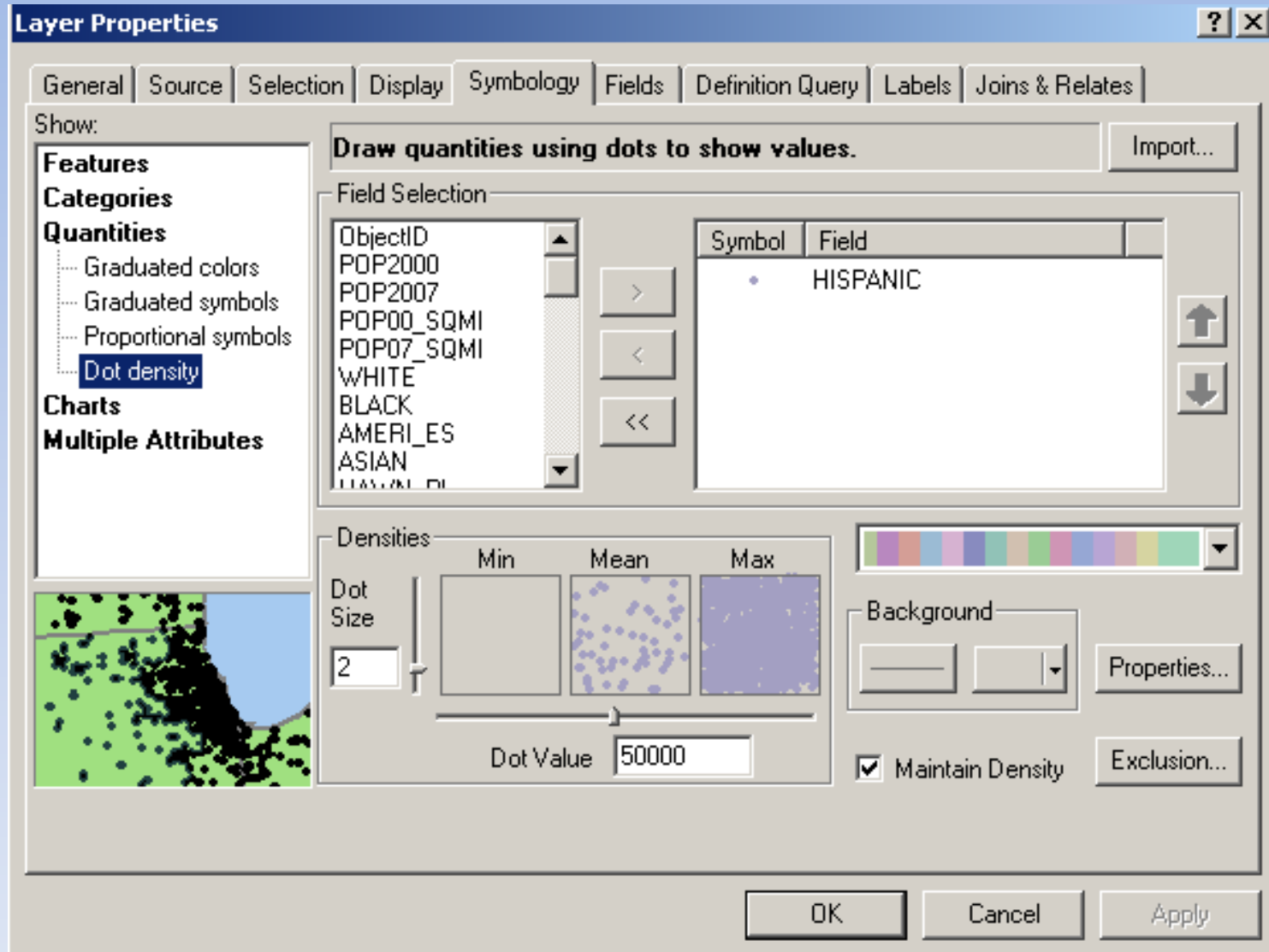
- Layers**
- Cities
 - States
 - POP2007
 - ◆ 1,000,000
 - ◆ 2,500,000
 - ◆ 5,000,000
 - ◆ 7,500,000
 - ◆ 10,000,000

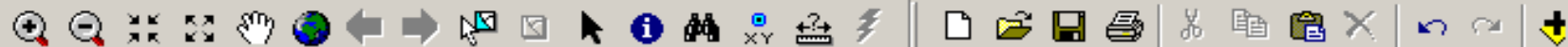


Display Source Selection

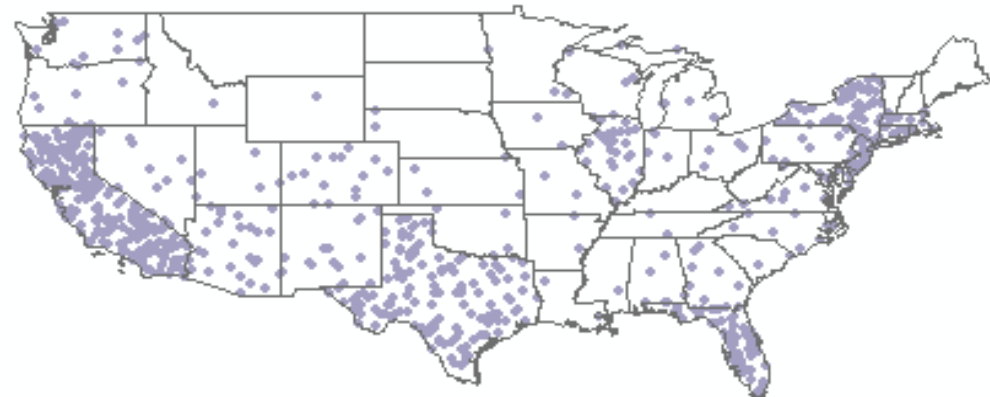


Dot Density





- Layers
 - Cities
 - States
 - 1 Dot = 50,000
 - HISPANIC

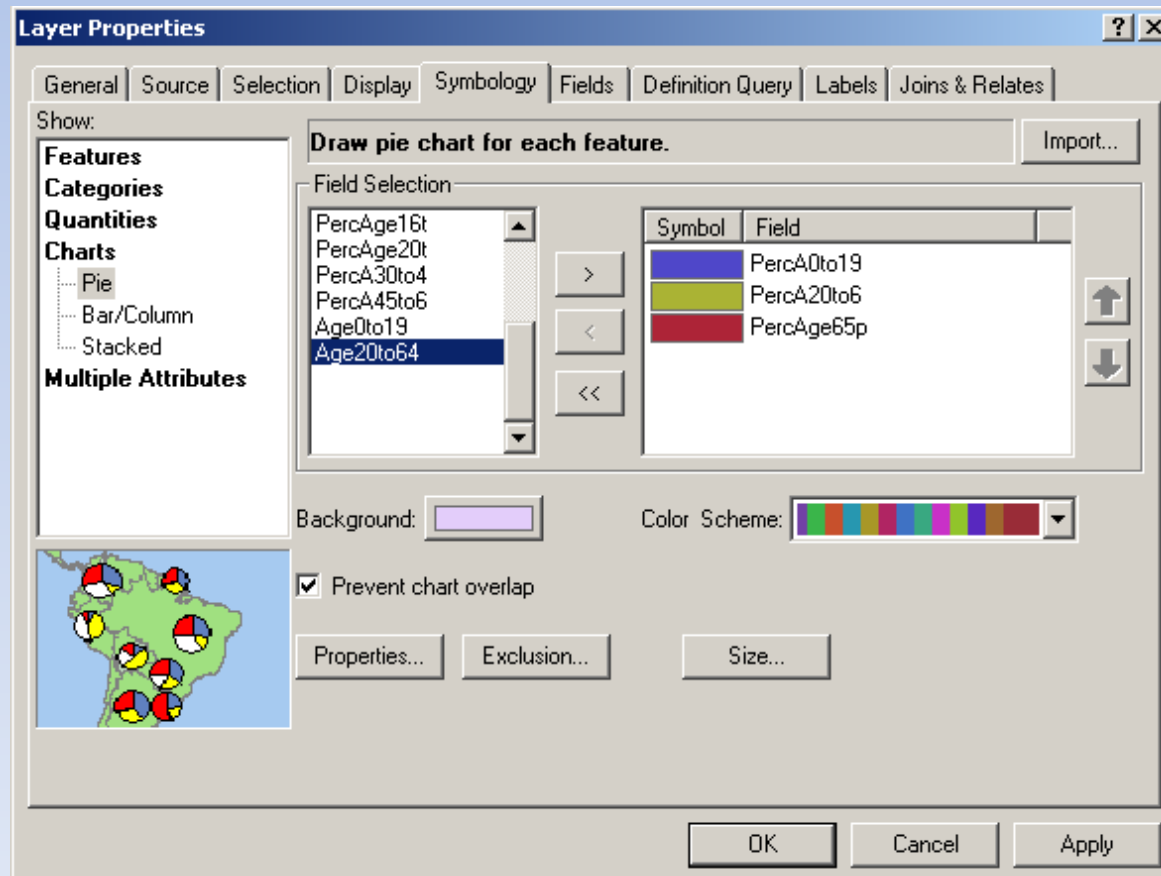


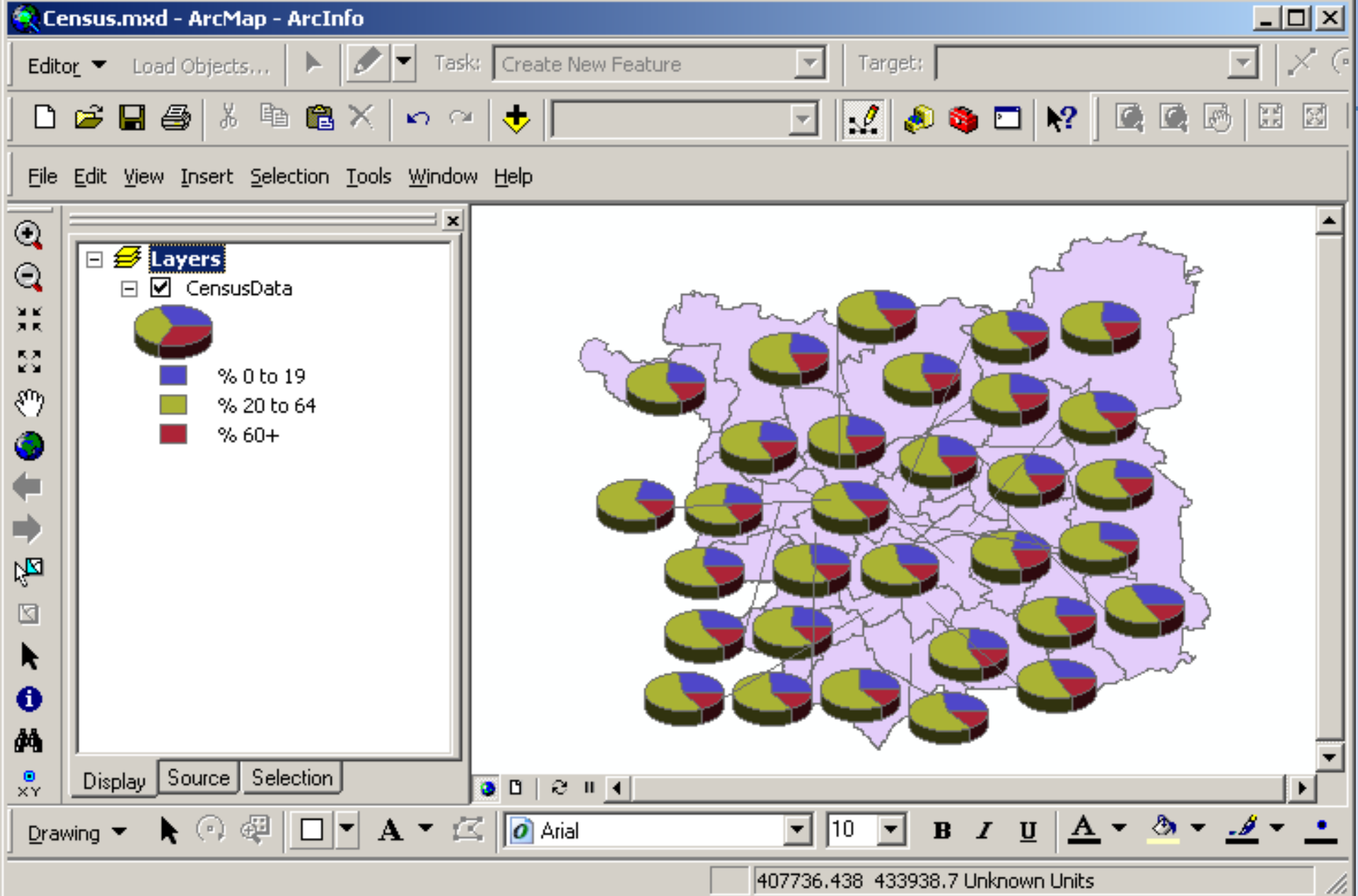
Display Source Selection



Drawing Arial 10 B I U

- Pie charts, Bar charts, Stacked bar charts
- Need more than one variable

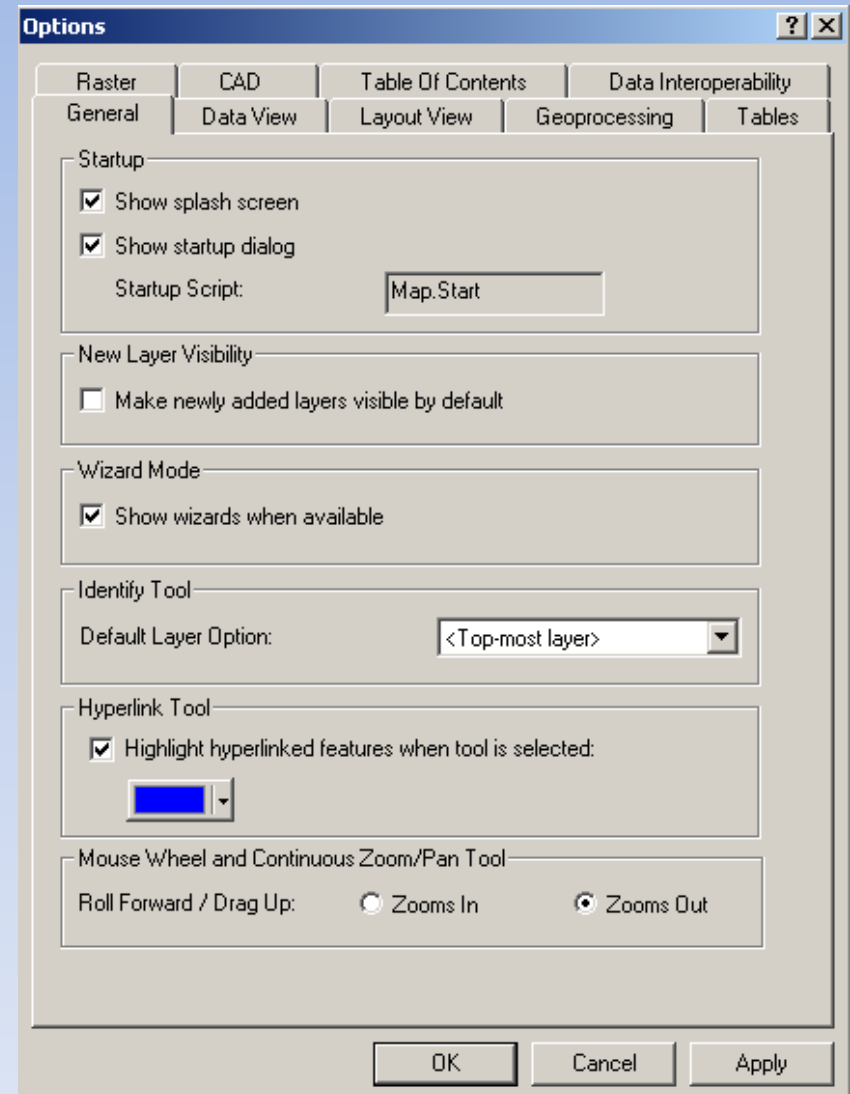




Inserting Map Elements

- ArcMap makes it easy to add.....
 - Titles
 - Legends
 - North arrows
 - Scale bars
 - Scale text
 - Label text
 - Pictures

- Arcmap → Tools → Options
 - ✓ Make newly added layers visible by default – OFF
 - ✓ Return to last used location when Add dialog first used – ON
 - ✓ Rendering behaviour on window resize - NO redraw



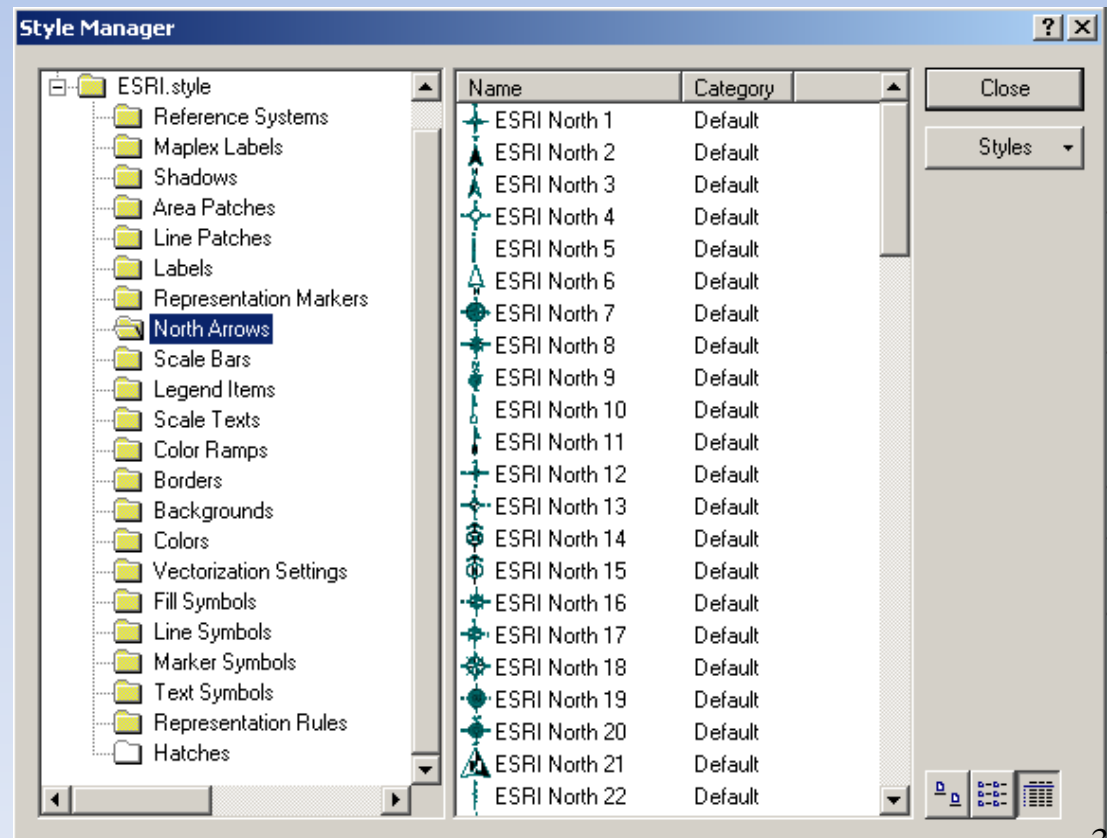
Map Documents

- When you are working, you load different maps, change symbology, create some new maps, etc.
- You can save your work as a Map Document (.mxd)
- You can then click on the **.mxd file** and it will load ArcMap and all your files
- The .mxd DOES NOT contain the data
- It is a pointer to the data + all your settings
- Can use absolute or relative pathnames (specify in File → Document Properties)

Saving Layer Properties

- Save layer properties for repeated use
- Data is not saved with the properties
- Can save this as an .mxd but do not always work in the same map document
- Definition file (.lyr) that defines the properties that you have set for that layer (e.g. symbols, labels, joins, etc.)
- Can load a combination of different layer files without creating each map from scratch

- Captures the symbol, text, etc. from a map document
- Tools → Styles →
 - Style Manager
 - Export Style



- Stored in the map document
- Can only be accessed from a single map document
- Holds the spatial extent of your map
- Zoom in + View → Bookmarks → Create
- Give the bookmark a meaningful name
- View → BookMarks → Name you gave it
- Each data frame contains its own list of bookmarks

Viewing Windows

- Window → Overview, Magnifier Windows permit efficient navigation and efficient editing

