

# SECTION 1

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# INTRODUCTION & GIS CONCEPTS

# Welcome

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- **Introduction**
  - Instructor: Katie Newcomb, GIS Analyst
- **Attendee Introductions**
  - Your Name
  - Department or Group
  - What you do
  - Any prior GIS experience?

# Logistics

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- **Schedule**

- Begin 8:30 AM
- Breaks at least every 90 minutes
- Lunch from about Noon to 1:00 PM
- Finish by 5:00 PM or sooner

- **Facilities**

- Refreshments provided
- Break Room with refrigerator and additional coffee
- Restrooms in hallway down from elevators
- Telephones – available, please ask

# About REGIS

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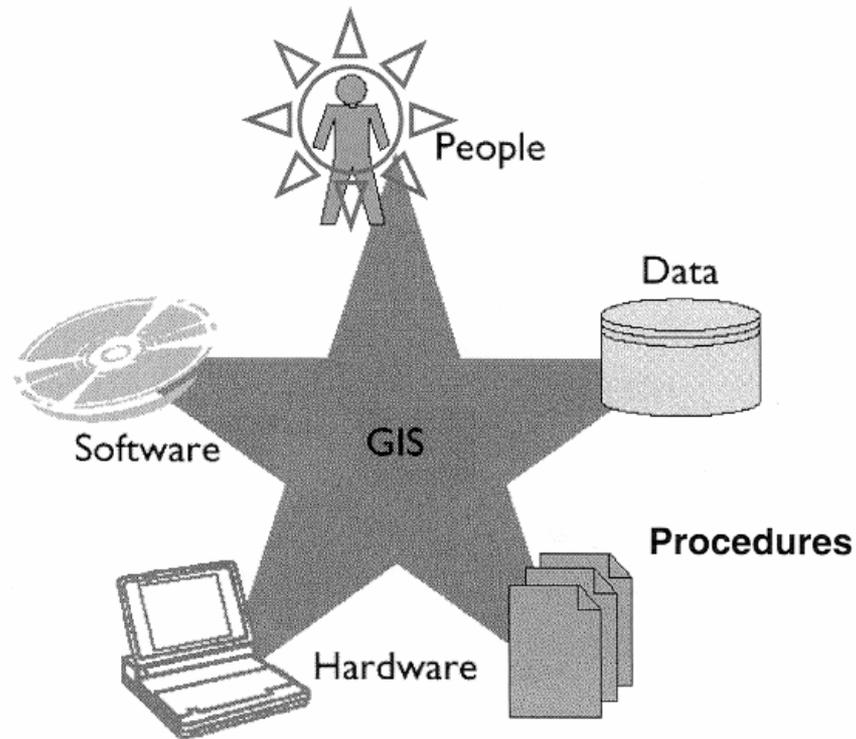
- GIS Consortium made up of twenty participants
- REGIS Participants include
  - 9 cities and 1 village
  - 7 townships
  - 3 other organizations like KCRC, ITP and GVMC
- Officially kicked off September 1997
- Officially debuted December 2001
- Provides access to applications, data and support
- Help to understand how GIS can be used in your organization
- Agency staff are your GIS staff



# What is a GIS?

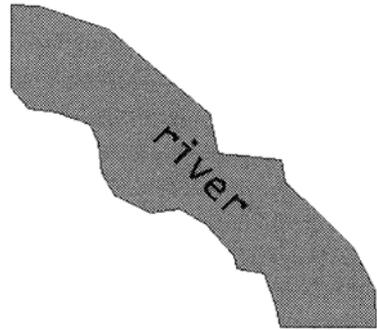
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- An integration of five basic components
  - People
  - Data
  - Hardware
  - Software
  - Procedures

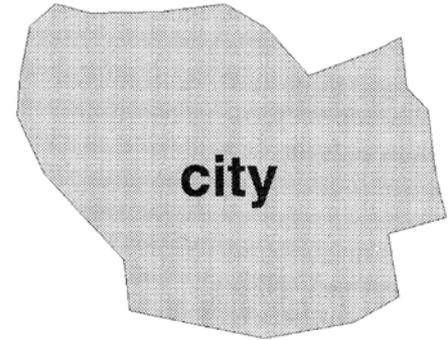


# Map Scale

- Map scale determines the size and shape of features
- Large scale



**1:500**



**1:24000**

- Small scale



**1:24000**

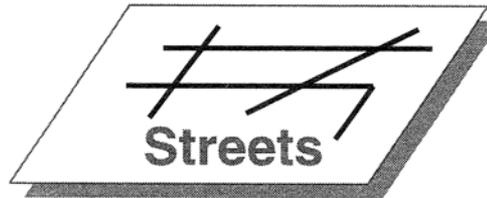


**city**

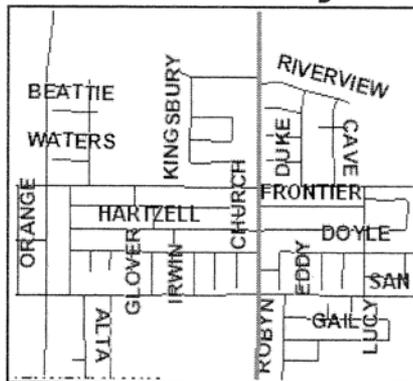
**1:250000**

# Components of Geographic Data

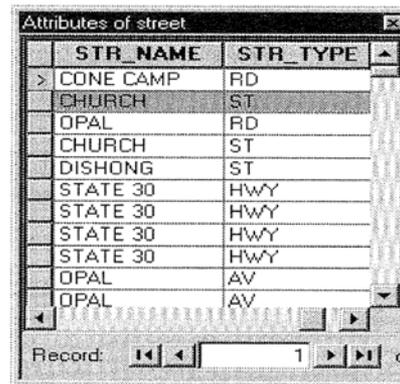
- Three general components of geographic information



## Geometry



## Attributes



STR_NAME	STR_TYPE
> CONE CAMP	RD
CHURCH	ST
OPAL	RD
CHURCH	ST
DISHONG	ST
STATE 30	HWY
STATE 30	HWY
STATE 30	HWY
OPAL	AV
OPAL	AV

## Behavior

**Rules**  
**Streets and highways may not intersect**

# Overview of REGIS GIS Applications

- Increasing functionality from ArcGIS Server (eREGIS) to ArcView and ArcEditor



**Public  
Members only**

## ArcMap

*Citrix web plugin  
needed*



**ArcView – Desktop GIS for Mapping,  
Data Integration, and Analysis**



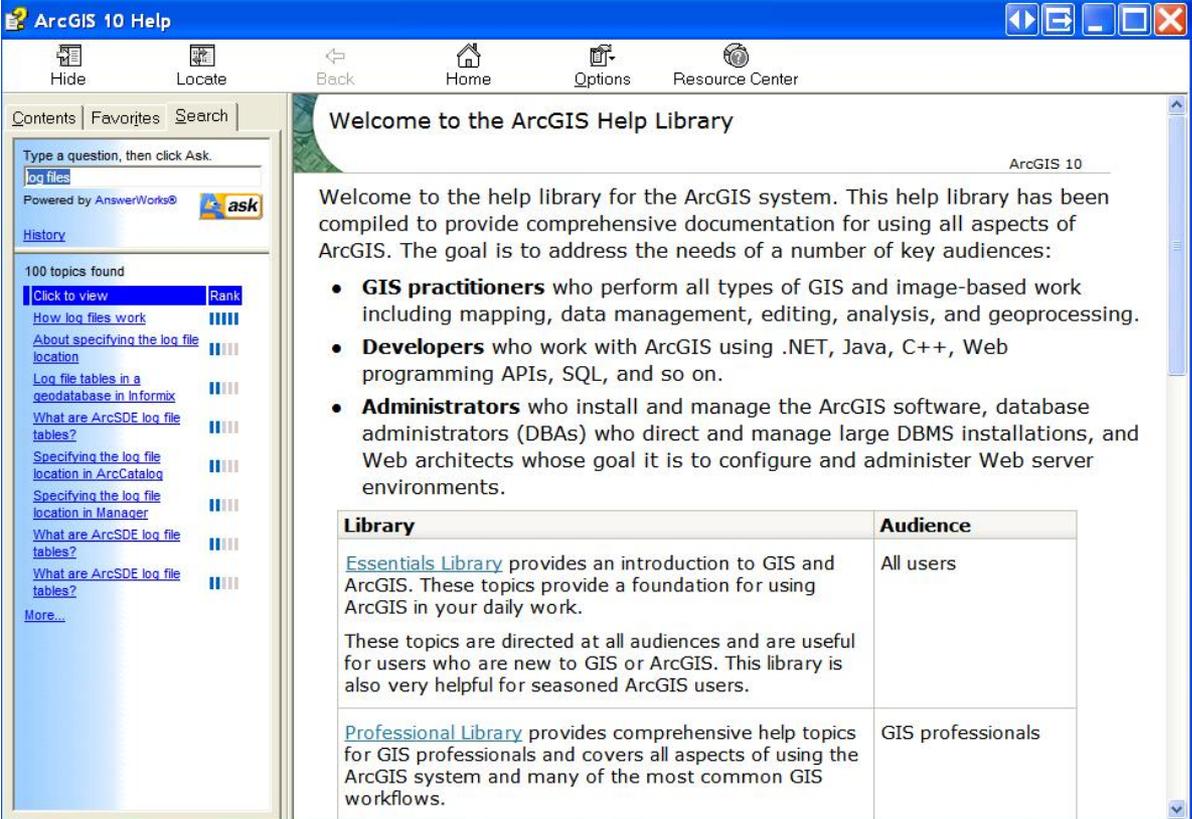
**ArcEditor – Desktop GIS with Advanced  
Geographic Data Editing and Management**



**ArcInfo – Complete Desktop GIS with  
Advanced Geoprocessing and Analysis**

# Getting “Online” Help

- Within ArcGIS application
- Contents tab
- Index tab
- Search tab
- Other help
- REGIS Help Desk
  - Telephone
  - E-mail
  - Fax



Welcome to the ArcGIS Help Library

Welcome to the help library for the ArcGIS system. This help library has been compiled to provide comprehensive documentation for using all aspects of ArcGIS. The goal is to address the needs of a number of key audiences:

- **GIS practitioners** who perform all types of GIS and image-based work including mapping, data management, editing, analysis, and geoprocessing.
- **Developers** who work with ArcGIS using .NET, Java, C++, Web programming APIs, SQL, and so on.
- **Administrators** who install and manage the ArcGIS software, database administrators (DBAs) who direct and manage large DBMS installations, and Web architects whose goal it is to configure and administer Web server environments.

Library	Audience
<a href="#">Essentials Library</a> provides an introduction to GIS and ArcGIS. These topics provide a foundation for using ArcGIS in your daily work.  These topics are directed at all audiences and are useful for users who are new to GIS or ArcGIS. This library is also very helpful for seasoned ArcGIS users.	All users
<a href="#">Professional Library</a> provides comprehensive help topics for GIS professionals and covers all aspects of using the ArcGIS system and many of the most common GIS workflows.	GIS professionals

# SECTION 2

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# LOGGING IN & NAVIGATION

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# Accessing the REGIS Environment

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- Web-based login screen
- Use any popular web browser
- Access to all REGIS-based applications



<http://192.168.10.38/Citrix/Metaframe/>

or

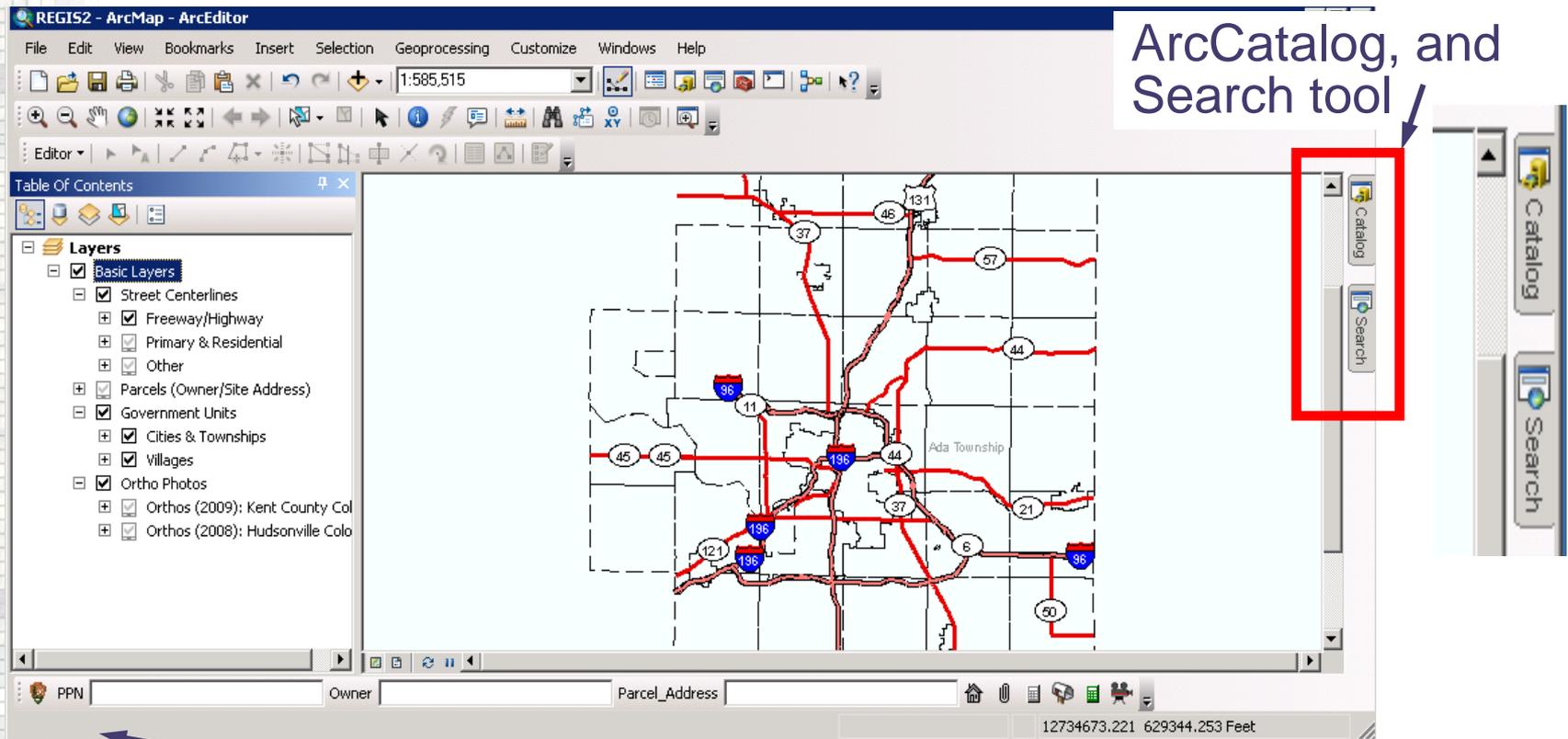
<https://csg.gvmc-regis.org/Citrix/XenApp/>

# Launch the ArcView 10 Application

- Application screen
- All REGIS-based applications you have access to
- Single-click to access



# What's New with the ArcMap 10 Interface



ArcCatalog, and Search tool

**\*\* Important: REGIS Custom Toolbar will not change**

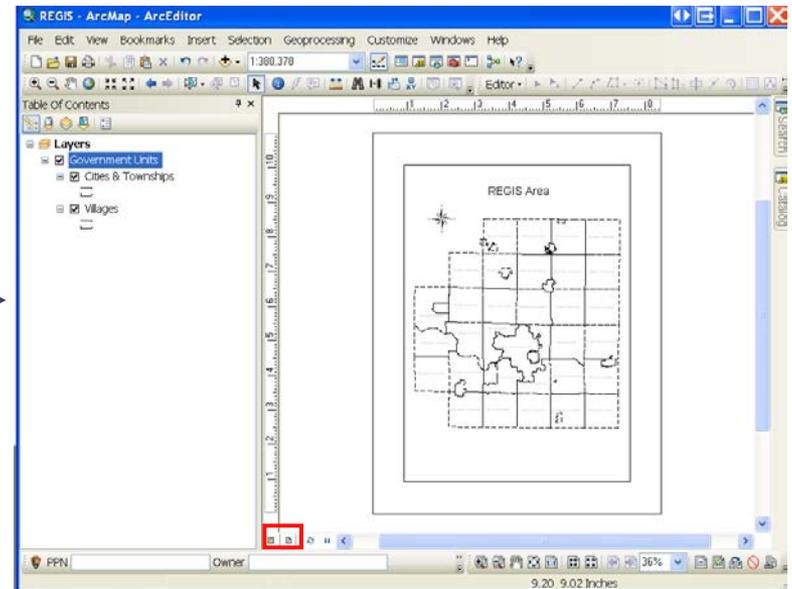
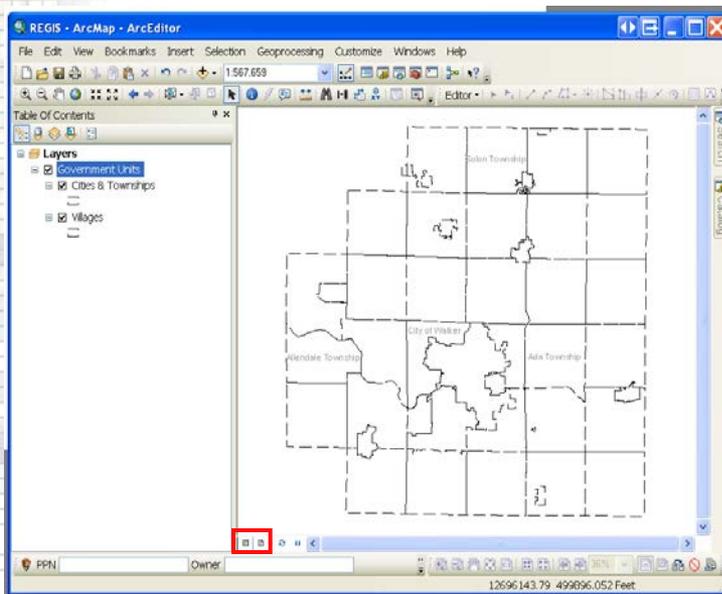
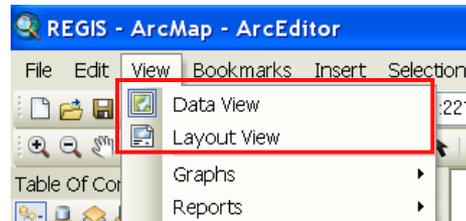
● Icons are more polished and easier on the eyes

● Easier Access to ArcCatalog and other tools

● Autohide, ArcCatalog, Table of Contents, Tables and Stack Windows

# Data View or Layout View

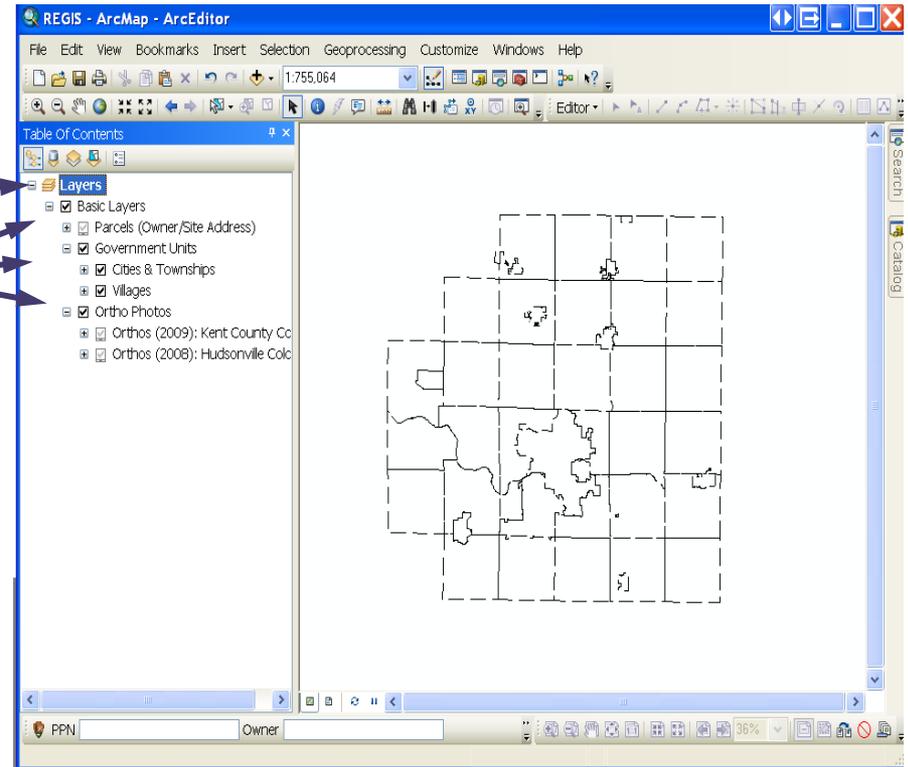
- Data view for display, queries, editing and analysis
- Layout view for creating map layouts



# Layers, Data Frames and Maps

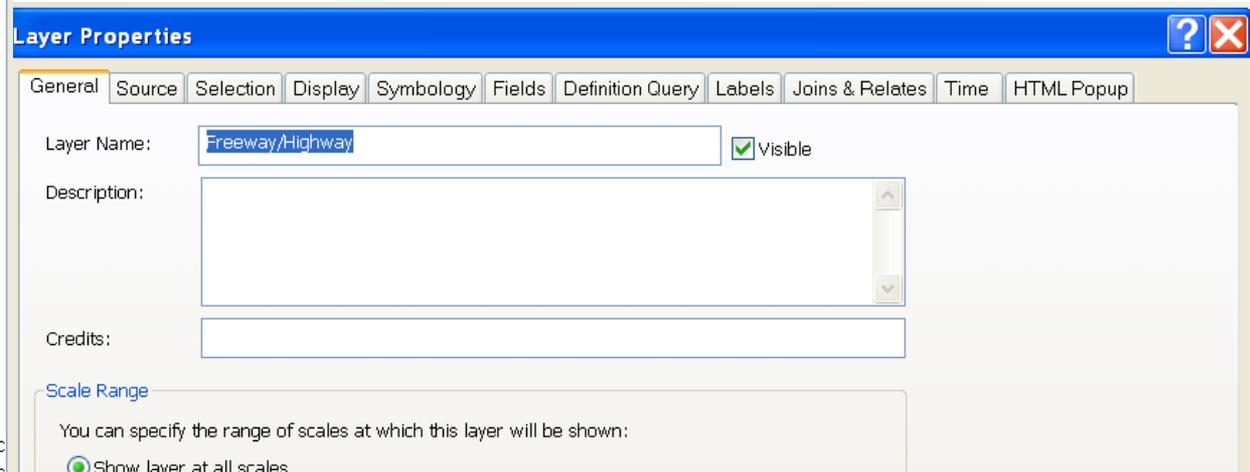
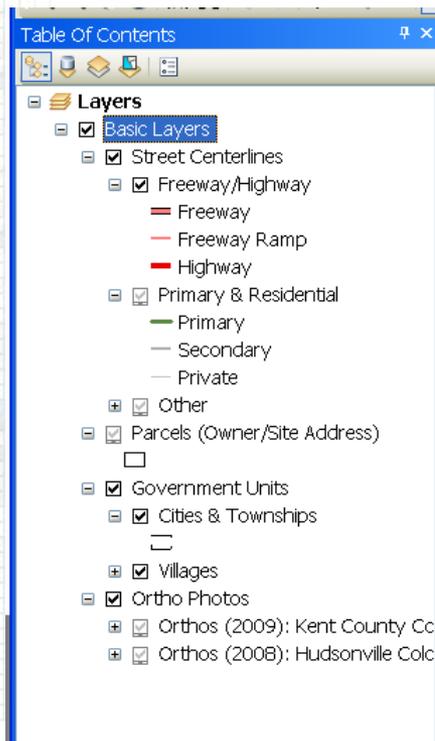
- Layer
  - Represents symbolized spatial data; formerly called “themes”
- Data frame
  - Organizes layers
- Map
  - Contains data frames, layers and map elements

Data frame →  
Layers →



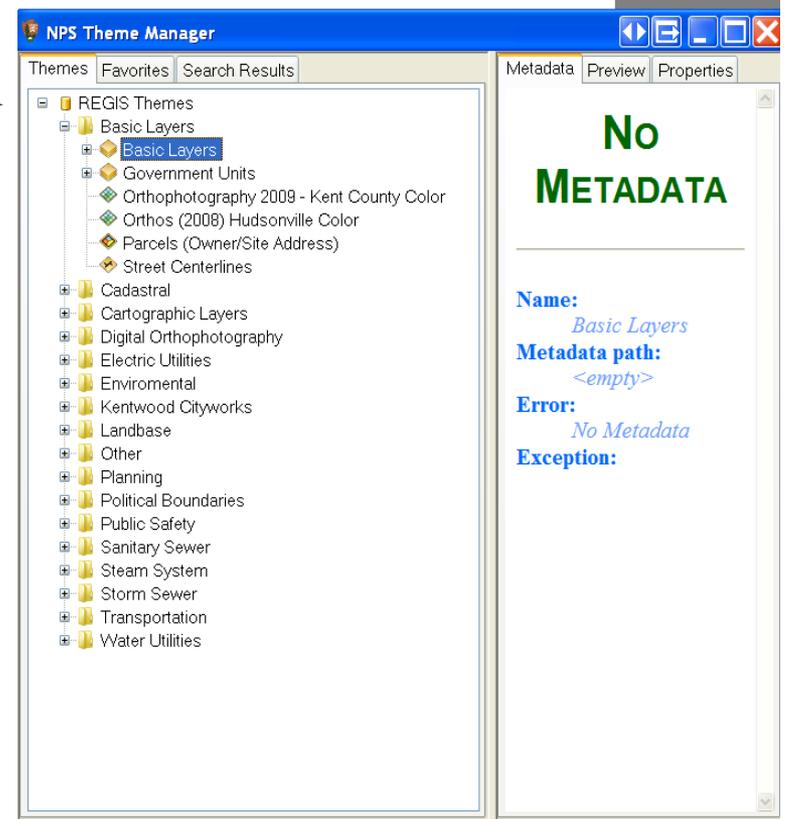
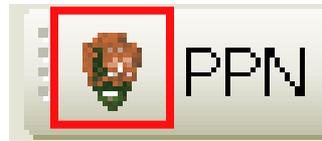
# Layers

- Reference spatial data sources
- Set symbols, labels and other properties
- Manipulate through context menu



# Adding Data Layers

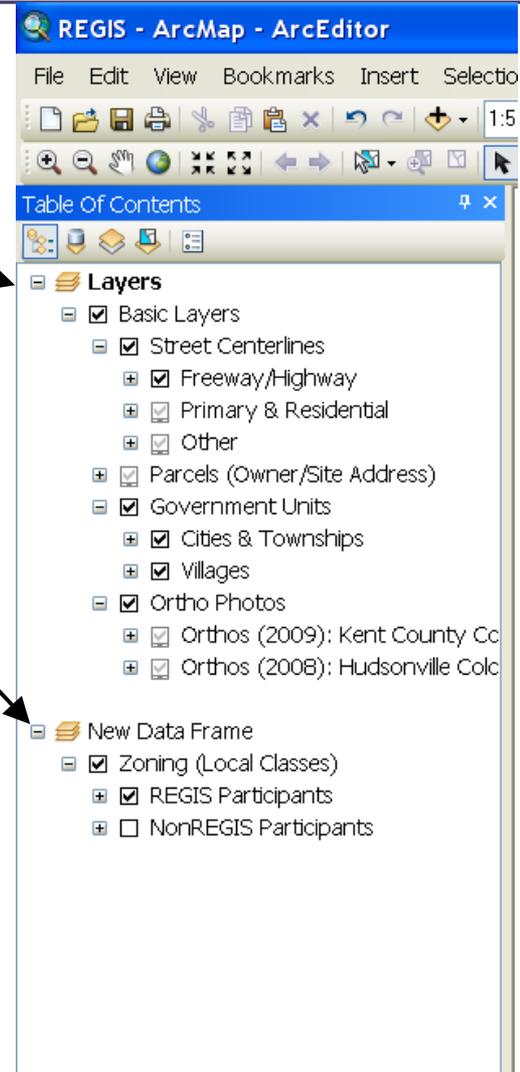
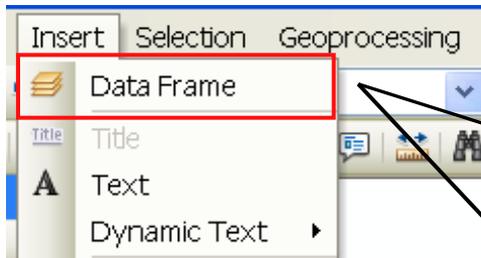
- REGIS Layer Manager



- Add Data button



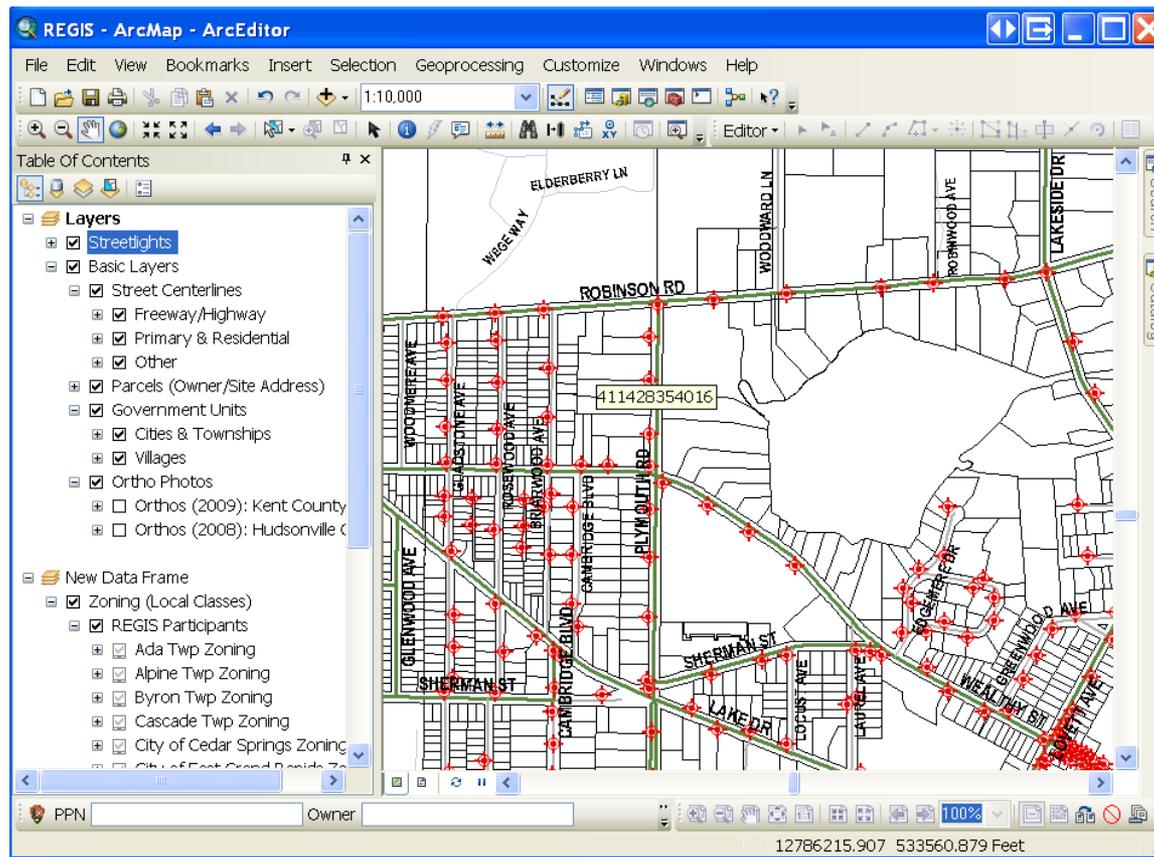
# Data Frames



- **Data frames are containers for layers**
- **Maps can have many data frames**
  - Index and inset maps
  - Arrange in Layout view
- **Add from Insert menu**
- **Activate data frames to view from context menu**

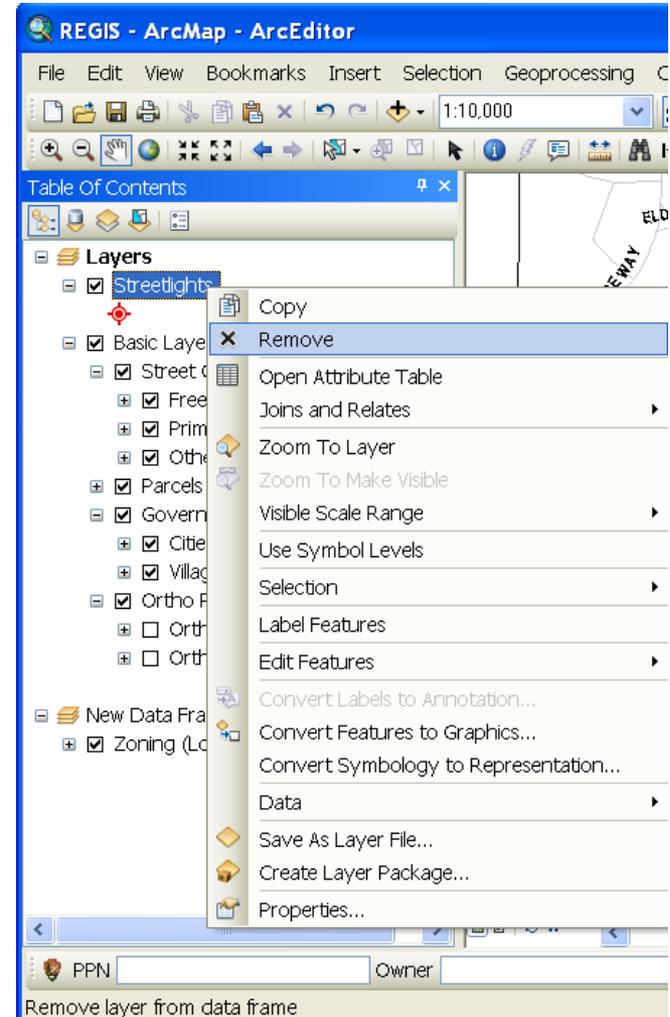
# Maps

- Hold layers, data frames, graphics and map elements
- Store information in a map document (MXD) file



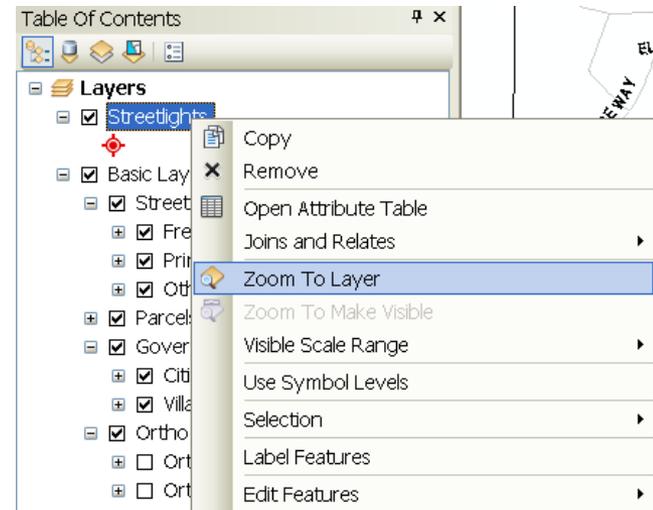
# Managing the Table of Contents

- Drag layers up or down to change display order
  - Smart defaults for layer draw order
    - Points, lines or polygons
  - Layers draw in the Table of Contents in order, from the bottom up
- Rename data frames and layers
- Remove layers
- Display tab or Source tab



# Moving Around the Map

- Zoom in or out
- Pan the display
- Full extents
- Back or forward one display
- Zoom to a layer
- Zoom to selected features
- Go To XY Command
- Navigate maps with mouse wheel

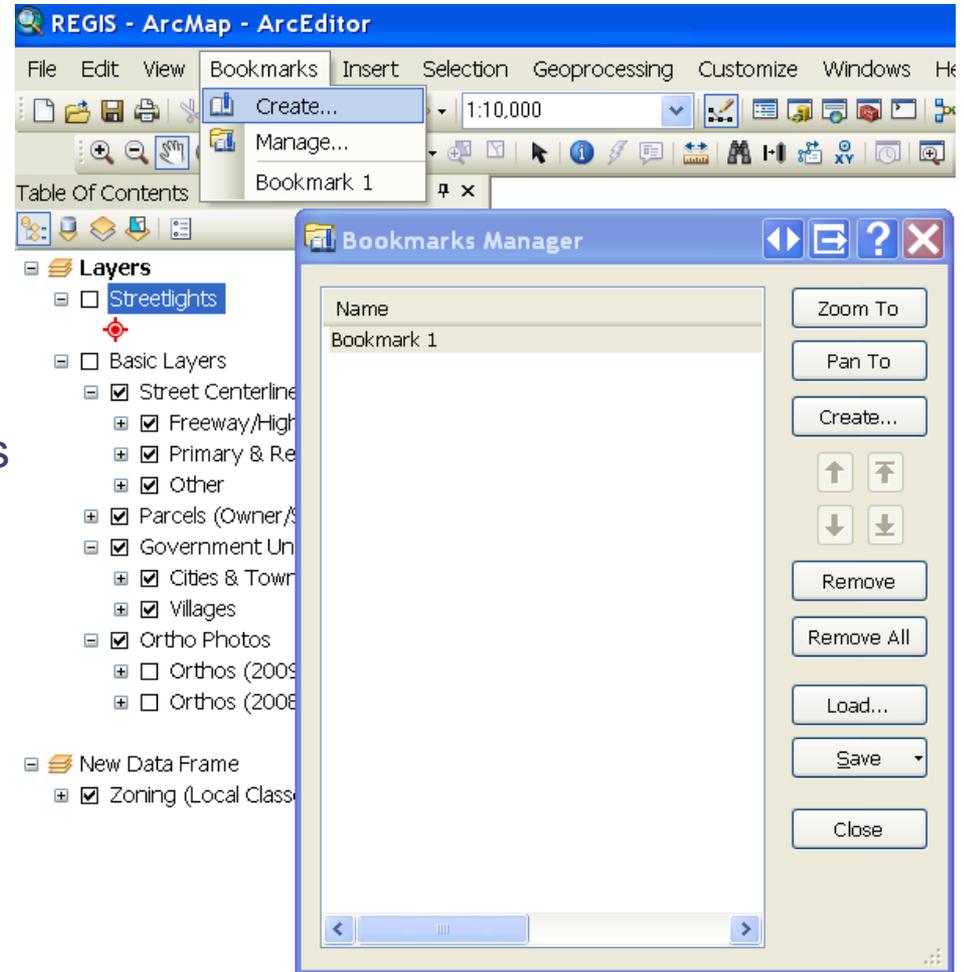


# Using a Bookmark

- **Spatial bookmarks**
  - Set and name a location extent
  - Return to it at any time in that map document
- **My Places**
  - Located in the Data Frames Toolbar
  - Store frequently used locations
  - Access from any map document

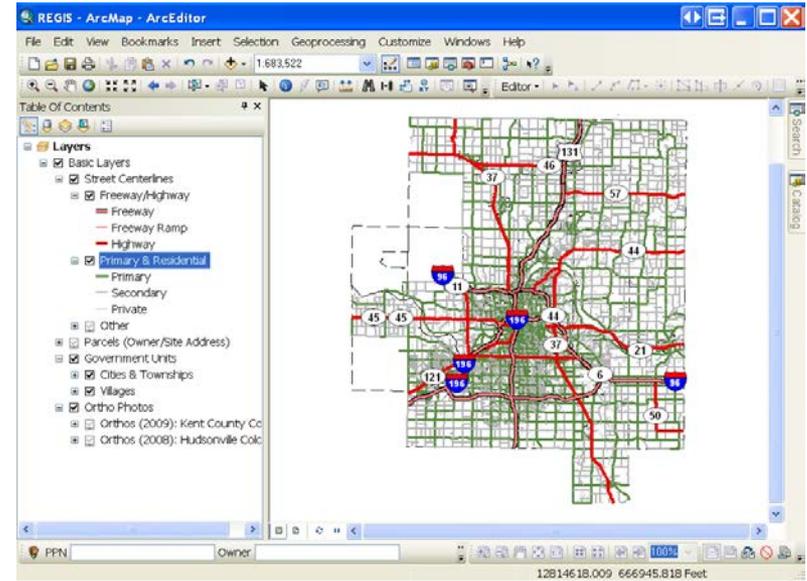
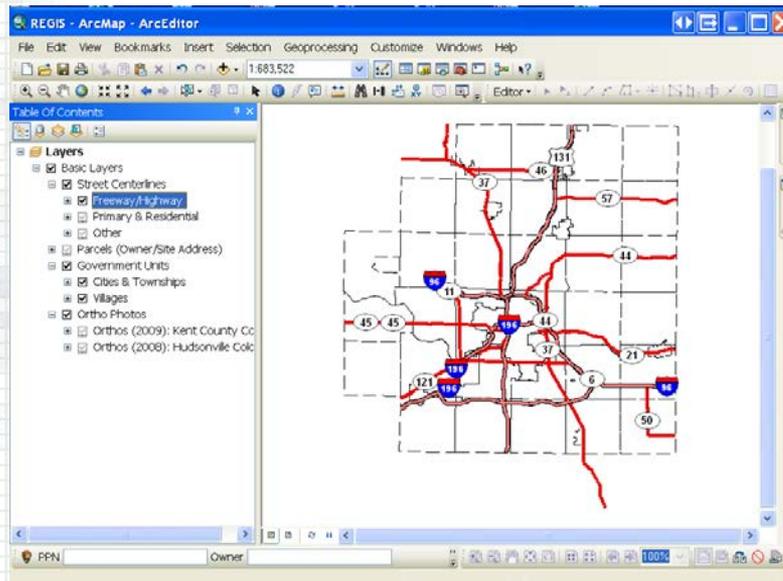


My Places



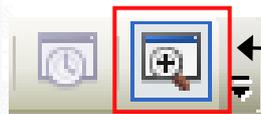
# Scale-dependent Display

- Display layers at specific scale range
  - Reduces clutter and drawing time
  - Layer display property

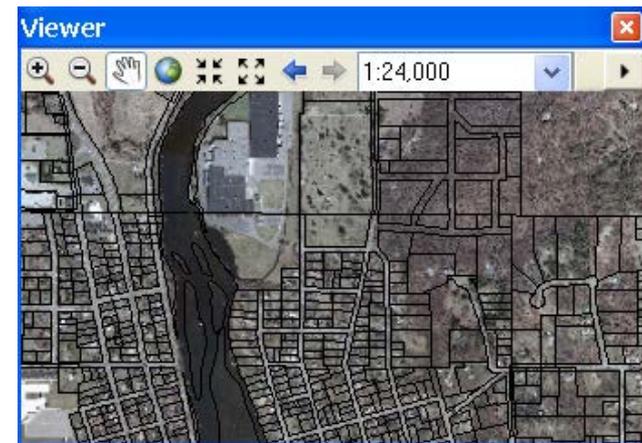


# Magnifier and Viewer Windows

- See more detail or overview without changing display

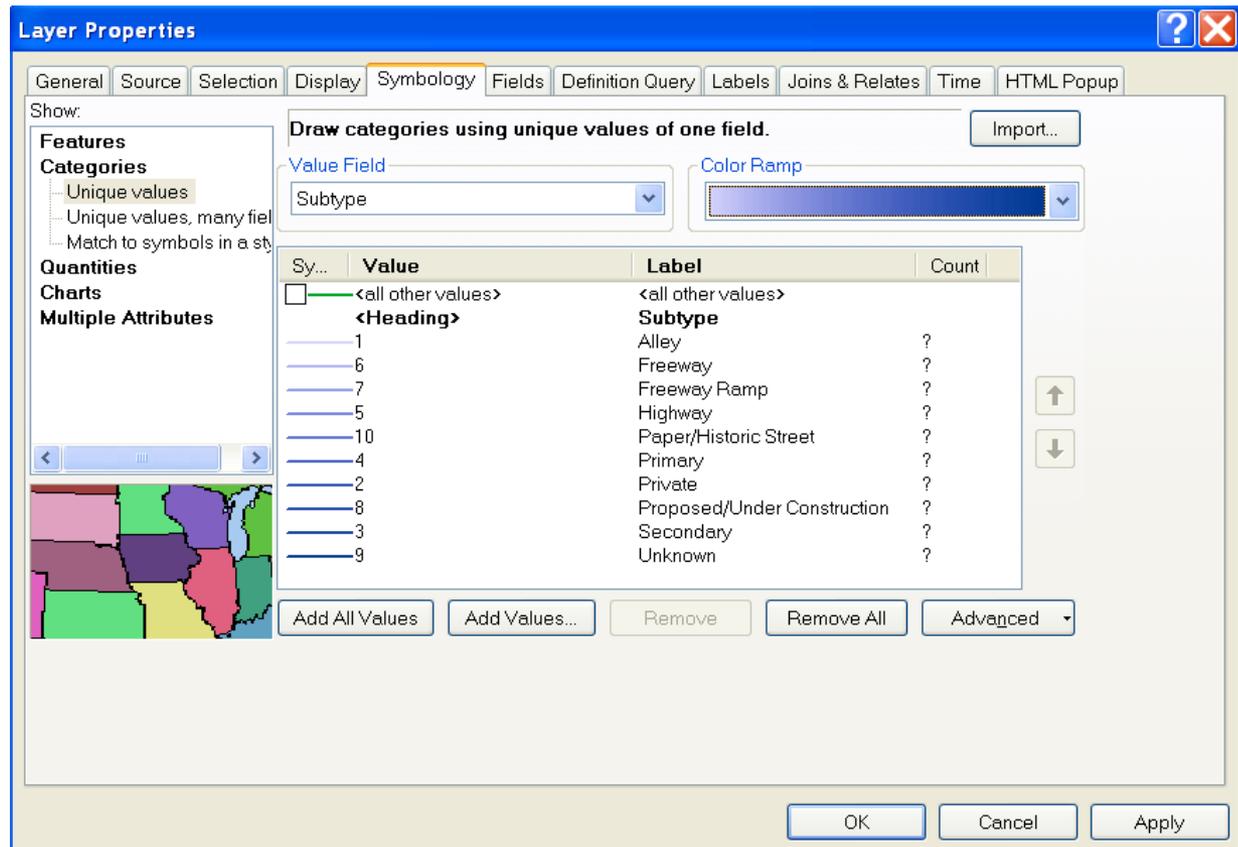


← Create Viewer Window



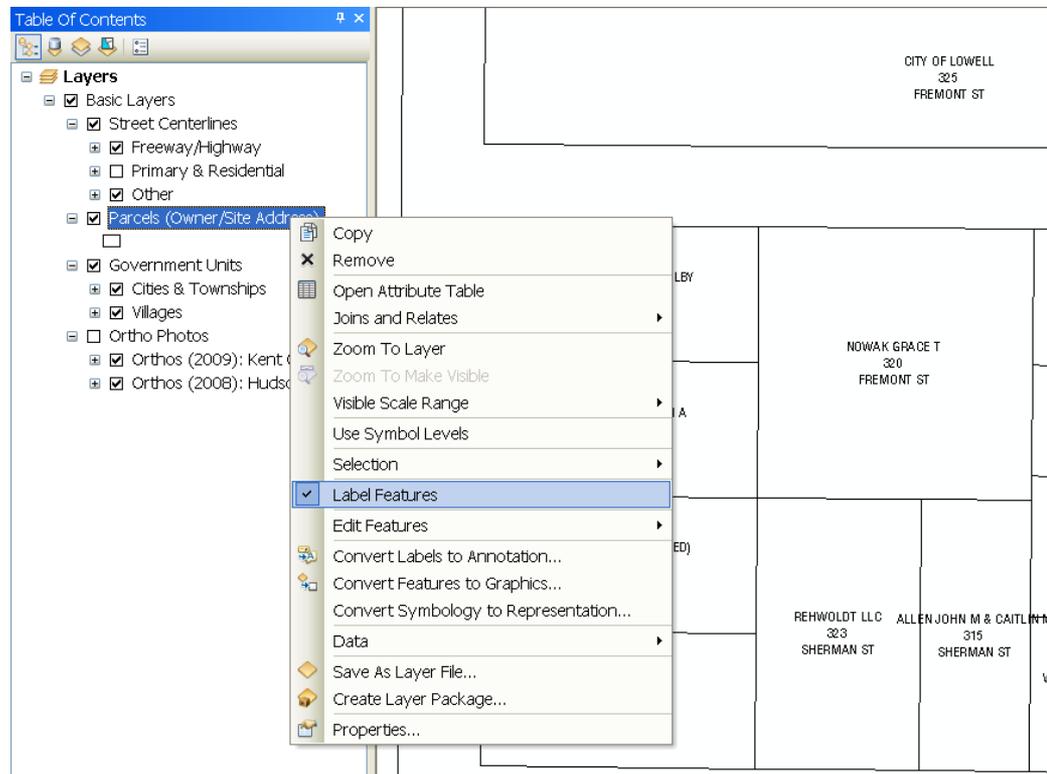
# Layer Symbology in ArcMap

- Same symbol for all features
- Based on attribute values



# Labeling Features

- Label features dynamically using attribute values
- Layer properties control appearance and position
- Convert labels to annotation features



# SECTION 3

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# QUERYING DATA

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# REGIS QuickSearch: PPN, Owner, & Parcel Address

- Search directly from the toolbar
- No need to build complicated query strings
- Selects appropriate parcel(s) and zooms in



Enter PPN as one long number string—do not use dashes

Enter parcel owner name as indicated on tax records—  
or just a partial name

Enter parcel address;  
e.g. 40 Pearl St NW

# Identifying

- Pop-up attributes for a specific feature

The image illustrates the process of identifying a feature in a GIS application. It shows the Tools toolbar with the Identify tool highlighted, the Identify window displaying attribute data for a selected parcel, and a context menu with various options.

**Tools Toolbar:** The Identify tool is highlighted with a red box and an arrow pointing to a blue information icon.

**Identify Window (Top-Right):** Shows the Identify tool settings and a list of features. The selected feature is 412002204009.

Field	Value
Parcel Number	412002204009
Owner Name	NOWAK GRACE T
Site Street Number	320
Site Street Name	FREMONT ST
Parcel in Right of Way	No
Hydro Parcel	No
Railroad ROW	No
Common Element	No
Shape	Polygon
SHAPE.AREA	27288.357925
SHAPE.LEN	660.761787

**Identify Window (Bottom-Left):** Shows the Identify tool settings and a list of features. The selected feature is 412002204009.

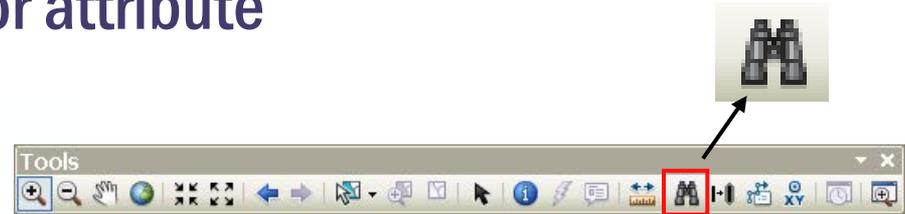
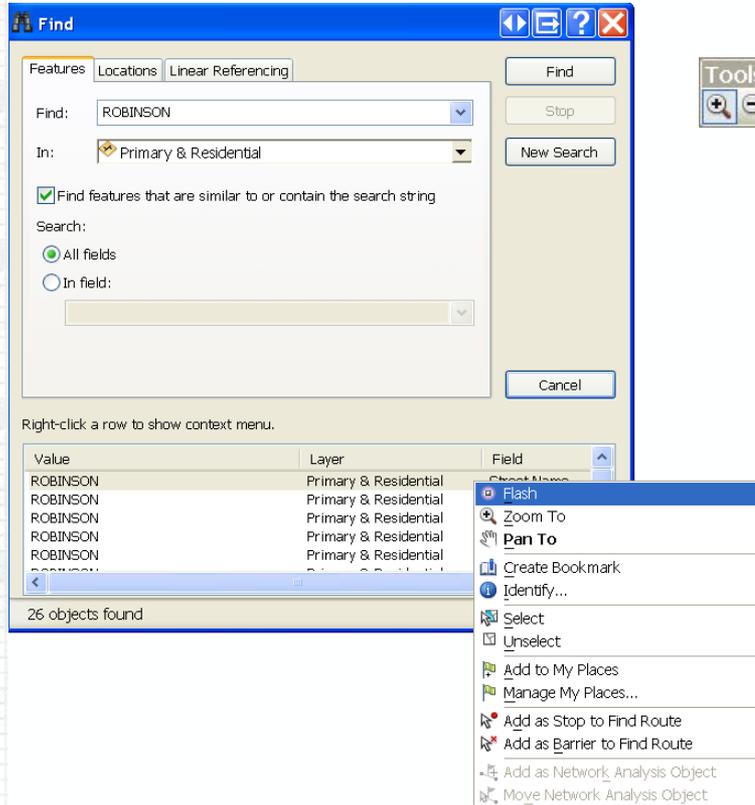
Field	Value
Parcel Number	412002204009
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Parcel in Right of Way	No
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Common Element	No
Shape	Polygon
SHAPE.AREA	27288.357925
SHAPE.LEN	660.761787

**Context Menu (Bottom-Center):** Shows a list of options for the selected feature.

- Flash
- Zoom To
- Pan To
- Select
- Unselect
- Hyperlinks
  - Add Hyperlink...
  - Manage Hyperlinks...
- Create Bookmark
- Remove from Tree Del
- Sort Ascending Ctrl+S
- Show Relates With Field Properties
- Copy Record Ctrl+C
- Open Attribute Table ...
- Layer Properties ...

# Finding

- Locate a specific feature or attribute



Robinson Rd flashes

# Geocoding

- Types of geocoding
  - Single address geocoding
  - Multiple address geocoding
- Geocoding targets
  - Parcels
  - Street centerlines



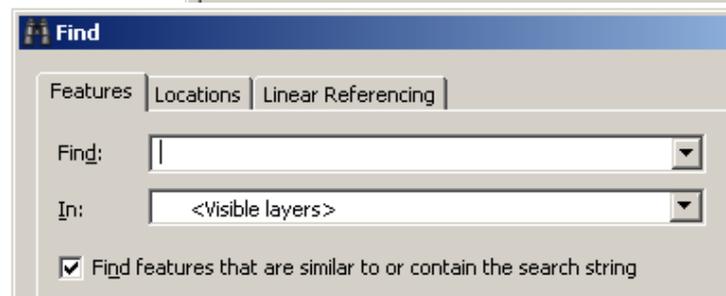
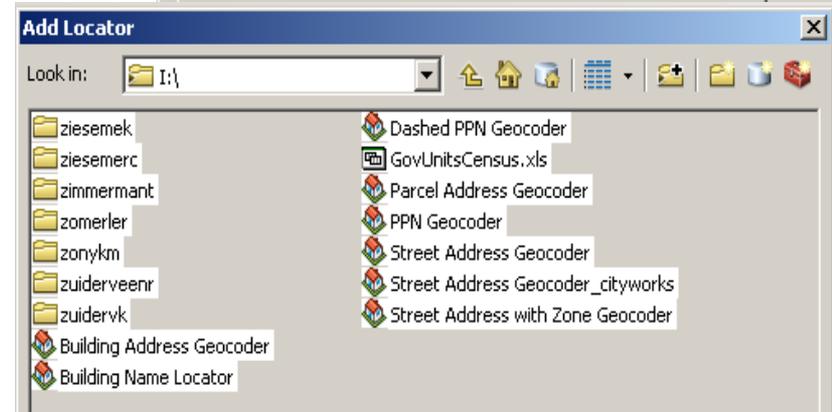
Single

Multiple



# Geocoding: Single Address

- Use the Find tool in the Tools toolbar
- Locations tab
- For Finding a Single Address use one of the following locators
  - Parcel address geocoder
  - Street address geocoder



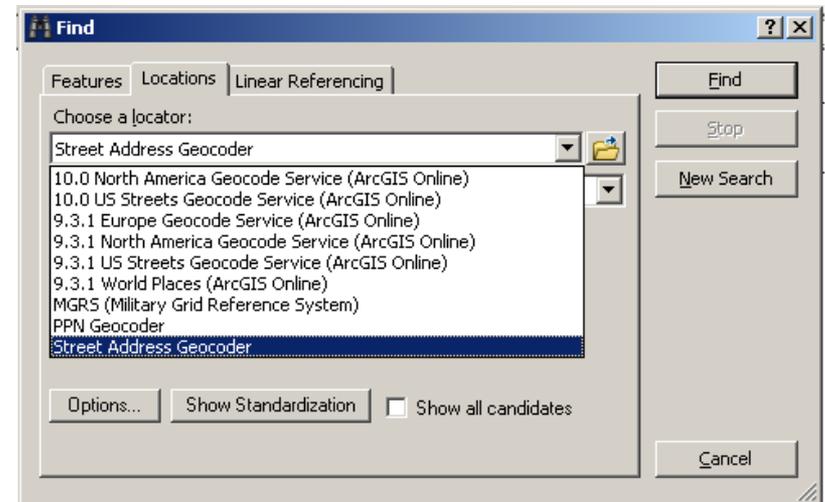
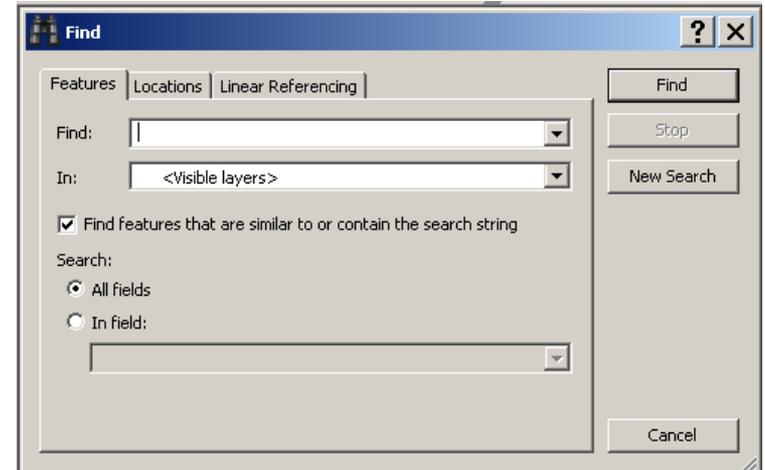
# Geocoding: Single Address

- **Addresses**

- Use as MANY address components as you possibly can:
  - Building Number (e.g. “40”)
  - Street Name (e.g. “Pearl”)
  - Street Suffix (e.g. “St”)
  - Street Directional (e.g. “NW”)
- Zone (optional, streets): ZIP Code

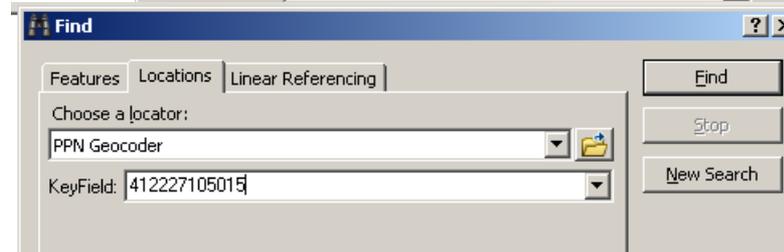
- **Street Intersections**

- Components (same as above)
- Link two street names with “&”
- “Ottawa Ave NW & Pearl St



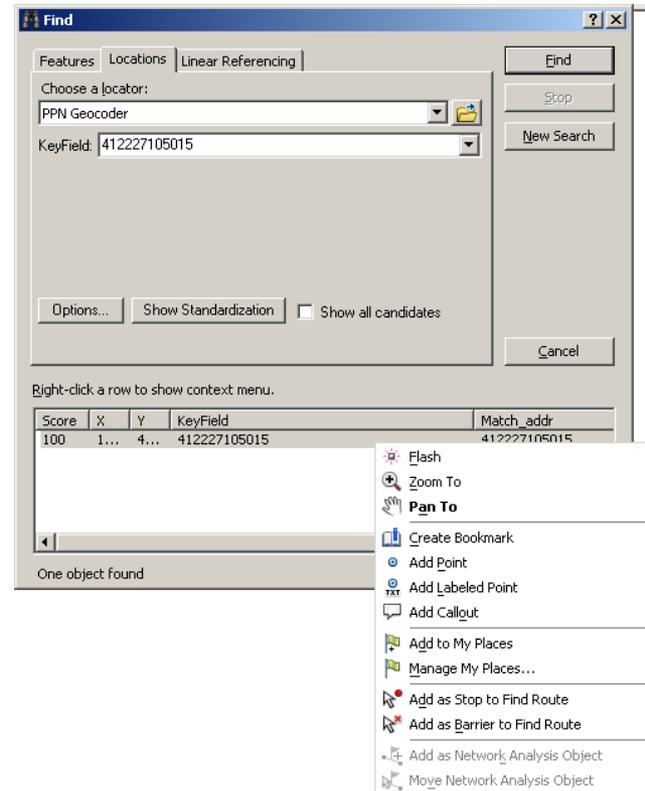
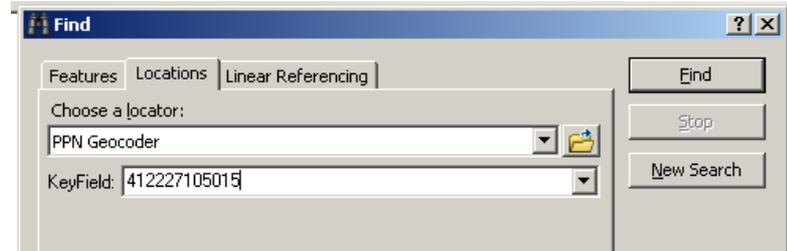
# Geocoding: Parcel Number

- Use the Find tool in the Tools toolbar
- Locations tab
- For Finding a Parcel by the Parcel Number use one of the following locators
  - PPN geocoder
  - Dashed PPN geocoder



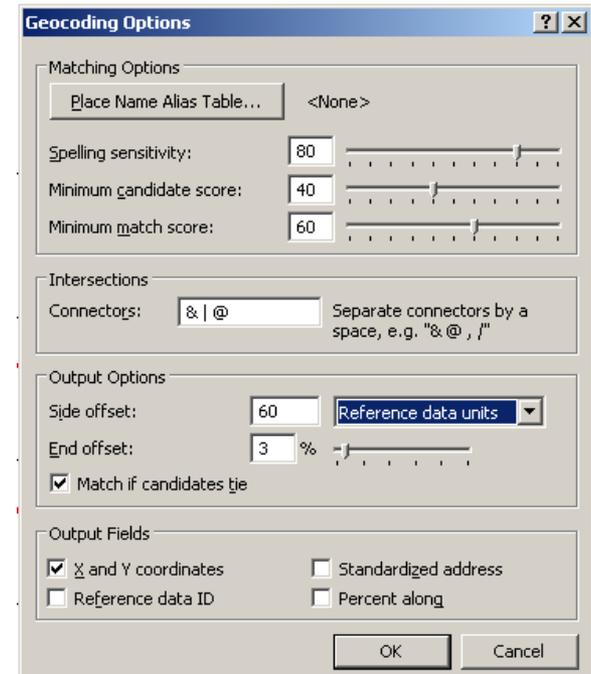
# Geocoding: Parcel Number

- PPN (packed)
  - 12 digits and nothing else
- PPN (dashed)
  - 12 digits separated by dashes



# Geocoding: Multiple Addresses

- Choose input address file
- Select address field
- Select output file



# Geocoding: Multiple Addresses

- Match success: geocoding result
- Status, score, side
- Review/Rematch addresses
  - Match interactively
  - Match automatically
  - Done

Table

Geocoding Result: Geocoding\_Result

FID	Shape	Status	Score	Match_type	Side	X	Y
0	Point	M	100	A	R	12818695.487543	513202.004769
1	Point	M	75	A	R	12813886.081114	515543.96262
2	Point	M	100	M	R	12812709.773075	518492.7362
3	Point	M	75	A	L	12822441.528549	516567.000803
4	Point	M	75	A	R	12812200.917535	518540.849213
5	Point	M	75	A	R	12823398.018503	516190.924242
6	Point	M	100	A	L	12817663.003254	516180.613978
7	Point	M	100	M	R	12820594.1312	517360.319325
8	Point	M	100	A	R	12812601.646386	517024.297409

(0 out of 7923 Selected)

Geocoding Result: Geocoding\_Result

Interactive Rematch - Geocoding\_Result

Show results: Unmatched Addresses Manage result sets... Refresh Rematch Automatically

FID	Shape	Status	Score	Match_type	Side	X	Y
12	Point	U	0	A		0	0
68	Point	U	0	A		0	0
72	Point	U	0	A		0	0
74	Point	U	0	A		0	0
75	Point	U	0	A		0	0
79	Point	U	0	A		0	0

(of 1220)

Matched: 6703 (85%)  
Tied: 0 (0%)  
Unmatched: 1220 (15%)

Address: Street or Intersection 2009 TIMBER TR

Standardized Address: 2009 | | TIMBER | TRL |

0 Candidates

Score	Side	Match_addr	X	Y	LeftFr
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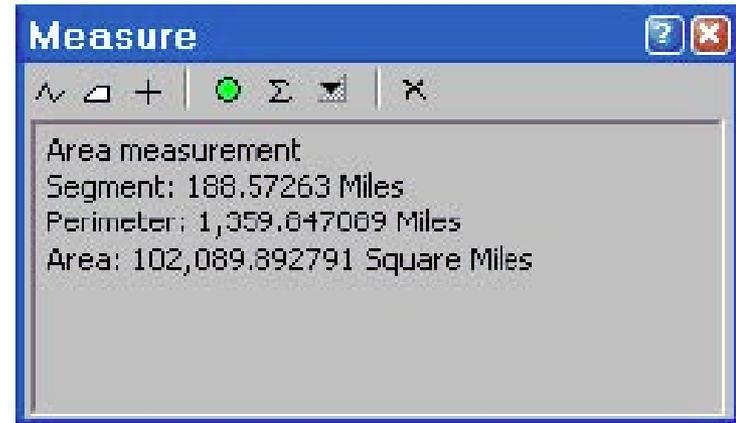
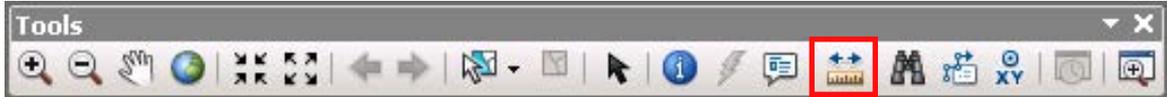
Candidate details:

X  
Y  
From  
To  
PreDir  
PreType  
StreetName  
StreetType  
SufDir

Geocoding Options... Zoom to Candidates Pick Address from Map Search Match Unmatch Save Edits Close

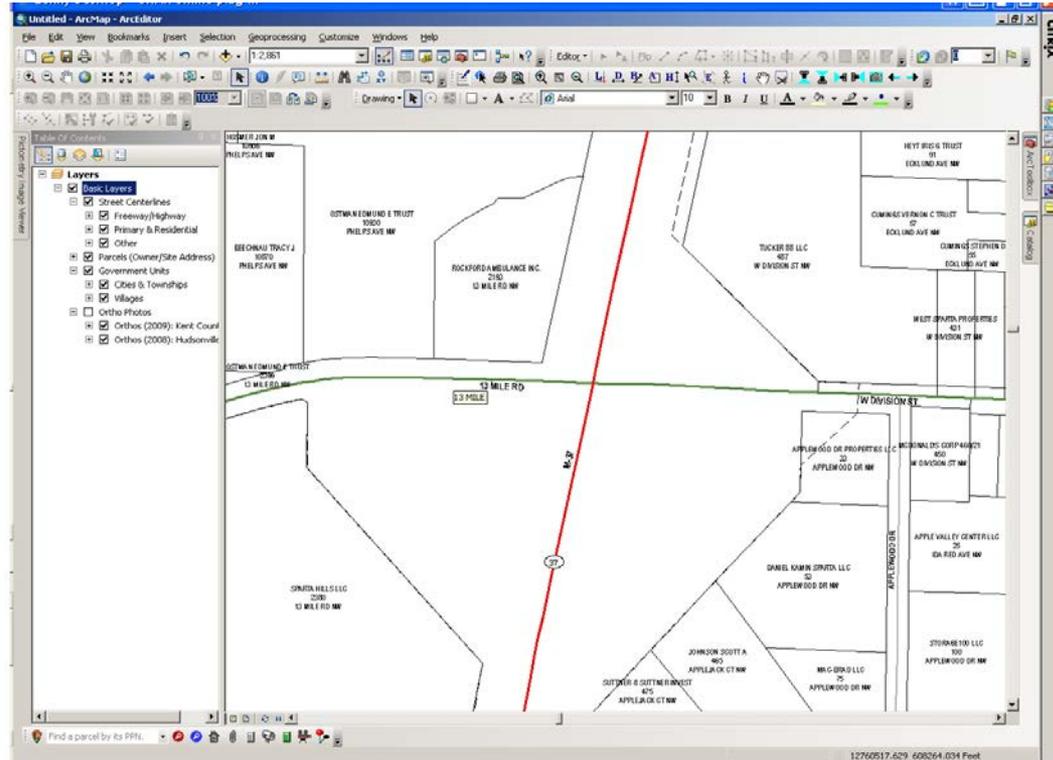
# Measuring

- Find linear distances
- Find area of a polygon
- Click on feature to get distance, area, xy coordinates
- Snap to features
- Running total



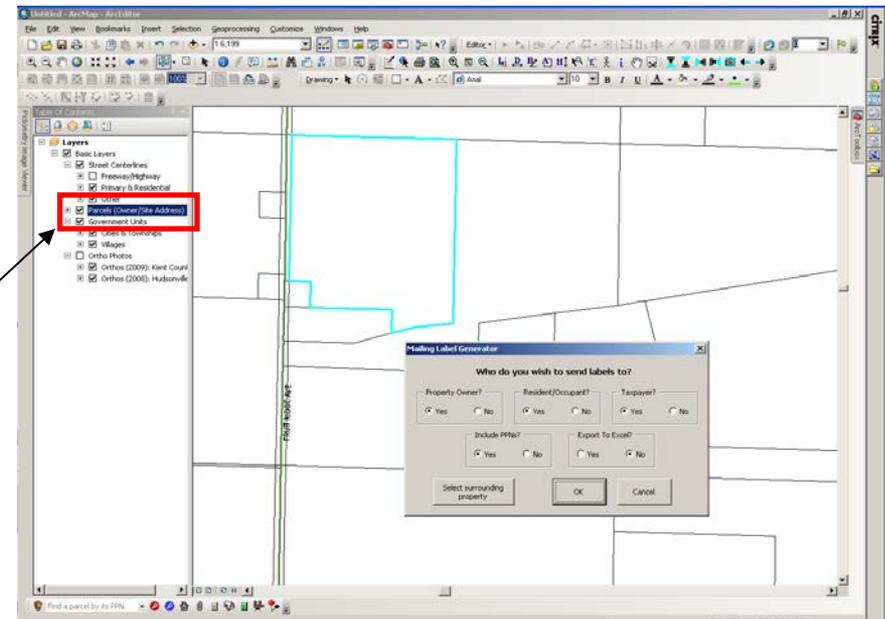
# Map Tips

- Display the property of a layer
- Map tips
  - Pointer location displays specific attribute



# REGIS Mailing Labels

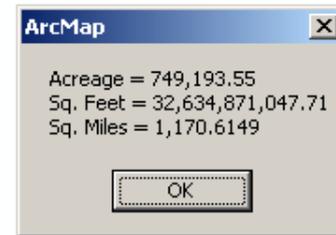
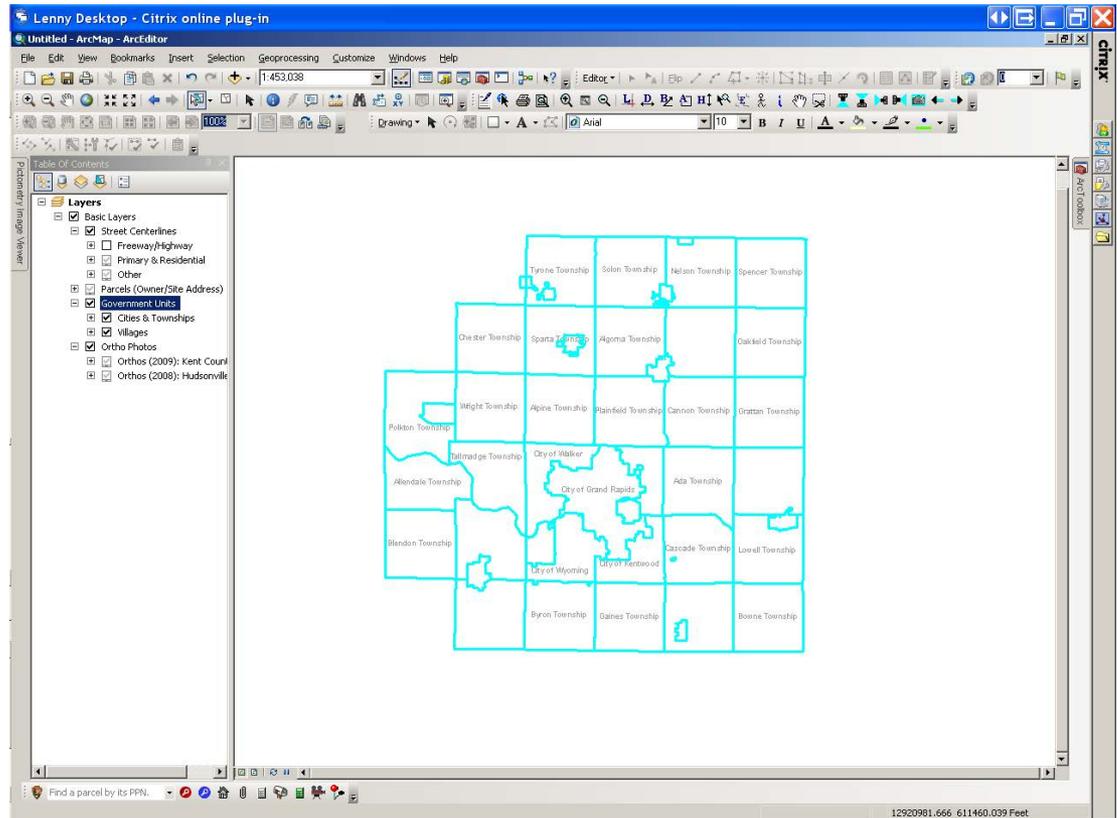
- Quick and easy way to generate mailing labels
- Accommodates up to three different types
  - Owner name and address
  - Taxpayer (lien holder) name and address
  - Occupant address
- Include or exclude PPN
- Export results to Excel



Parcels must be highlighted

# Calculating Acreage

- Select
  - Features
  - Calculator icon in toolbar



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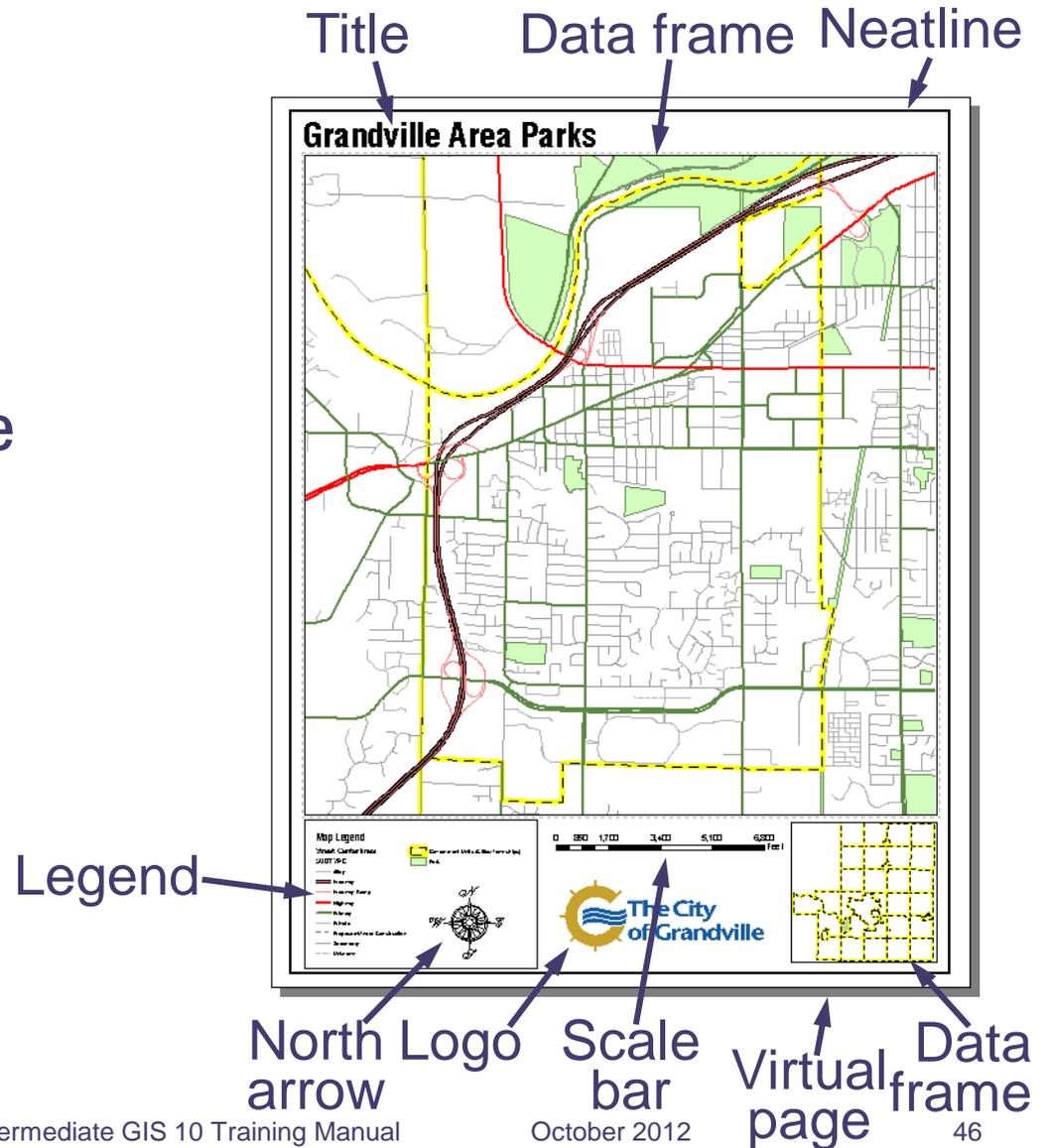
# SECTION 4

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# MAPS AND LAYOUTS

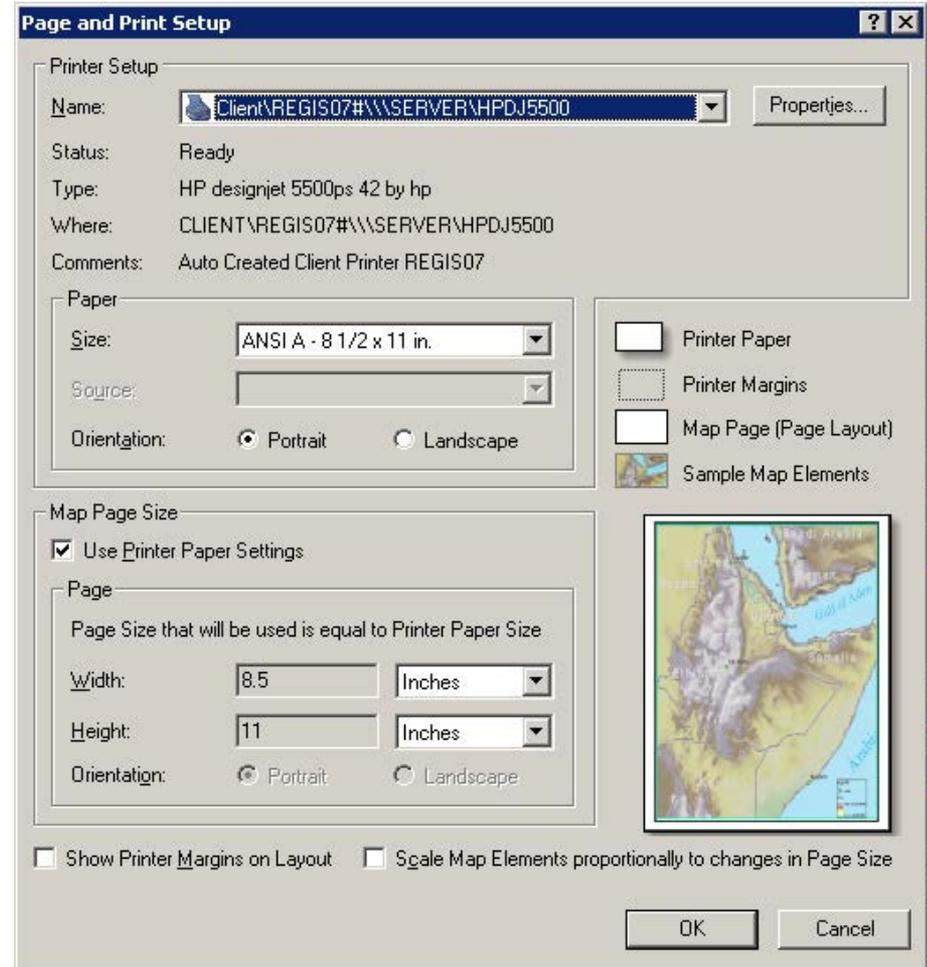
# Creating Maps in ArcMap

- Design in Layout view
- Data frames organize layers
- Map elements are added to a virtual page
- Maps stored as .mxd files
  - Data location
  - Layer properties



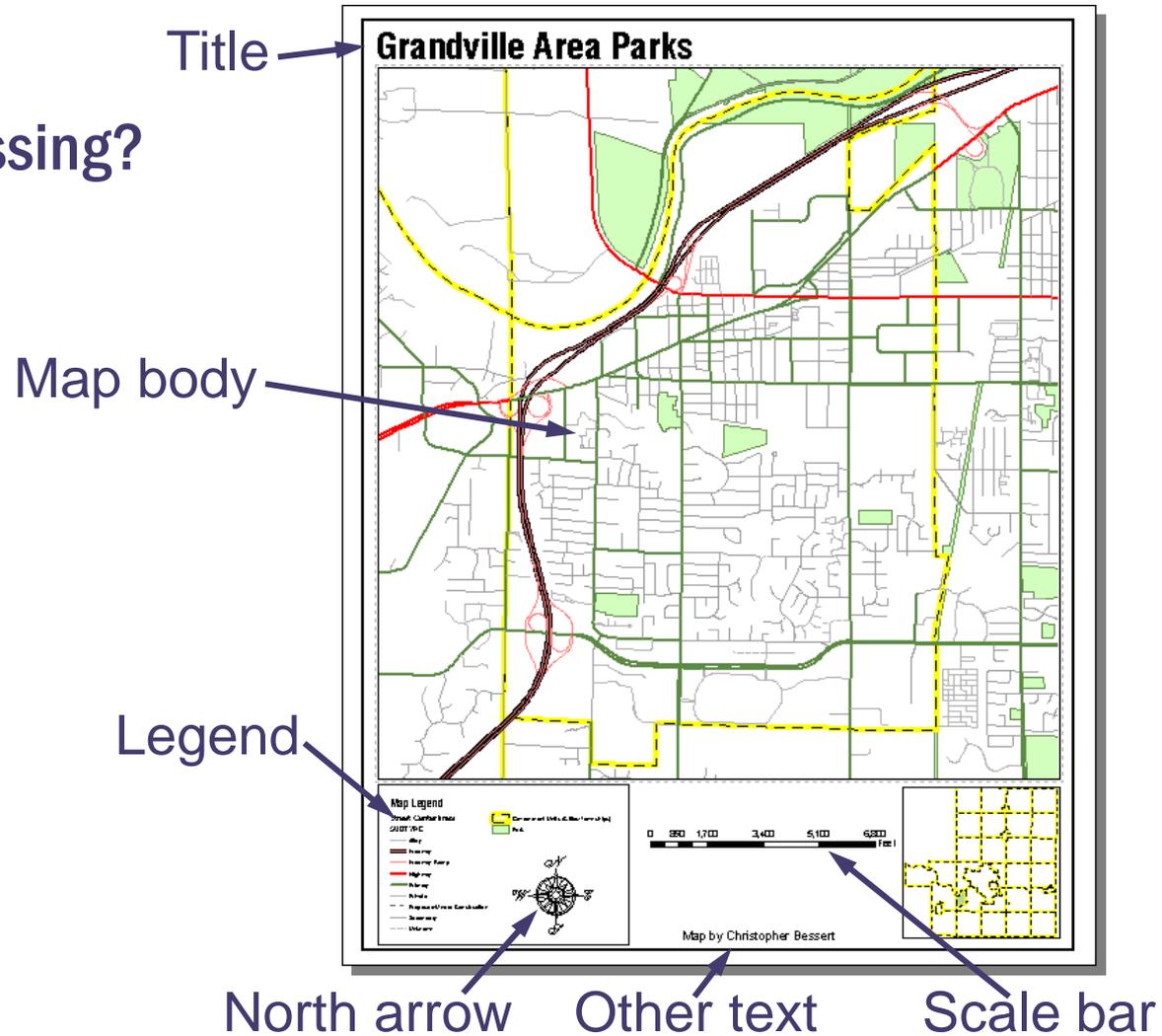
# Setting up the Page

- Remember the purpose
  - Will the map be viewed up close or at a distance?
  - What is the best page size?
  - Landscape or portrait?
  - What printer will I be using and what are my printer size limitations?

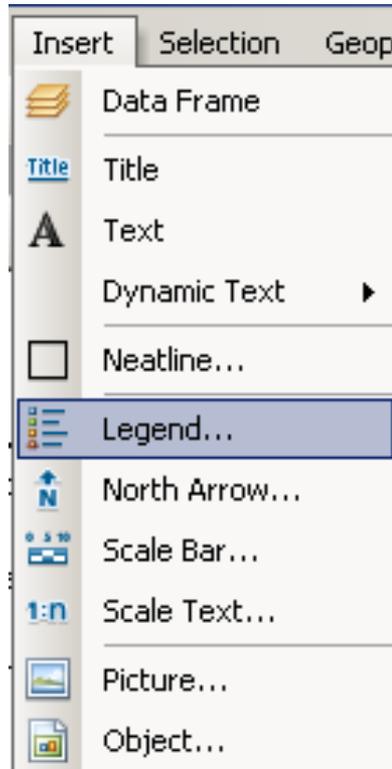


# Identifying Map Elements

- What is missing?

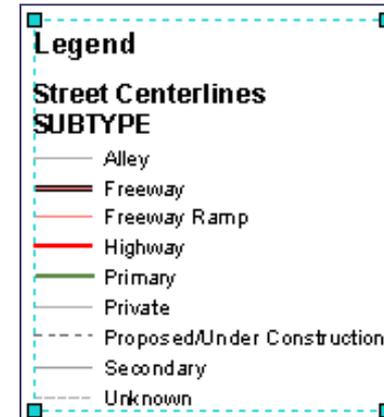


# Inserting Map Elements



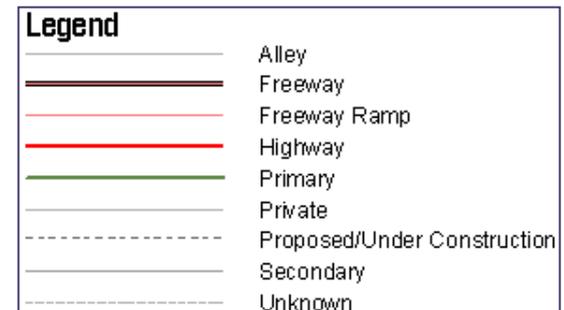
1 Choose type

2 Legend appears

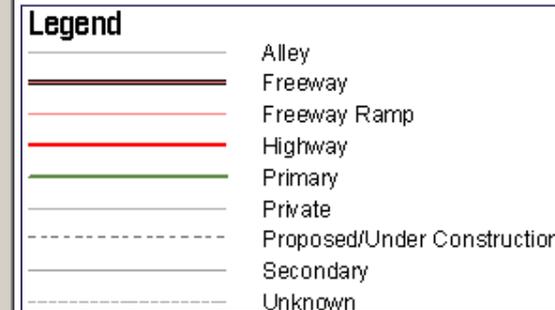
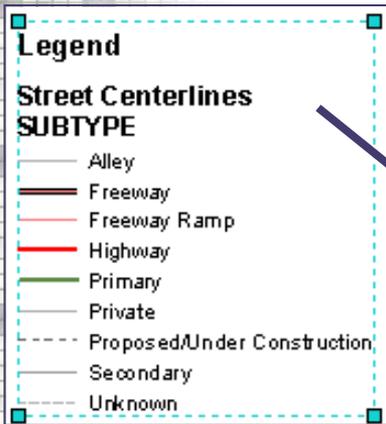
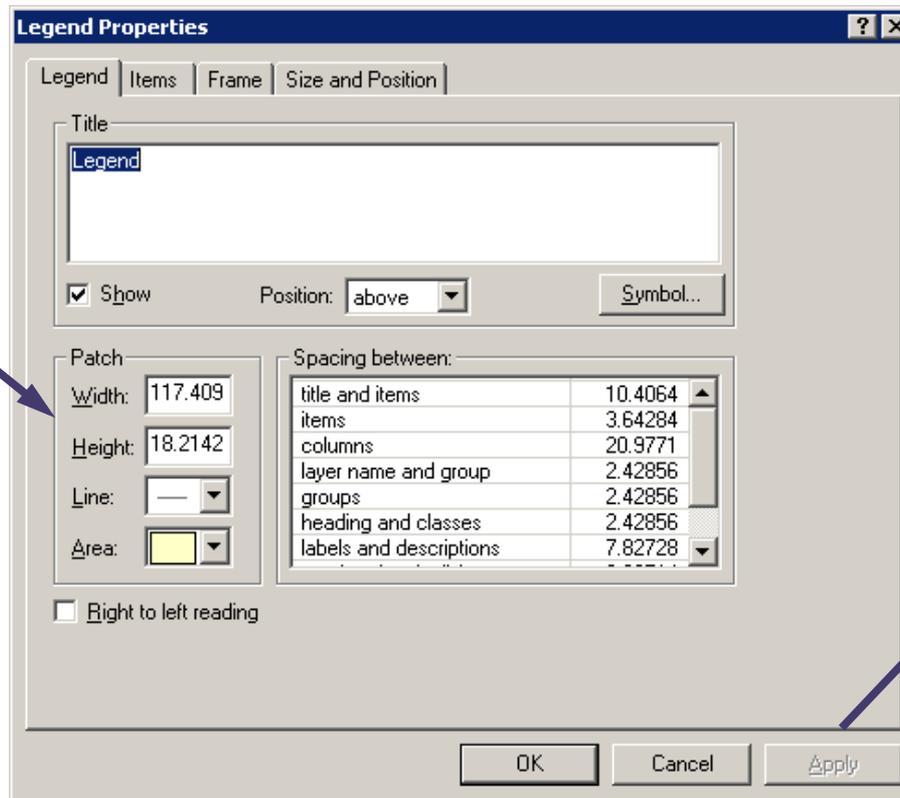


3 Drag

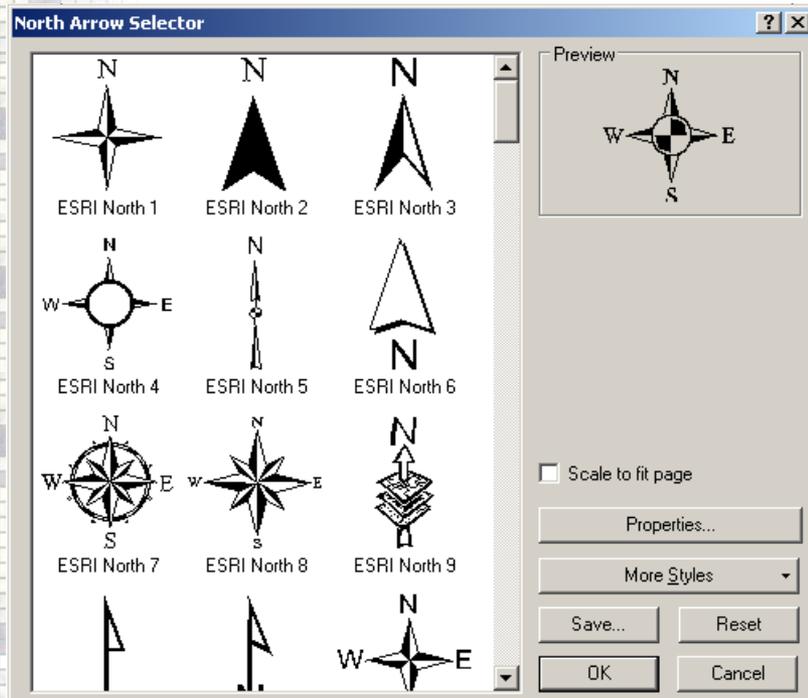
4 Modify



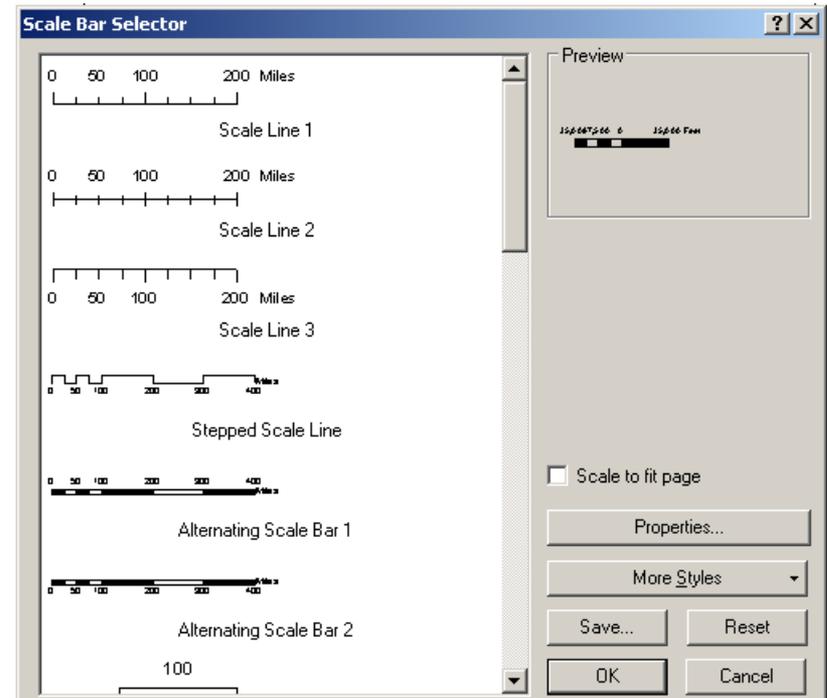
# Example of Legend Properties Dialog



# Adding a North Arrow and a Scale



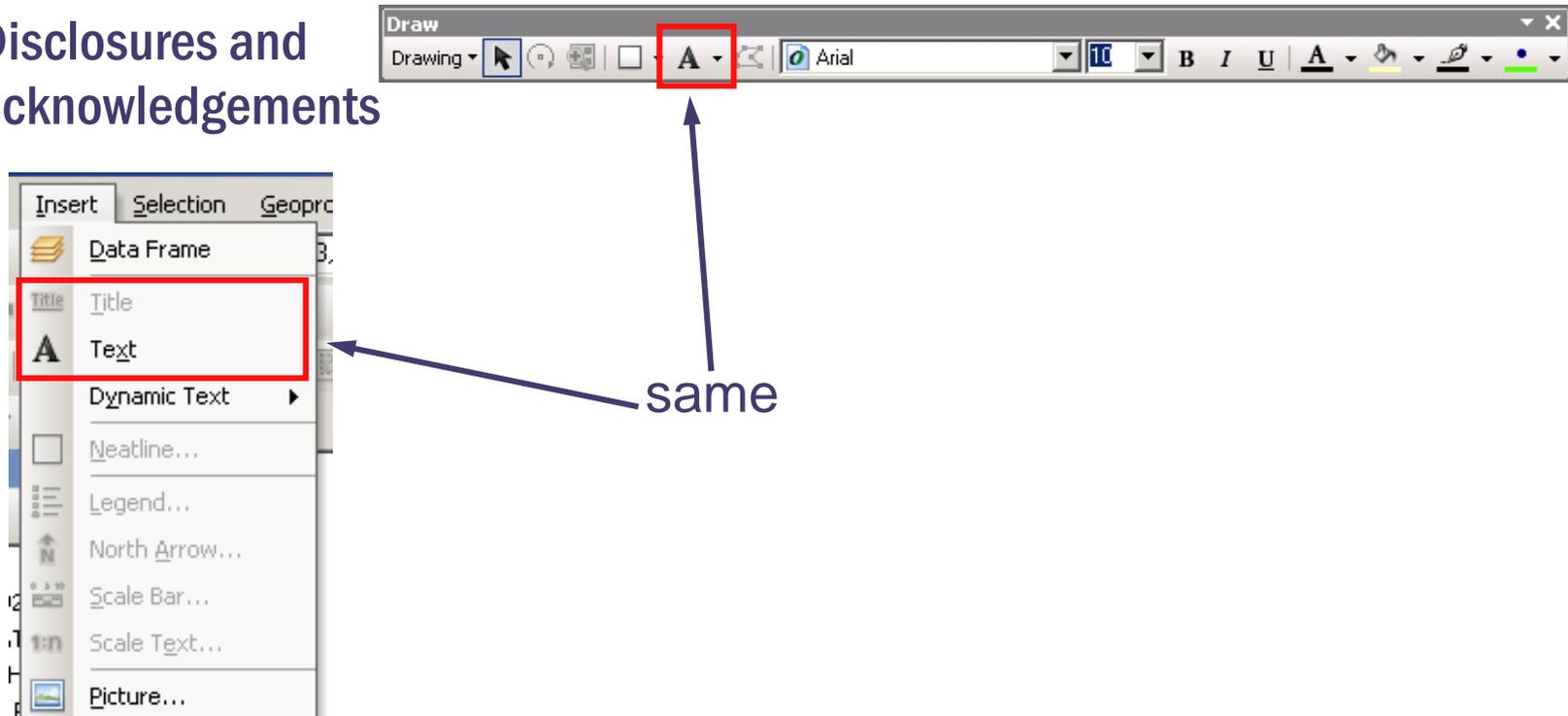
- Change angle, size and color



- Choose type, unit increments, color and font

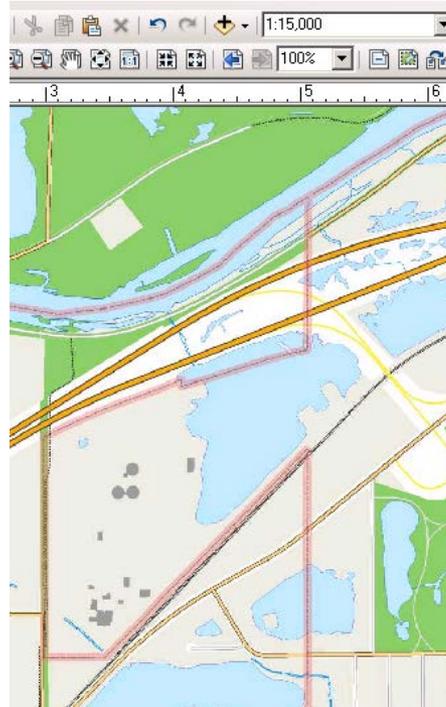
# Inserting Textual Information

- Title and author
- Data source, date, projection
- Date of map
- Disclosures and acknowledgements



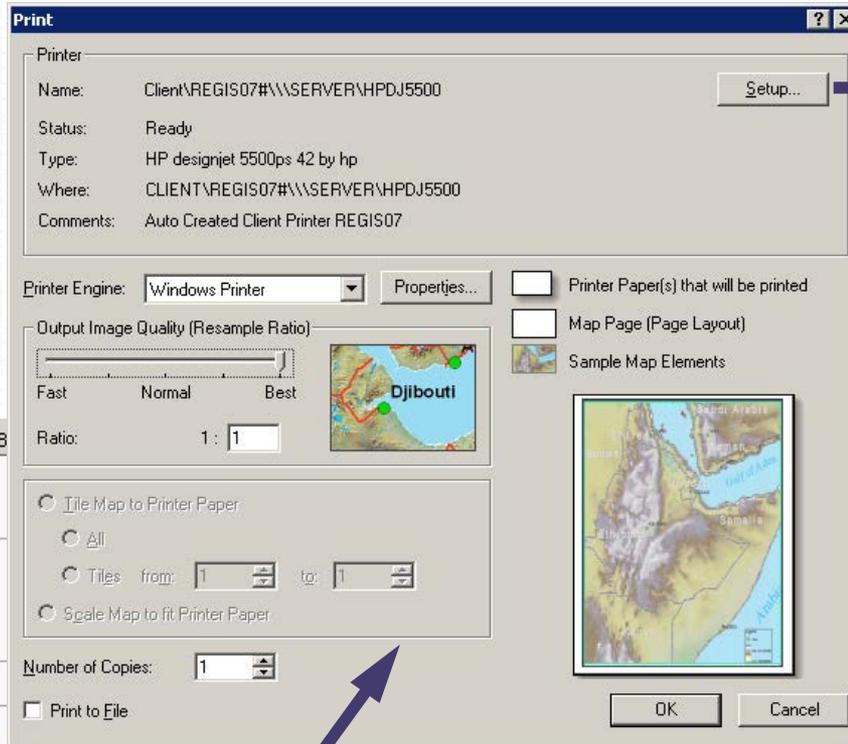
# Layout Tools

- Zoom and pan the layout page

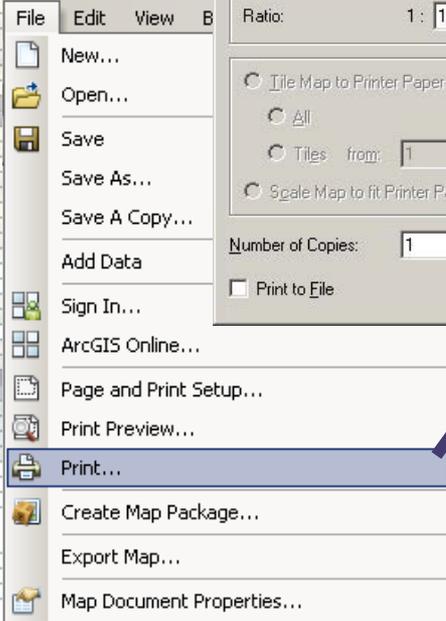


- Additional layout settings from Tools > Options

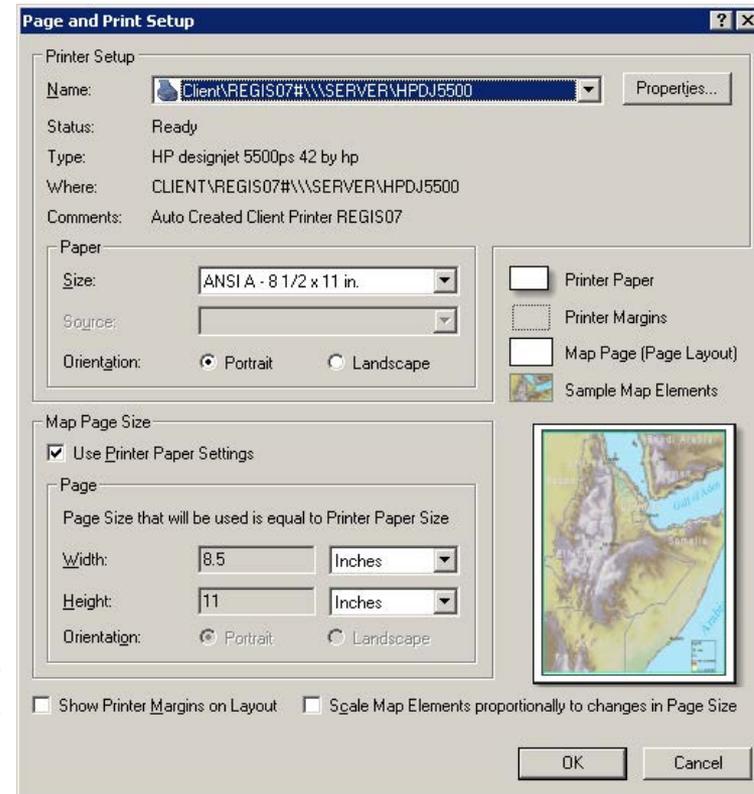
# Printing and Plotting Maps



Choose a printer engine  
ArcPress  
PostScript  
Windows

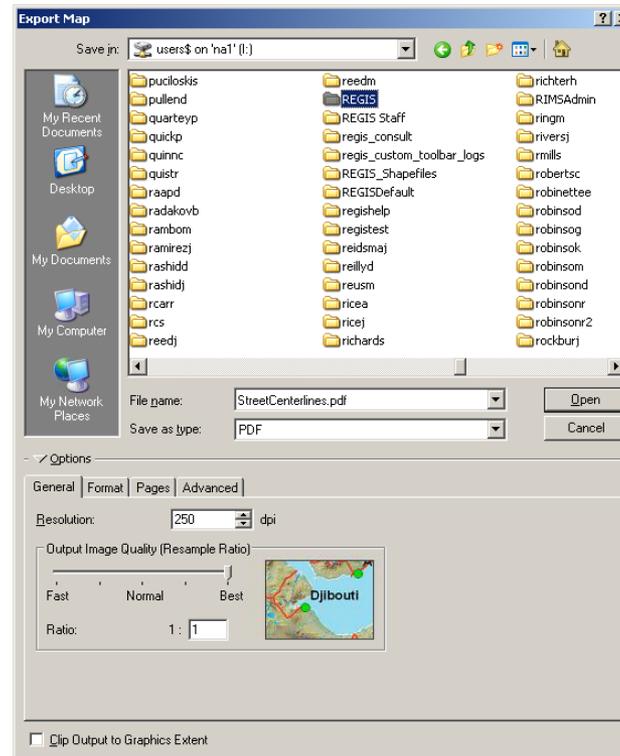
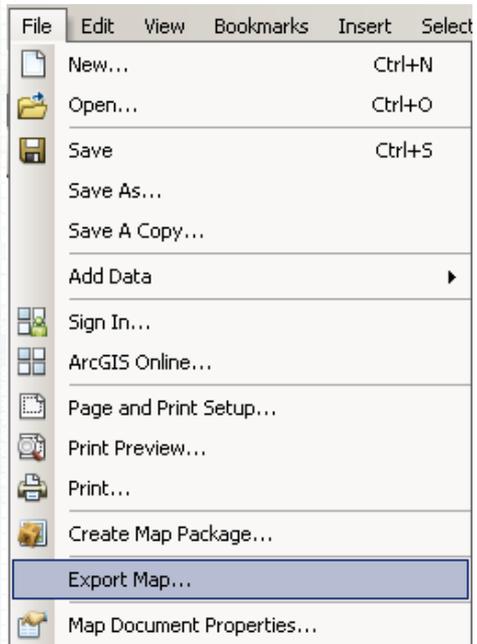


Windows  
printer engine



# Exporting Maps as Digital Files

- Export from Layout view, not Data view!
- Exports all elements from layout, not just map
- Export to raster (.gif, .jpeg, .tiff) or PDF formats



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# SECTION 5

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# OTHER APPLICATIONS

# ArcGIS Extensions: Brief Overview

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- **Spatial Analyst**

- Find suitable locations or the best path between them
- Perform integrated raster/vector analysis
- Perform distance and cost-of-travel analysis
- Perform statistical analysis based on the local environment, small neighborhoods, or zones
- Generate new data using simple image processing tools
- Interpolate data values for a study area based on samples
- Clean up a variety of data for further analysis or display

- **Network Analyst**

- Conduct drive-time analysis, point-to-point routing, route directions, service area definition, shortest path, optimum route, closest facility or origin-destination analysis

- **3D Analyst**

- Create three-dimensional views directly using your GIS data
- Analyze three-dimensional data using cut/fill, line-of-sight and terrain modeling
- View your data from a global to local perspective
- Navigate through multi-resolution terrain data seamlessly
- Do spatial analysis in two or three dimensions
- Visualize modeling or analysis results in three-dimensions
- Use three-dimensional models and symbols for realism
- Export your visualizations into videos

# ArcGIS Extensions: Brief Overview

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- **Publisher**

- Easily provide interactive maps to your clients
- Protect your maps, including cartography and data, from inappropriate use
- Control how your published maps are used and who uses them
- Create rich interactive maps that meet your clients' needs
- Provide efficient and controlled access to your enterprise GIS data
- Easily package the required data and maps for distribution
- Build custom map viewers for your maps

- **Maplex**

- Place more and better labels
- Reduce manual editing time using intelligent annotation placement
- Produce clearer maps that better communicate findings

## Exercise 2.1 – Starting ArcView

---

In this exercise, you will learn how to:

- ◆ Log in to the web-based REGIS environment
- ◆ Launch the ArcView 10 application

### Setup

From your desktop computer, open a web browser such as Internet Explorer or Firefox.

### Starting ArcView Tutorial

1. In your web browser, type in one of the following URL addresses exactly as it appears below. Depending on how your community or agency accesses REGIS, you will only type **one** of the following addresses. Contact REGIS or your local REGIS coordinator for assistance.

<http://192.168.10.38/Citrix/Metaframe/>

or

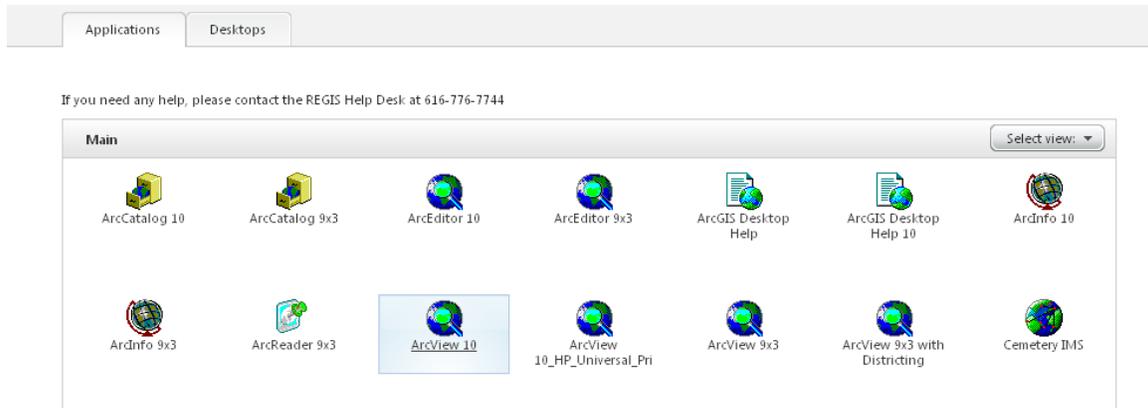
<https://csg.gvmc-regis.org/Citrix/XenApp/>

2. In the **REGIS Application Web Interface**, enter your REGIS User ID and password into the Username and Password fields. Press **Log In**.

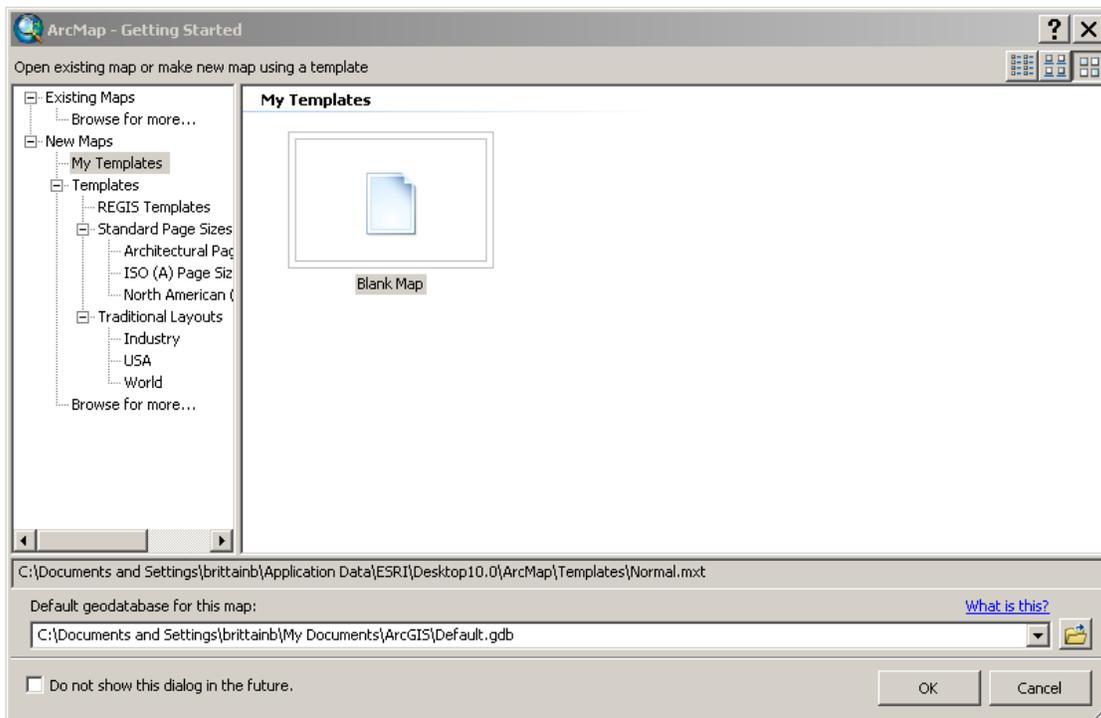


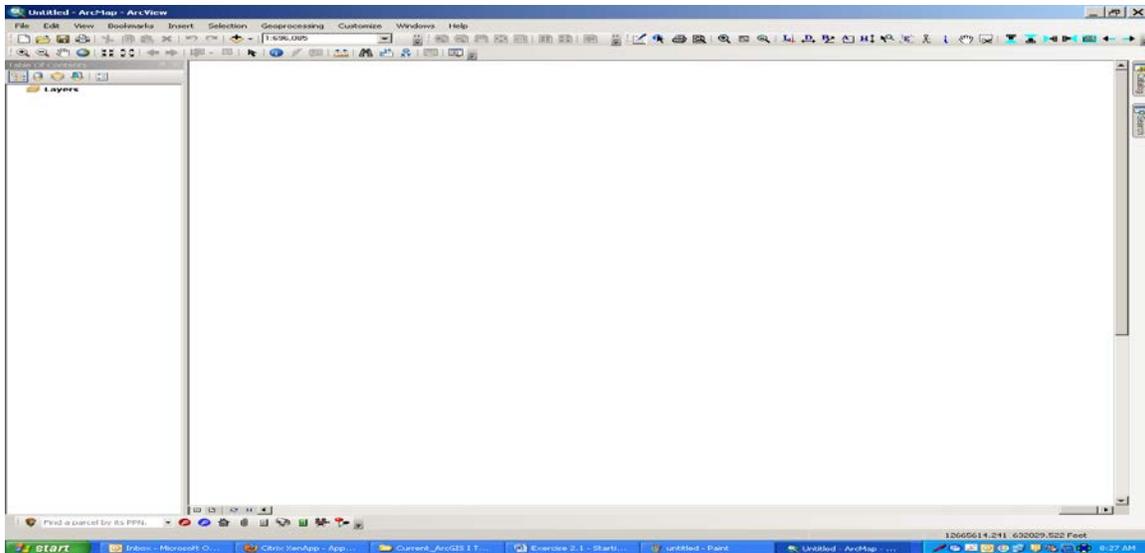
3. The first time you log in to REGIS, you will be prompted to change your password to something of your own choosing. Enter a new password and continue with the log in.

- Logging in successfully will display the REGIS Applications screen. Here you will be presented with the REGIS applications you may access. *Single-click* on the **ArcView 10** icon and wait for the program to launch. It may take several minutes for the application to open.



- ArcView's mapping application, **ArcMap**, will appear. The ArcMap interface may load with a window in front of it that includes a box entitled **Arc Map – Getting Started**. Click the **REGIS Templates** option and press **OK**.





## Additional Information

If you do not have a REGIS user account, contact the REGIS Help Desk. If you forget your password, call the REGIS Help Desk for assistance. While REGIS personnel do not have access to your password, they can reset it for you. For other types of issues related to the REGIS Application Web Interface, contact the REGIS Help Desk using the contact information below.

### REGIS Help Desk

- ◆ Telephone: (616) 776-7744
  - Monday-Friday 8:30am –Noon, 1:00pm – 5:00pm
  - Off-hours, including weekends and holidays, feel free to leave a message
  - REGIS Agency staff will attempt to resolve your problem within one business day – often within a few hours or a few minutes!
- ◆ E-mail: [regis@gvmc.org](mailto:regis@gvmc.org)
  - E-mail support is good for non-time-sensitive issues
  - REGIS Agency staff will respond via e-mail or telephone generally within one day or sooner.
- ◆ Fax: (616) 774-9292
  - If you need to fax documents to REGIS Agency staff, please be sure to label them “ATTN: REGIS Help Desk” or “ATTN: *Staff Member Name*”

Note that you may want to contact your local Information Technology (IT) or Computer Help personnel first since your question or problem may be due to a local computer or network issue.

*End of Exercise 2.1*

## Exercise 2.2 – Exploring the ArcMap Interface

In this exercise, you will learn how to:

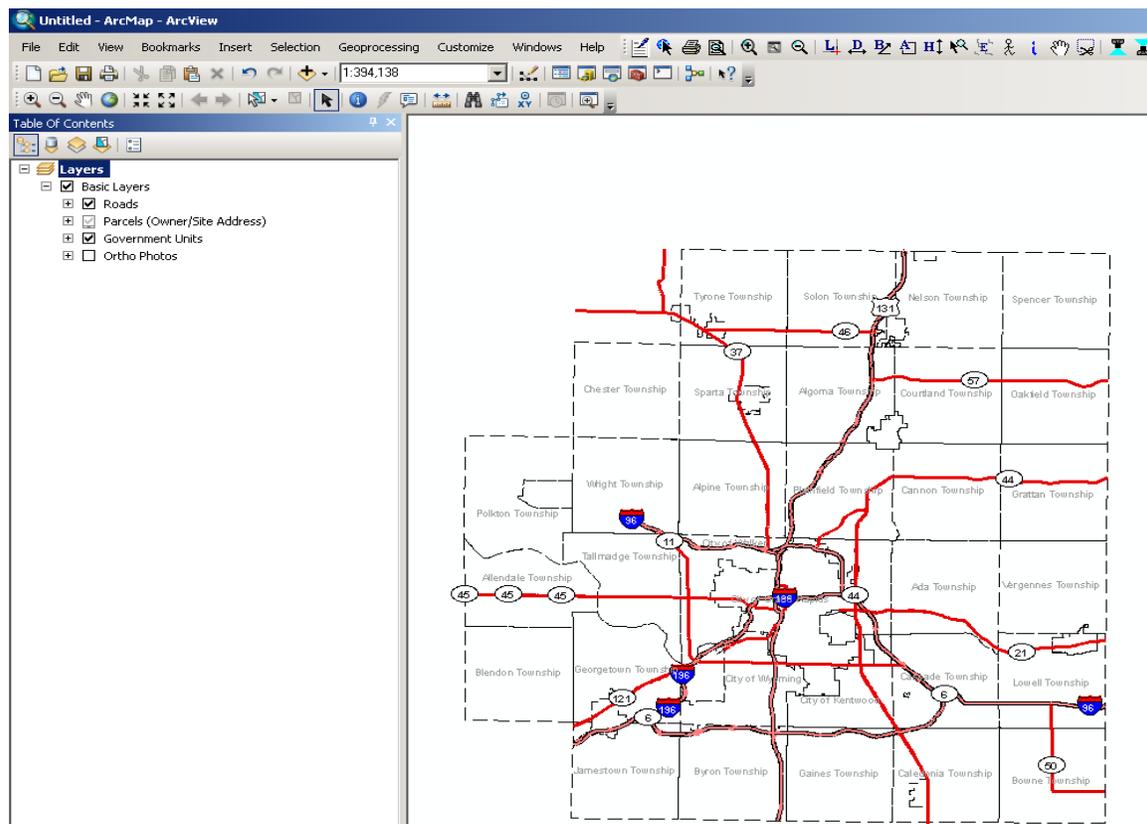
- ◆ Understand the ArcMap interface and terminology
- ◆ Customize ArcMap by moving around toolbars
- ◆ Turn toolbars and the table of contents on or off
- ◆ Access the help documentation

### Setup

Log in to the REGIS Application Web Interface and launch the ArcView 10 program.

### Exploring the ArcMap Interface Tutorial

The ArcMap interface consists of several components:

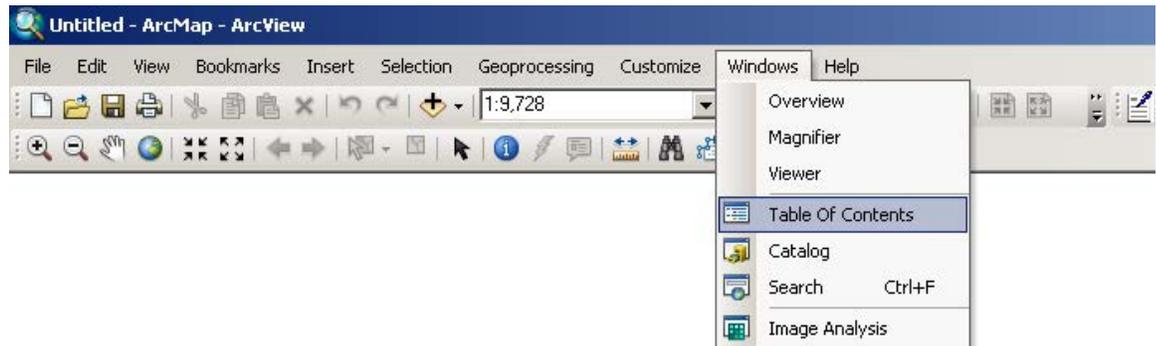


- ◆ **Map-data Area (Data View)** – The majority of the program’s window is devoted to the Data View for displaying the digital map-data layers. Each time a new ArcMap window is opened, the area will be blank since no data has been added yet. This is also commonly referred to as simply the “map.”

1. Notice in the bottom-left corner of the Data View there are four small buttons.  The first button is selected to indicate the display area is in the **Data View**.
  2. Select the page icon  to switch from Data View to **Layout View**. A map page-layout is displayed. This Layout View is used to create and print maps in ArcMap.
- ◆ **Table of Contents (TOC)** – Positioned on the left side of the Data View (unless you change the default location – discussed below) is the Table of Contents. The TOC lists all the data layers in the Data View. The first time ArcMap is opened or when a new map project is started, the TOC will be empty except for the Layers data frame icon.  **Layers**

1. Change the width of the Table of Contents by moving your mouse cursor to right edge of the TOC and wait for the resize icon to appear. Drag the border left or right to change the size. This may be necessary to see the entire names of the data layers you will add.
2. Turn off the Table of Contents (which can happen by accident on occasion) by *left-clicking* on the x in the upper-right corner.

 Turn it back on by going to the **Window** menu item at the top of the screen and choosing **Table of Contents**.



3. Many ArcMap components, including the Table of Contents, are “**dockable**”. This means they can be moved around the interface and docked somewhere else. For example, at the top of the TOC, *double-click* . The TOC should now become undocked and capable of being moved around the screen by *left-clicking and dragging*. When it approaches another location, the outline of the TOC changes shape as it tries to fit in to that location.

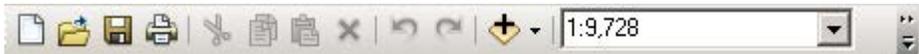
- Return the TOC to its original location by moving it there or *double-clicking* again on .

- ◆ **Toolbars** – In addition to the Data View and the Table of Contents, ArcMap also contains a number of buttons at the top and bottom of the screen. These buttons are first separated on toolbars based on similar or related functionality. Then each toolbar is further divided by more specific functions. Each within-toolbar group begins with an icon  and then displays a suite of related icons. The following are some of the common toolbars.

#### Main Menu



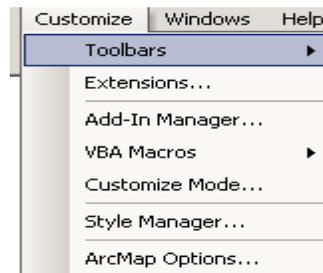
#### Standard Menu



#### Tools



- Each toolbar is also dockable so briefly test moving around the toolbars and docking them in different spots. To undock a toolbar, *left-click and hold* on the left edge of the toolbar and drag it somewhere else.
- Toolbars can be turned off by clicking on the small x  that appears when a toolbar is not docked. To turn a toolbar back on, go to the **Customize** menu, select **Toolbars** and choose the name of the toolbar to turn back on. Notice that ArcMap contains dozens of other toolbars that are turned off but can be used in special circumstances.



- ◆ **REGIS Toolbar** – REGIS has created their own toolbar that will usually appear at the bottom of the ArcMap window.

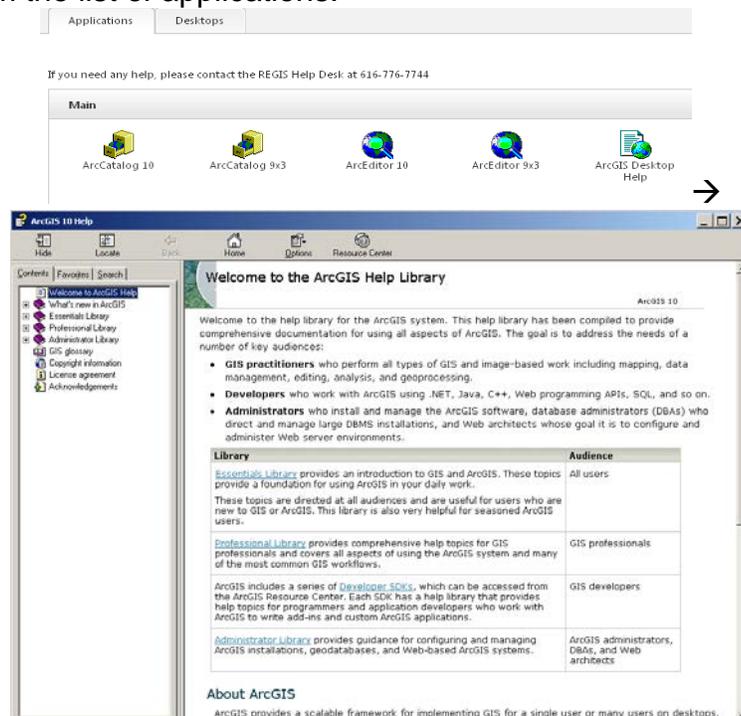


## Getting Help and Technical Support

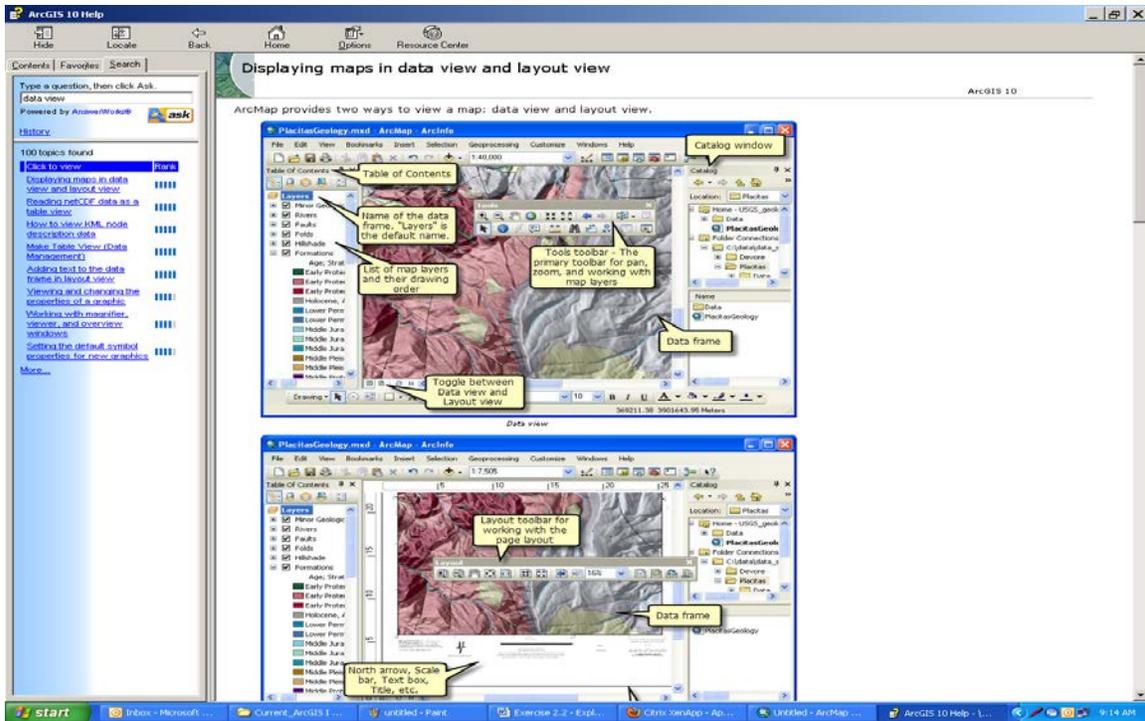
1. ESRI, the software developer of ArcGIS, offers several outlets for getting help and documentation on using ArcMap software.
  - a. The **ArcGIS Desktop Help** manual can be accessed in the **Help** dropdown menu or through the keyboard shortcut **F1** within ArcGIS.



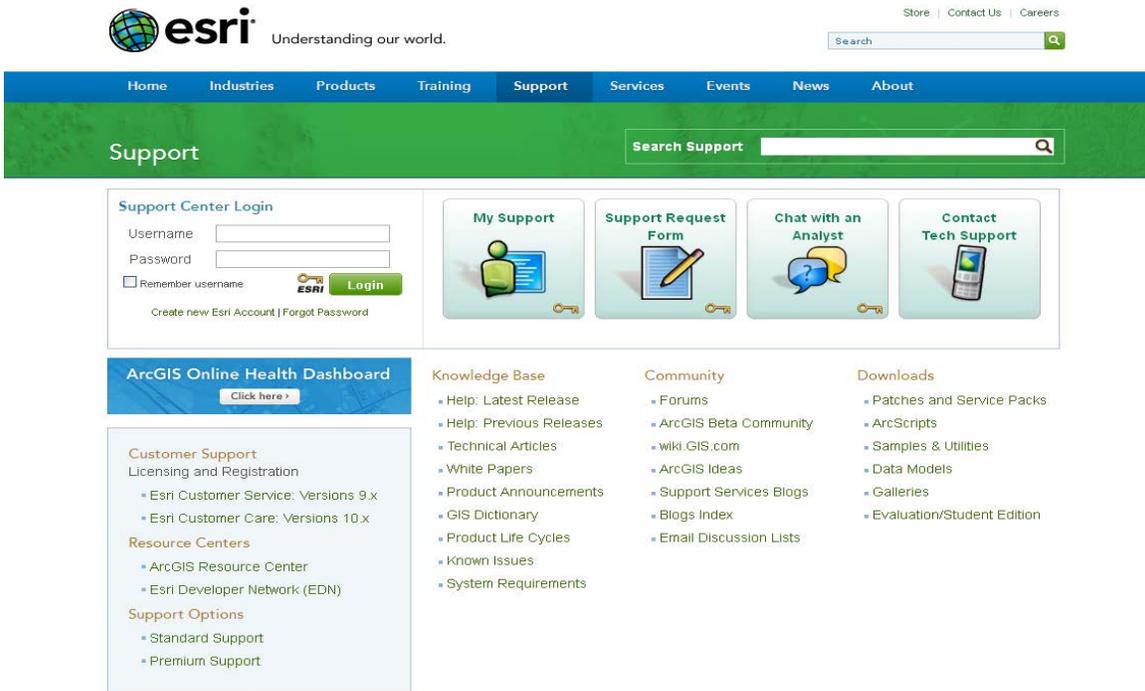
- b. The **ArcGIS Desktop Help** manual can also be accessed by returning to the REGIS Application Web Interface and selecting it from the list of applications.



2. Use the Contents, FavoritesIndex and Search tabs to find a section of interest. For example, select the **Search** tab and type **data view**. Notice that the topic has many sections. *Left-click* on the section named **displaying maps in data view and layout view**.



- Another location for technical support is the **ESRI Support Center**. Open a web browser and enter the URL [support.esri.com](http://support.esri.com). The search box on the top of the screen provides a quick way to search the entire support site for information on your question.



## Additional Information

See the **Mapping and visualization in ArcMap** section in the ArcGIS Desktop Help manual.

- ⊕  What's new in ArcGIS
- ⊕  Essentials Library
- ⊖  Professional Library
  -  What's in the Professional Library
- ⊕  Data Management
- ⊖  Mapping and Visualization
  -  **Mapping and visualization in ArcGIS Desktop**
  -  What is ArcMap?
  -  A quick tour of ArcMap
  -  Essential ArcMap vocabulary

See the **Customizing the user interface** section in the ArcGIS Desktop Help manual.

- ⊖  Guide books
  -  Introduction to the guide books
  - ⊕  Defense and intelligence
  - ⊕  Finding a route
  - ⊕  Geocoding
  - ⊕  Linear referencing
  - ⊕  Map projections
  - ⊕  Interoperability and standards support
  - ⊖  Customizing the ArcGIS Desktop interface
    -  **About configuring the user interface**
    -  Basic user interface elements

*End of Exercise 2.2*

## Exercise 2.3 – Adding and Managing Data Layers

---

In this exercise, you will learn how to:

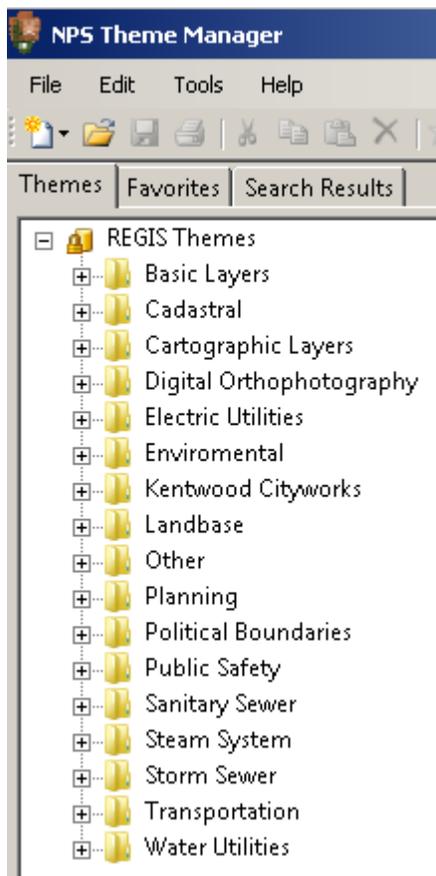
- ◆ Add and remove data layers to ArcMap
- ◆ Rearrange, rename and copy data layers
- ◆ Add and remove data frames

### Setup

Log in to the REGIS Application Web Interface and launch ArcView 10.

### Adding and Managing Data Layers Tutorial

1. Press the **NPS Theme Manager** button  in the REGIS toolbar (bottom of screen). A Theme Manager window is displayed. Expand **REGIS Themes**; this shows all the possible REGIS data layers grouped into categories.

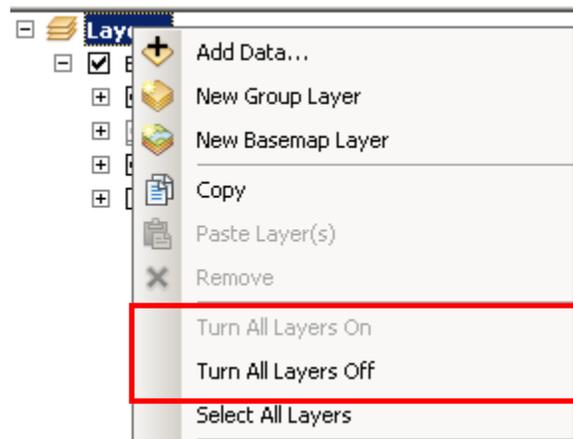


2. In the Basic Layers folder, select the **Basic Layers (Group Layer)** by *left-clicking* and dragging it onto the map. Once added, the layers will appear

individually in the Table of Contents (TOC).



3. The order of the layers in the TOC determines how they are displayed in the Data View. Rearrange the layers by *left-clicking and holding* on a layer name and then dragging it up or down in the list.
4. Layers can be turned on or off individually by selecting the checkbox  next to their name. For bulk changes, *right-click* on the data frame name and choose **Turn All Layers On** or **Turn All Layers Off**.



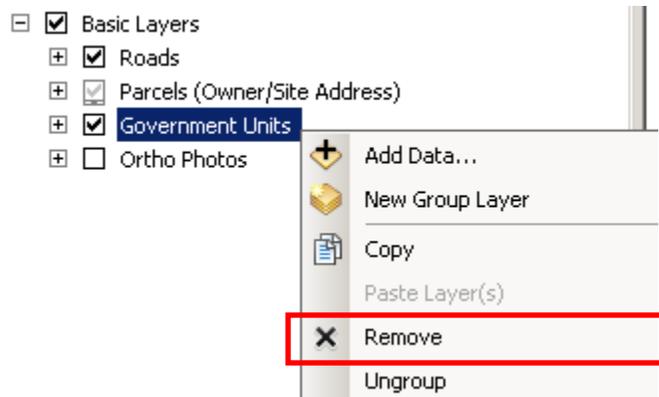
5. Rename a map layer by highlighting it in the TOC and pressing F2. For example, highlight the Street Centerlines layer, press **F2**, and rename it to Roads.



6. Rename the data frame in the same manner – highlight it, press **F2** and change the name to something more appropriate.



7. Remove a layer from the map by *right-clicking* on a layer name and selecting **Remove**. This and other actions can also be undone by going to the **Edit** menu and selecting **Undo**.



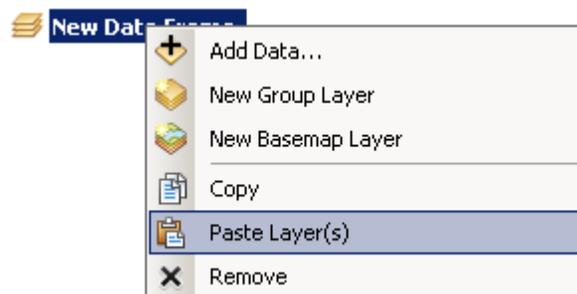
8. Add a second data frame to ArcMap by going to the **Insert** menu and choosing **Data Frame**. Multiple data frames are often used when printing page layouts that have multiple maps on the same page.



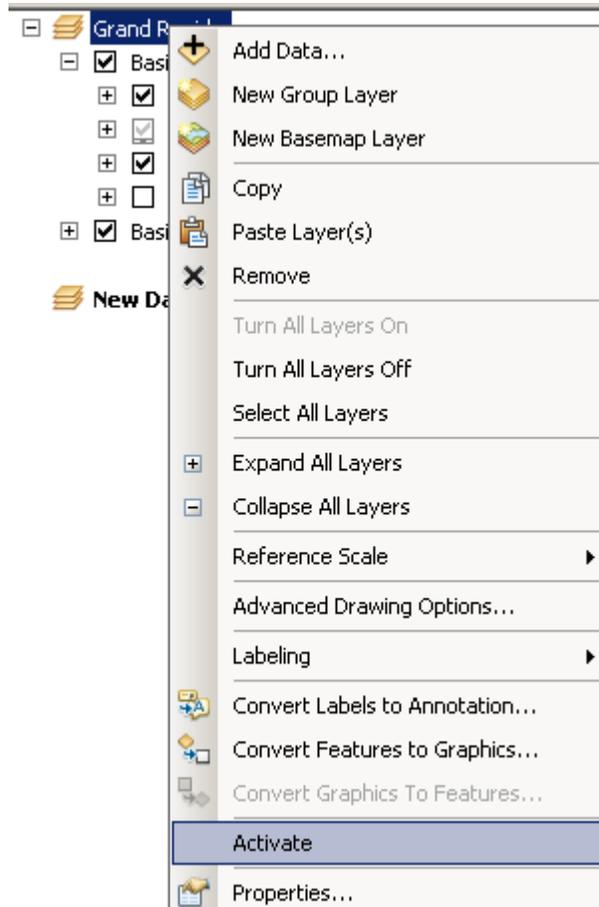
9. **Return to the layers in the first data frame** and find the Parcels layer. *Right-click* on the layer name and select **Copy**.



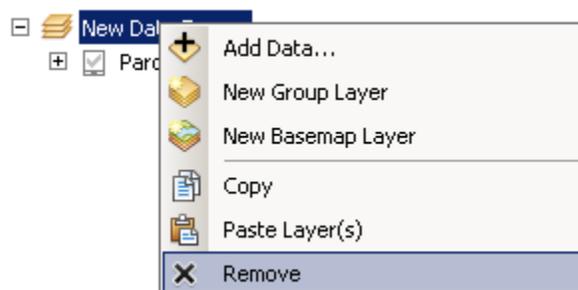
10. **Back in the newly added data frame**, *right-click* on the data frame name and choose **Paste Layer(s)**. The Parcels layer has now been added to the second data frame.



11. To go back to viewing data from the first data frame, *right-click* on that name and choose **Activate**. Notice how the data frame name-text switches to bold.



12. Remove the second data frame by *right-clicking* on it and choosing **Remove**.



## Additional Information

See the **Working with layers** section in the ArcGIS Desktop Help manual.

- [-]  Working with layers
  -  What is a layer?
  -  A quick tour of map layers
  -  Essential layer vocabulary
- [-]  Managing layers
  -  Adding layers to a map
  -  Working with group layers
  -  Adding x,y coordinate data as a layer
  -  Changing a layer's drawing order
  -  **Working with basemap layers**
  -  Setting layer properties
  -  Displaying layers at certain scales
  -  Displaying a subset of features in a layer
  -  Repairing broken data links
  -  Renaming a layer
  -  Viewing metadata from the Table of Contents
  -  Saving layers and layer packages
- [+]  Adding and working with query layers

*End of Exercise 2.3*

## Exercise 2.4 – Moving Around the Map

---

### In this exercise, you will learn how to:

- ◆ Use the map navigation controls in ArcMap
- ◆ Set the full extent of your map to a specific government unit
- ◆ Zoom to a particular latitude/longitude location

### Setup

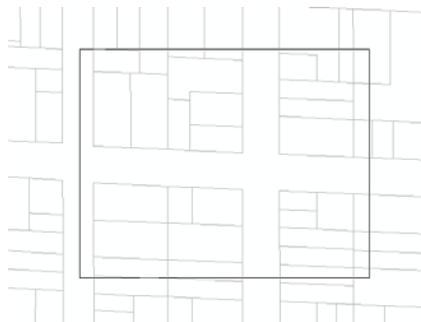
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Moving Around the Map Tutorial

1. Locate the Tools toolbar in the ArcMap interface.



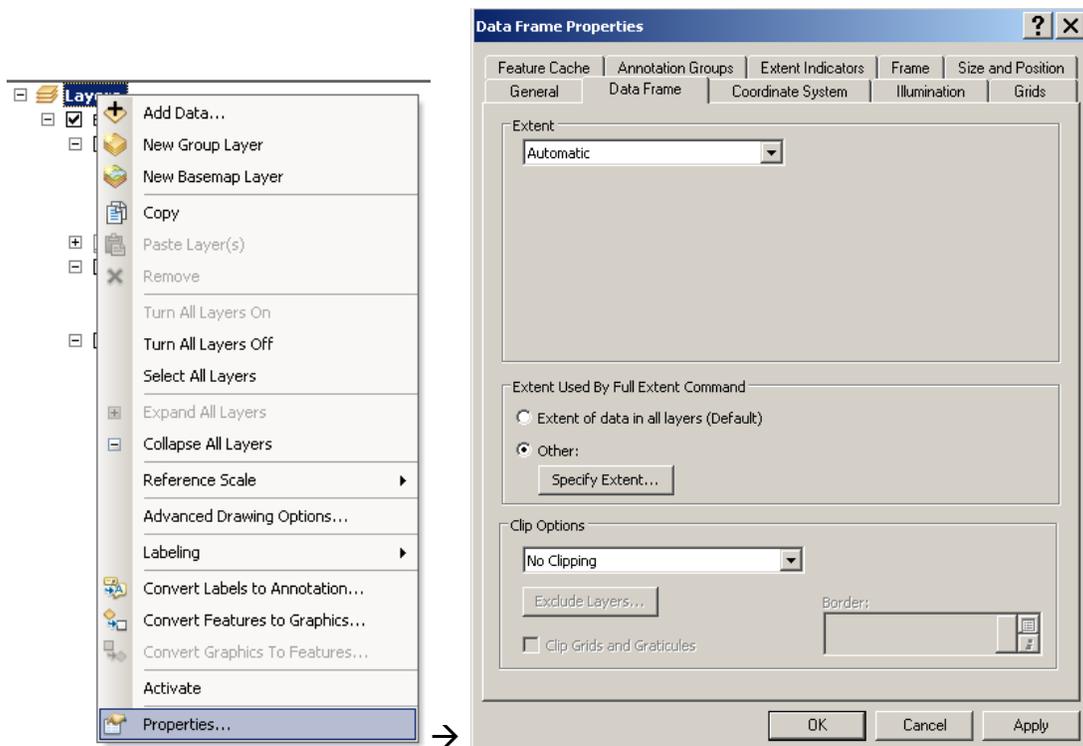
2. Begin by selecting the **Zoom In**  tool. There are two ways to use this tool. First, move the mouse cursor to a location of interest on the map and *left-click* once. This will zoom in and re-center the map on wherever you clicked. A second option involves drawing a box to zoom into the area of the box. *Left-click and hold* the zoom cursor on the map, drag the mouse to create a rectangle in any direction. Release the mouse button to zoom to the area inside the rectangle you drew.



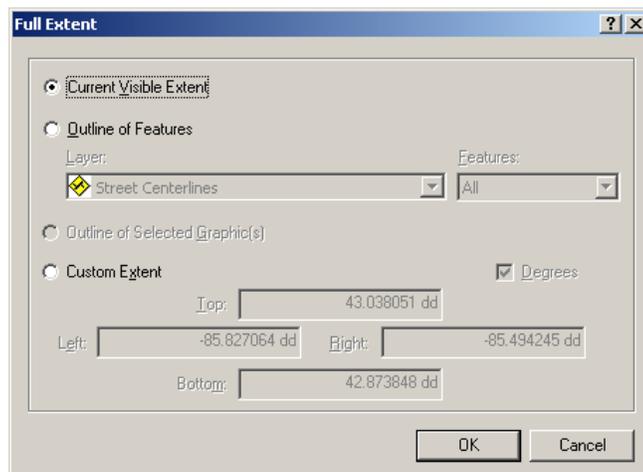
3. To pan (i.e., move) the map in any direction, use the **Pan**  tool. *Left-click and hold* on the map and then drag it any direction.
4. The **Zoom Out**  tool works in a similar fashion as the Zoom In tool but more often you will probably use the **Fixed Zoom Out**  tool. *Left-click* on the tool to zoom farther out at consistent intervals. Or use the **Fixed**

**Zoom In**  button to zoom back in on the data. Finally, use the **Full Extent**  button to return the full extent of all data layers in the data frame.

- The Full Extent button can also be customized to zoom to a specific map extent instead of the entire map. For example, it may be more efficient to always return to the extent of your city or township. First use the **Zoom In**  tool to navigate to the extent of your local unit. *Right-click* on the data frame name  **Layers**, choose **Properties** and select the **Data Frame** tab. In the box entitled **Extent Used By Full Extent Command**, choose the **Other** option and select **Specify Extent**.

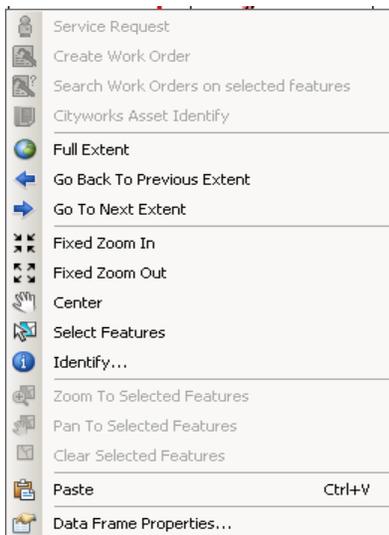


- The Full Extent window will appear. Choose the **Current Visible Extent** option and Press **OK** twice to return to the map. Navigate somewhere else in the map and then *left-click* the **Full Extent**  button. Instead of zooming to the entire



map, it zoomed to the extent you defined. This will remain in effect until you return to the **Data Frame** tab and switch back to the **Extent of data in all layers (Default)** option.

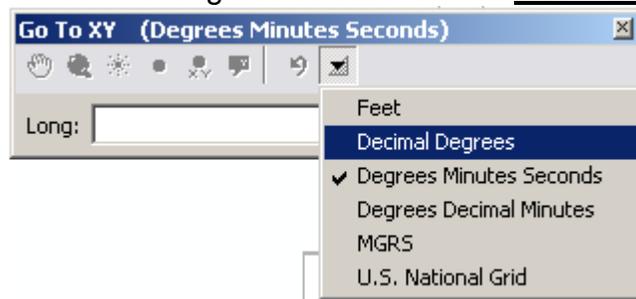
7. The **Go Back to Previous Extent**  and **Go To Next Extent**  buttons allow you to return to previous extents you had zoomed to in the map. Try this by pressing the Go Back to Previous Extent button several times and notice how it returns to views you were just looking at.
8. Additionally, many of the previously mentioned navigation tools can be accessed by *right-clicking* on the map while in the Data View.



9. Another navigation option is the **Go To XY**  tool for zooming to an exact location. *Left-click* on the tool to display the input form.



10. Use the black down-triangle to select the units **Decimal Degrees**.



11. Enter the following values for longitude and latitude.



12. Pressing enter immediately converts the input to the degrees-minutes-seconds format and also zooms and flashes the location on the map. Use the **Flash**  button to highlight the location again. Press the **Add Callout**  button to add a text box on top of the data showing the location and its coordinates.



## Additional Information

See the **Moving around the map** section of the ArcGIS Desktop Help manual.

- [-]  Mapping and Visualization
  -  **Mapping and visualization in ArcGIS Desktop**
  -  What is ArcMap?
  -  A quick tour of ArcMap
  -  Essential ArcMap vocabulary
- [-]  ArcMap basics
  -  Starting ArcMap
  -  Opening a map document
  -  Adding layers to a map
  -  Using data frames
  -  Coordinate systems for map display
  -  Specifying a coordinate system
  -  Using the table of contents
  -  Using symbols and styles
  -  Referencing data in the map
  -  Pausing the map's drawing
  -  Using page layouts
  -  Printing a map in ArcMap
  -  Saving a map
  -  Adding data from ArcGIS online
  -  Creating a map package
  -  Using search in ArcGIS
  -  Setting ArcMap options
  -  Map automation using geoprocessing
  -  Using ArcGIS extension products
  -  Keyboard shortcuts in ArcMap
- [-]  Navigating maps
  -  Displaying maps in data view and layout view
  -  Setting a custom full extent for your data frame
  -  Quick ways to navigate data frames and layouts
  -  Using the Go To XY tool
  -  Working with map scales
  -  Working with data frame reference scales
  -  Working with magnifier, viewer, and overview windows
  -  Using spatial bookmarks
  -  Using My Places
  -  Working with the feature cache

*End of Exercise 2.4*

## Exercise 2.5 – Working with Spatial Bookmarks

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In this exercise, you will learn how to:

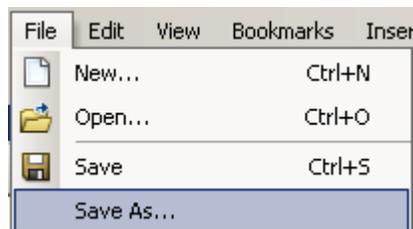
- ◆ Save ArcMap project files (MXDs)
- ◆ Create and manage spatial bookmarks in an ArcMap project
- ◆ Create and manage spatial bookmarks using My Places

### Setup

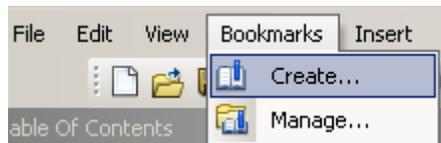
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Creating and Managing Bookmarks Tutorial

1. Spatial bookmarks can be stored in a specific ArcMap project which we will first create. To save an ArcMap project, go to the **File** menu and choose **Save As...**



2. Navigate to a location in your REGIS user directory and name the project, in this case use **BookmarksDemo.mxd**. All ArcMap project files have the MXD file extension and are often referred to as just “MXDs.”
3. Zoom to a particular location in the data that would be logical place for a bookmark (e.g., City Hall, subdivision, golf course, lake, etc.). Go to the **Bookmarks** menu and choose **Create**.



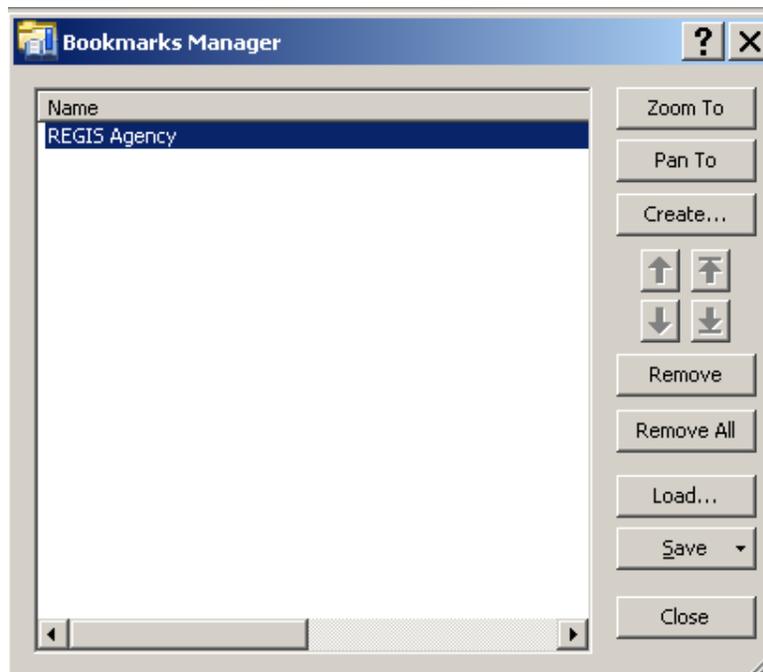
4. Enter an appropriate name for the spatial bookmark.



5. Press **OK** and the bookmark has been added to the ArcMap project. To ensure the project is saved with the new bookmark, *click* the **Save**  button.
6. Press the **Full Extent**  button to return the map to entire extent. Return to the **Bookmarks** menu again. Notice that a new entry exists for the bookmark you created.

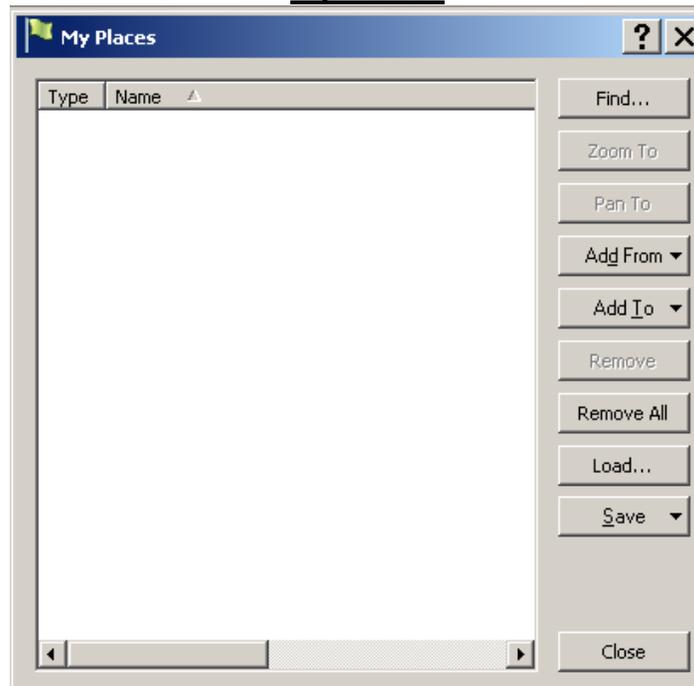


7. Select the bookmark name and the Data View will be automatically zoomed to the location of your bookmark. It is important to remember that these bookmarks are only accessible in this ArcMap project.
8. To remove the bookmark, return to the Bookmarks menu and choose **Manage**. A Spatial Bookmarks window appears where you can select the bookmark name and choose **Remove**.



9. ArcMap offers a second option for saving spatial bookmarks call **My Places**. My Places stores spatial bookmarks in a separate file that can be

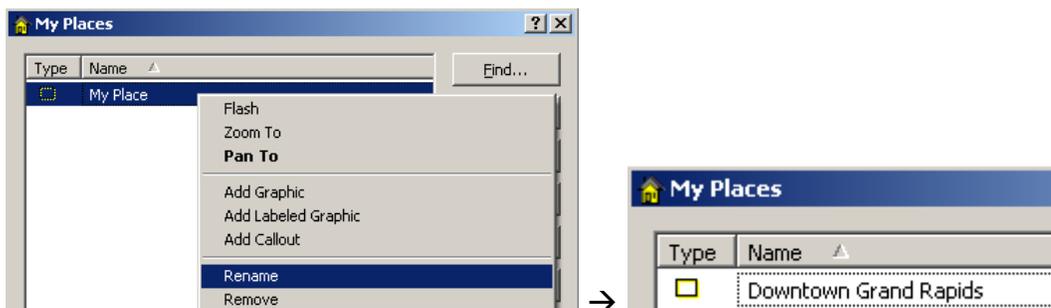
accessed in any ArcMap project you create. Go to the **Data Frames Tools** toolbar and select  **My Places**.



10. Add a bookmark to My Places by selecting the **Add From** button and choosing **Current Extent**.

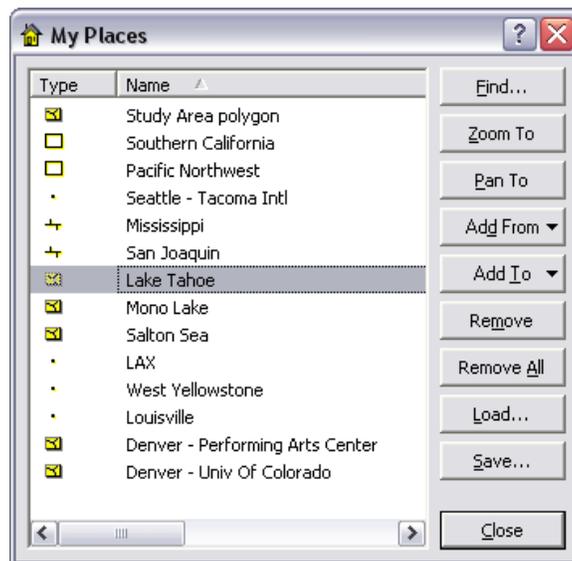


11. A new bookmark is created and added to the list named **My Place**. *Right-click* on the name and select **Rename**. Type in an appropriate name for the location. This bookmark will be accessible in any ArcMap project you open or create.



12. My Places bookmarks can be zoomed to by selecting one in the list and *clicking* the **Zoom To** or **Pan To** buttons. Use the **Remove** or **Remove All** buttons to delete places.

13. Notice that in the **Type** column, a black and yellow rectangle  indicates that the bookmark you created is for a map extent. My Places can also store the locations of specific features and addresses. These types of places would appear with different icons as shown below. My Places will be discussed further in upcoming exercises and in the Advanced GIS training class.



## Additional Information

See the [Using spatial bookmarks](#) and [Using My Places](#) sections of the ArcGIS Desktop Help manual.

- [-]  ArcMap basics
  -  Starting ArcMap
  -  Opening a map document
  -  Adding layers to a map
  -  Using data frames
  -  Coordinate systems for map display
  -  Specifying a coordinate system
  -  Using the table of contents
  -  Using symbols and styles
  -  Referencing data in the map
  -  Pausing the map's drawing
  -  Using page layouts
  -  Printing a map in ArcMap
  -  Saving a map
  -  Adding data from ArcGIS online
  -  Creating a map package
  -  Using search in ArcGIS
  -  Setting ArcMap options
  -  Map automation using geoprocessing
  -  Using ArcGIS extension products
  -  Keyboard shortcuts in ArcMap
- [-]  Navigating maps
  -  Displaying maps in data view and layout view
  -  Setting a custom full extent for your data frame
  -  Quick ways to navigate data frames and layouts
  -  Using the Go To XY tool
  -  Working with map scales
  -  Working with data frame reference scales
  -  Working with magnifier, viewer, and overview windows
  -  Using spatial bookmarks
  -  Using My Places
  -  Working with the feature cache

*End of Exercise 2.5*

## Exercise 2.6 – Map Scale and Scale-Dependent Display

In this exercise, you will learn how to:

- ◆ Understand map scale
- ◆ Set the map scale to achieve a specific scale
- ◆ Recognize when a layer has a visible scale range

### Setup

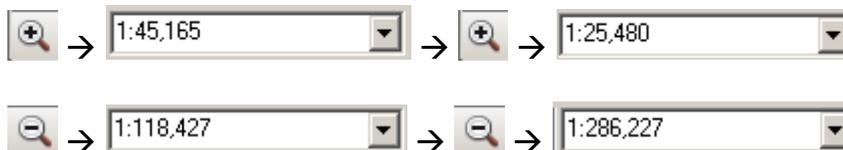
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Map Scale and Scale-Dependent Display Tutorial

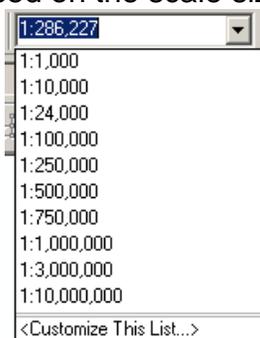
1. Notice that in the Standard Toolbar there is a drop-down box displaying the map scale. Remember that the scale displayed is a representative fraction and not tied to any specific unit of measure. In the example below, the map scale may be read as “1 inch on the map represents 118,427 inches on the ground” or “1 meter on the map represents 118,427 meters on the ground.”



2. Zoom in on the data and notice how the scale ratio increases. In other words, zooming in creates a **larger-scale map** while zooming out creates a **smaller-scale map**.



3. ArcMap also has several predefined, commonly used map scales that can be accessed by clicking on the black-down triangle at the right end of the scale box. Choose several different scales in the list and notice how the map extent changes based on the scale size.



- You can also enter your own scale by typing a new number into the scale box. You do not have to type the 1: portion as that is added automatically after hitting enter. To try this, type a number into the scale text box and press enter.



- Often times, engineering plans or other maps will contain map scales such as **1 inch = 400 feet**. Zooming to this scale in ArcMap is not as simple as typing 400 because there are both inches and feet in the scale. There are two methods for entering this type of scale.

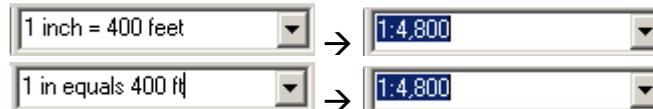
**Method 1:** The scale must be converted to a representative fraction without units. The easiest approach is to convert the 400 feet to inches.

400 feet x 12 inches per foot = 4,800 inches

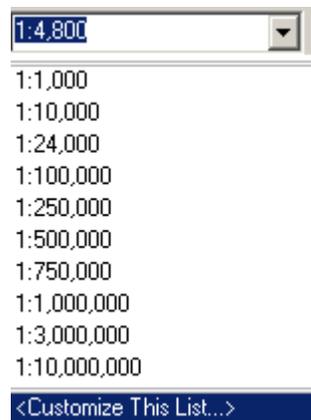
1 inch = 4,800 inches or **1:4,800**

Typing 4,800 in the scale text box would achieve a scale of 1 inch = 400 feet.

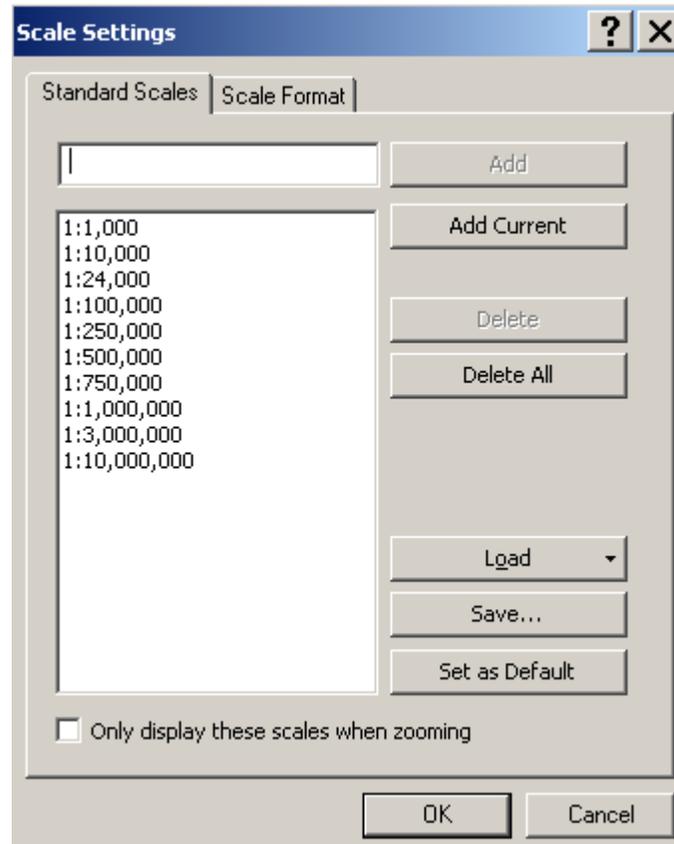
**Method 2:** ArcMap can detect unit names in the scale box and will perform the necessary conversion. Both of the following examples would be valid inputs.



- To set 1:4,800 as a permanent option in the scale drop-down box, choose the **<Customize This List...>** option.



7. In the Scale Settings window, enter **4,800** in the input box and press **Add**.



8. If you have loaded in layers using the REGIS Layer Manager, you may notice that some of them turn on or off as you zoom to various scales. REGIS has setup these layer with their own **visible scale range** to avoid the situation where a very complex layer, such as Parcels, attempts to draw all of its polygons at once when the map is zoomed to a small-scale (e.g., 1:200,000). Instead, ArcMap will hide the layer and indicate this with a grayed-out checkbox in the Table of Contents.

Parcels (Owner/Site Address)

Setting and changing the visible scale range will be discussed in the REGIS Advanced GIS training class or see the following additional information section.

## Additional Information

See the **Working with map scales** section of the ArcGIS Desktop Help manual.

- [-]  Navigating maps
  -  Displaying maps in data view and layout view
  -  Setting a custom full extent for your data frame
  -  Quick ways to navigate data frames and layouts
  -  Using the Go To XY tool
  -  Working with map scales
  -  Working with data frame reference scales
  -  Working with magnifier, viewer, and overview windows
  -  Using spatial bookmarks
  -  Using My Places
  -  Working with the feature cache

See the **Displaying layers at certain scales** section of the ArcGIS Desktop Help manual.

- [-]  Working with layers
  -  What is a layer?
  -  A quick tour of map layers
  -  Essential layer vocabulary
- [-]  Managing layers
  -  Adding layers to a map
  -  Working with group layers
  -  Adding x,y coordinate data as a layer
  -  Changing a layer's drawing order
  -  Working with basemap layers
  -  Setting layer properties
  -  Displaying layers at certain scales
  -  Displaying a subset of features in a layer
  -  Repairing broken data links
  -  Renaming a layer
  -  Viewing metadata from the Table of Contents
  -  Saving layers and layer packages

*End of Exercise 2.6*

## Exercise 2.7 – Using the Magnifier and Viewer Windows

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In this exercise, you will learn how to:

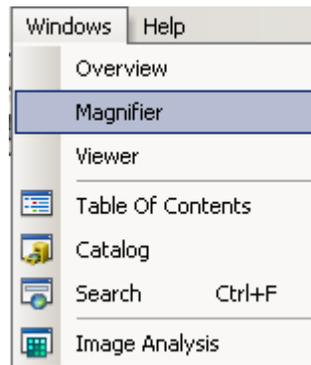
- ◆ Use the Magnifier and Viewer Windows

### Setup

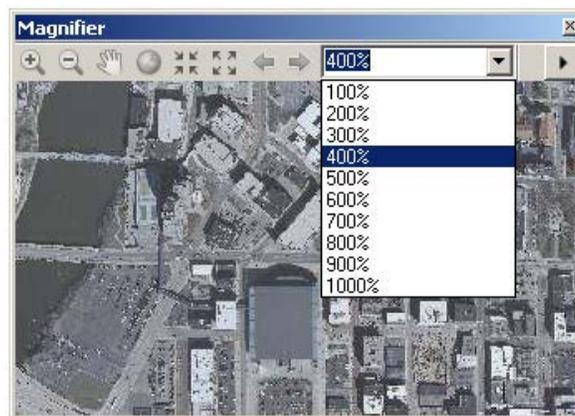
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Using the Magnifier and Viewer Windows Tutorial

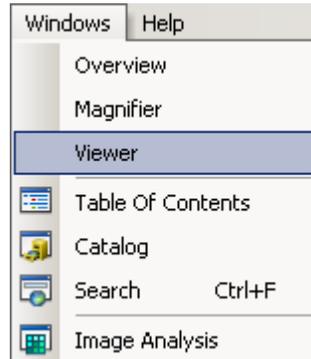
1. ArcMap offers a **Magnifier Window** for viewing a close-up map of a specific area without having to zoom in the entire display to that location. Turn on the Magnifier Window by going to the **Window** menu and choosing **Magnifier**.



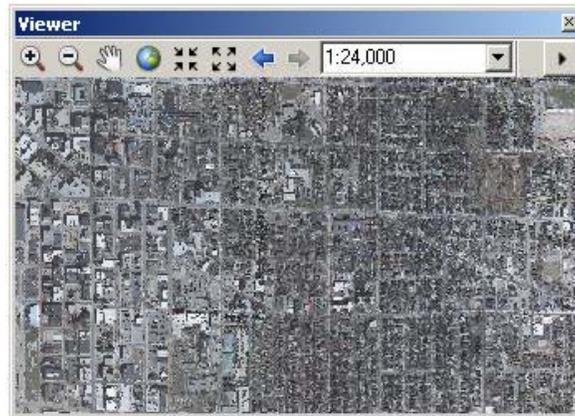
2. A separate magnifier window is displayed on top of the main map showing a close-up view of the area it is directly above. The Magnifier can be moved around by *left-clicking and holding* on the blue title area and then dragging it around the map. The amount of magnification can be changed by choosing a percentage in the drop-down box.



3. Related to the Magnifier Window is a **Viewer Window**. This can be turned on by going to the **Window menu** and choosing **Viewer**.



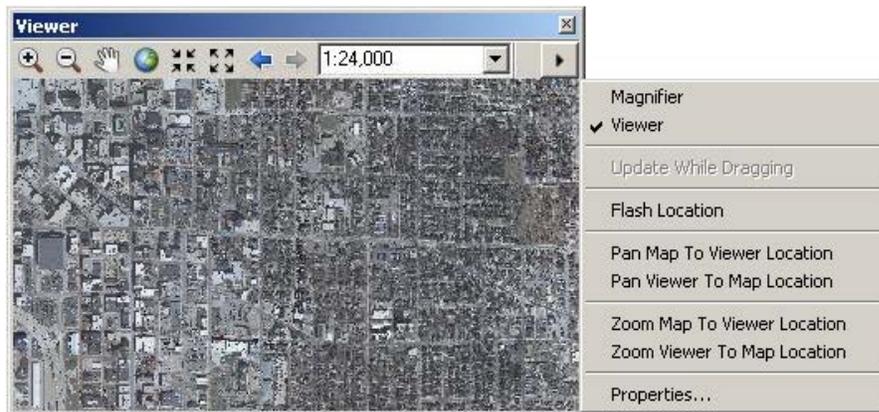
4. When it is first opened, it will display in its window the data at the center of the main map.



5. Unlike the Magnifier, it does not change its view when the window is moved. Instead it relies on its own set of map controls to pan and zoom. This allows you to keep a view of a specific area regardless of where you navigate in the main map.



6. Clicking on the black triangle at the upper-right of the Viewer Window displays an additional set of controls. Select each available option and note the effect on the main map.



## Additional Information

See the **Working with magnifier, viewer, and overview windows** section in the ArcGIS Desktop Help manual.

- ☐  Navigating maps
  -  Displaying maps in data view and layout view
  -  Setting a custom full extent for your data frame
  -  Quick ways to navigate data frames and layouts
  -  Using the Go To XY tool
  -  Working with map scales
  -  Working with data frame reference scales
  -  **Working with magnifier, viewer, and overview windows**
  -  Using spatial bookmarks
  -  Using My Places
  -  Working with the feature cache

*End of Exercise 2.7*

## Exercise 2.8 – Introduction to Layer Properties

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In this exercise, you will learn how to:

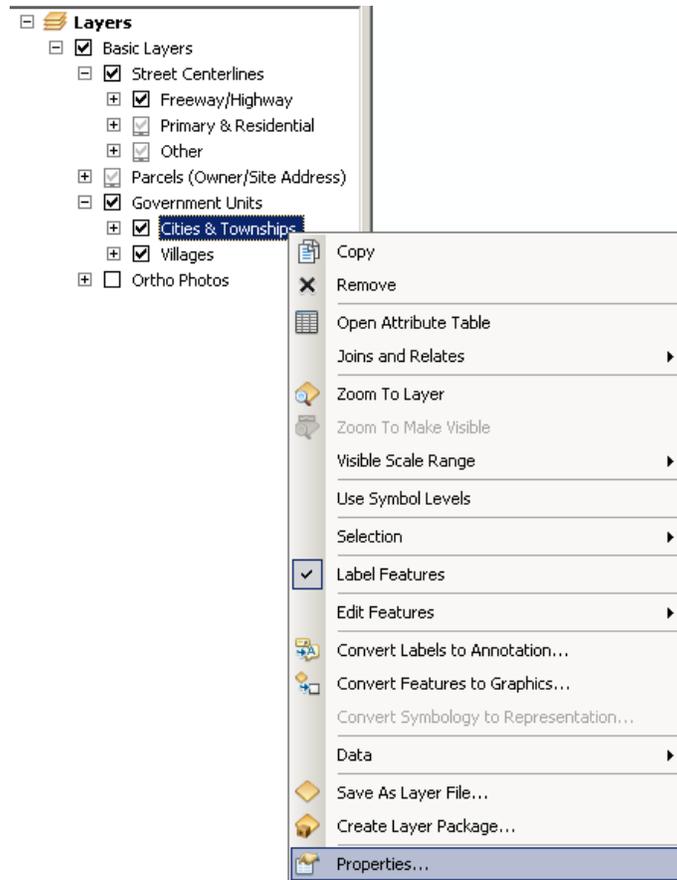
- ◆ Access the layer properties for a data layer
- ◆ Change the symbology of a data layer
- ◆ Turn labeling on or off for a data layer

### Setup

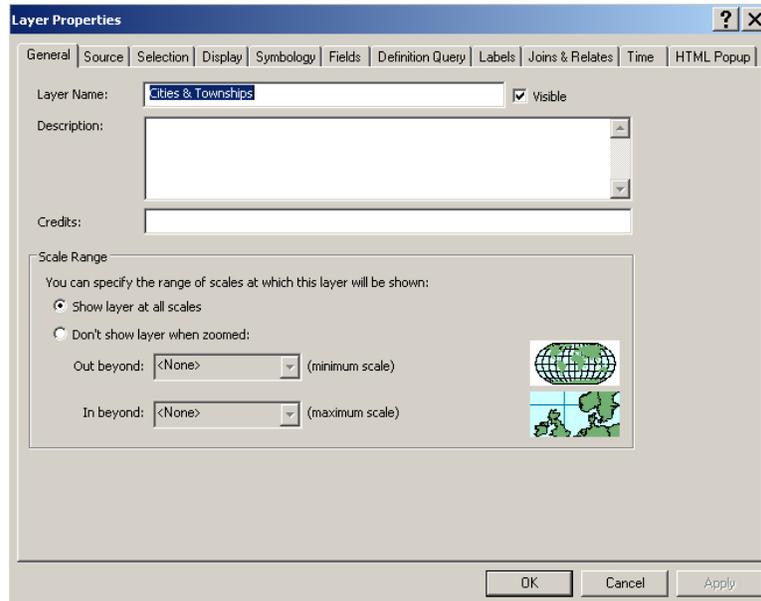
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Introduction to Layer Properties Tutorial

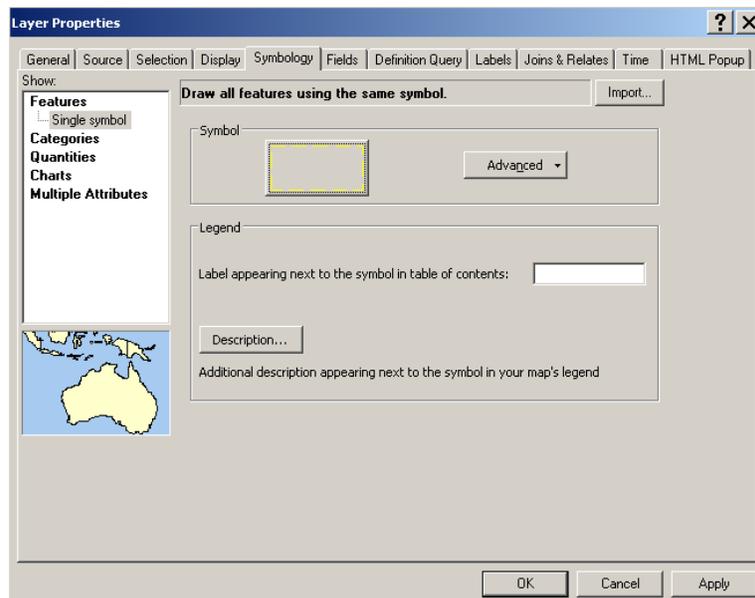
1. Each data layer in the Table of Contents (TOC) has an associated set of properties that ArcMap uses to display that data in the map. This set of properties can be accessed by *right-clicking* on a layer name in the TOC and choosing **Properties**.



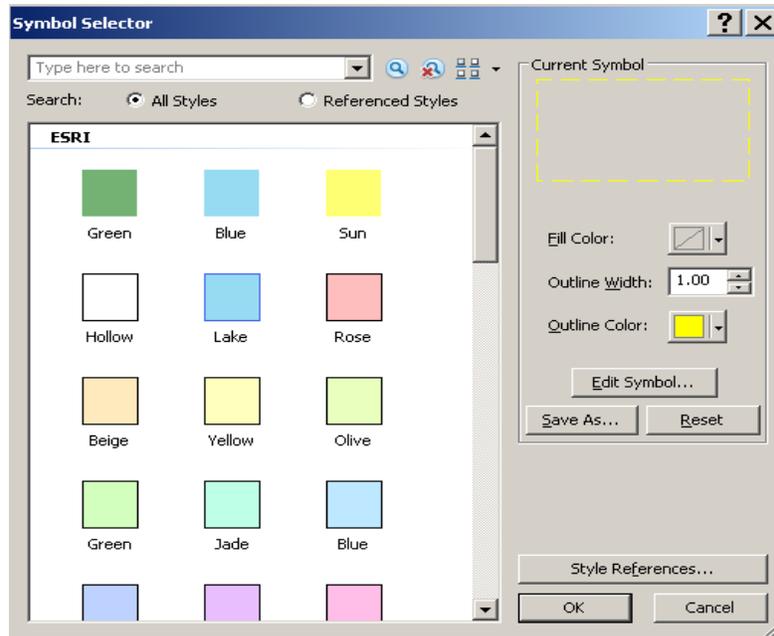
2. A **Layer Properties** window is displayed with eleven tabs that each contain settings related to how the layer is used and displayed in ArcMap. Click on each tab and glance at the options available. This exercise will focus only on the **Symbology** and **Labels** tabs while the REGIS Advanced GIS training class will examine all the tabs.



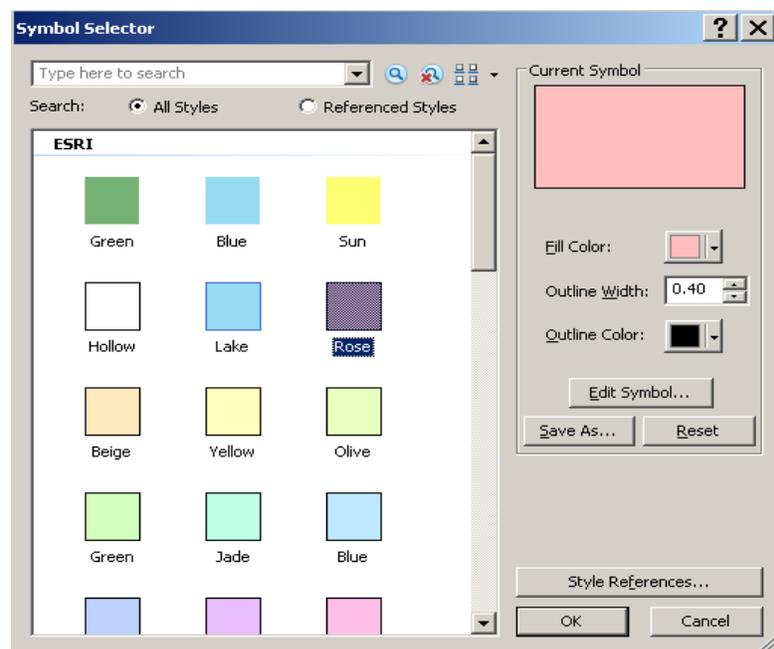
3. Locate the Cities & Townships layer in your TOC. *Right-click* on the name, choose **Properties**, and then Select the **Symbology** tab. This tab sets the layer's display colors on the map. In this example, all the Government Unit polygons are displayed with no fill color and yellow outline.



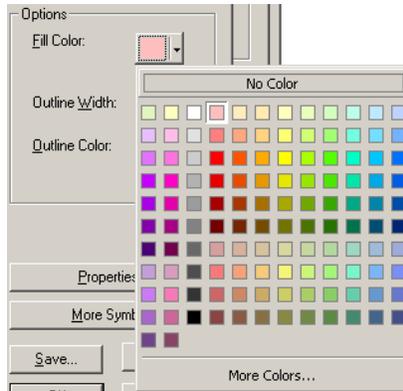
4. To change the symbology, *left-click* on the Symbol graphic  to bring up the **Symbol Selector** window.



5. On the left-side is a listing of predefined coloring schemes that can be chosen. For example, select the **Rose** option and notice how the **Preview** and **Options** boxes on the right-hand side are updated to reflect the chosen symbology.



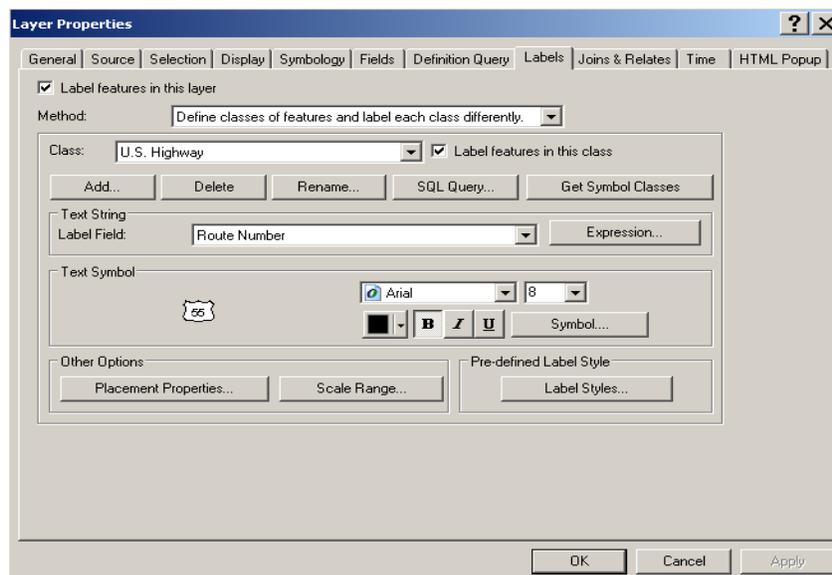
- In the **Options** box, the symbology settings can also be customized. The **Fill Color** and **Outline Color** can be changed by selecting the black down-triangle and choosing a new color. The **Outline Width** can also be adjusted in size.



- Press **OK** to set the new symbology and then press **OK** again to update the map with the new colors.
- The TOC also offers a shortcut to changing a layer's symbology. *Left-click* once on the small symbology icon just below the layer's name to go directly to the Symbol Selector menu.

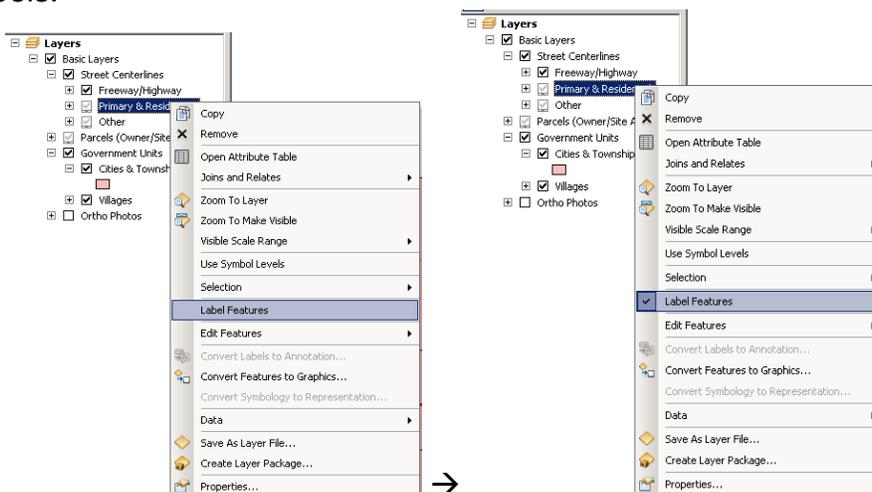


- Labeling features are also controlled in the Layer Properties. Find the Primary & Residential layer in the TOC, *right-click* on the name, and chose **Properties**. Select the **Labels** tab.



10. Notice the first checkbox that reads **Label features in this layer**. If this box is checked, labels will be displayed on the map. If the box is checked, uncheck the box and press **OK** to return to the map. Turning labels on and off is controlled by simply checking or un-checking the box. The Labels tab will be discussed in more detail in the Advanced GIS training class.

11. There is also a shortcut for turning labels on or off. After *right-clicking* on a layer name in the TOC, there is a **Label Features** option that displays a checkbox when labeling is turned on. If it is missing, *left-click* on the Label Features text and the checkbox will be added and the map will draw the labels.



## Additional Information

See the **About labeling** section of the ArcGIS Desktop Help manual.

- [-] Adding text to a map
  - [+] An overview of working with text
  - [+] Common text-related tasks
  - [+] Converting labels to annotation
  - [+] Formatting tags available in ArcMap
- [-] Displaying labels
  - [+] Essential labeling concepts
  - [+] A quick tour of the Labeling toolbar
  - [+] Using the Label Manager
  - [+] The Labeling Summary dialog box
- [-] General label settings
  - [+] **About the general label settings**
  - [-] Using the general label settings
    - [+] ...to set the unplaced label color
    - [+] ...to rotate labels with the data frame
    - [+] ...to set the orientation of vertical labels

End of Exercise 2.8

## Exercise 3.1 – Identifying Features

---

In this exercise, you will learn how to:

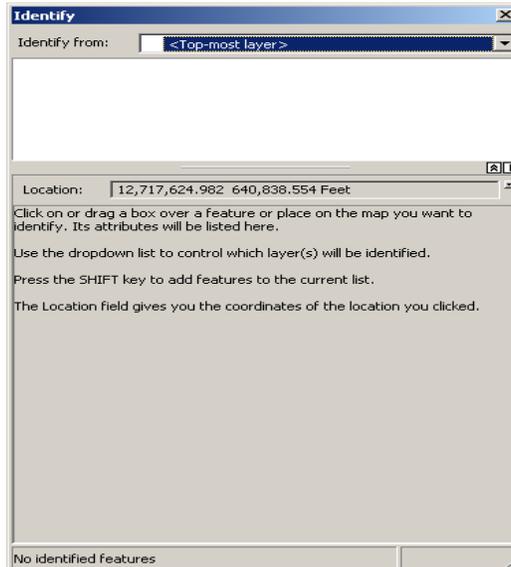
- ◆ Use the Identify tool to obtain attribute information about the data layers

### Setup

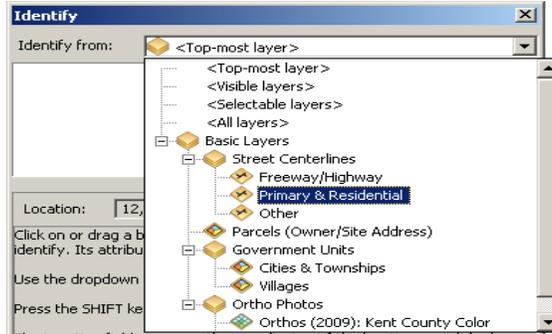
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Identifying Features Tutorial

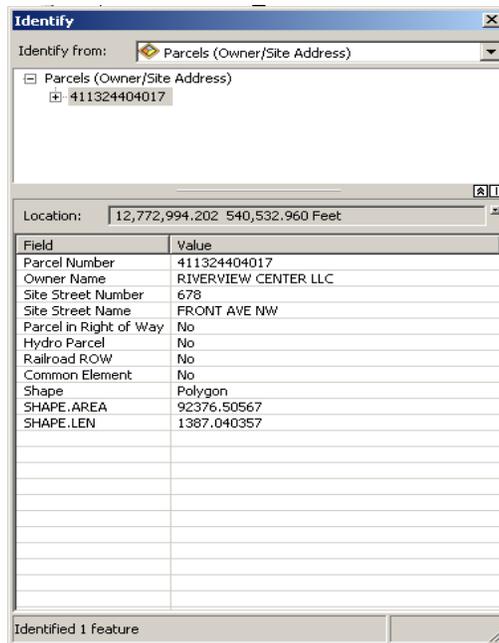
1. Locate the **Identify Features**  button on the Tools toolbar, *left-click* on it and then the map to activate. It should display the Identify window without anything inside it.



2. Since there are usually multiple data layers in your data frame, it is sometimes necessary to first inform the Identify tool which layer you will be querying. Use the **Identify from** drop-down box to pick the layer of interest. For this exercise, select the **Parcels** layer from the list of layers.

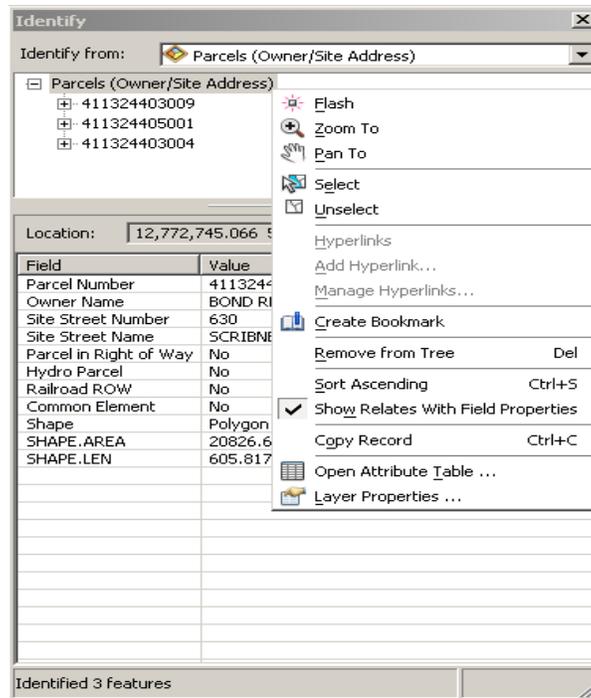


- Return to the map and *left-click* inside a parcel of interest. The Identify window will refresh showing the selected parcel attributes. Each field name is displayed along with its corresponding value in the GIS database.

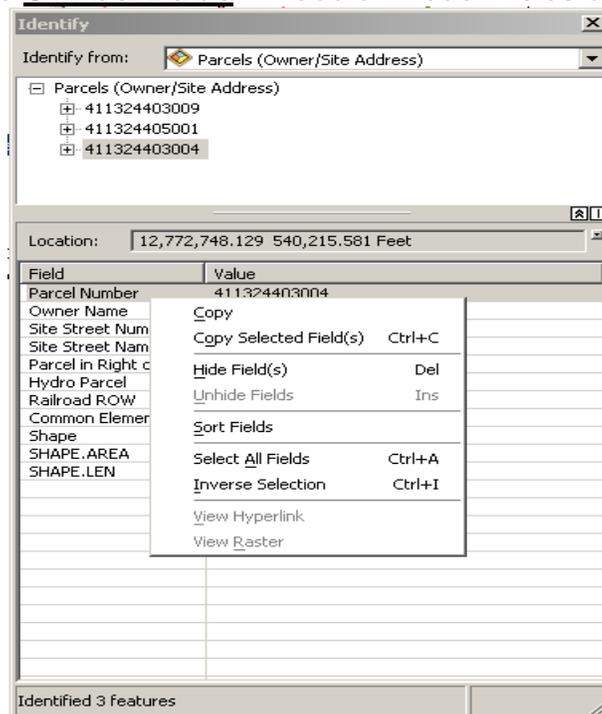


- Features can also be identified by drawing a rectangle on the map. Return to the map, *left-click and hold* and draw a rectangle around a group of parcels. Releasing the mouse button will identify all parcels that intersect the identify rectangle. The Identify window now will contain a list of those parcels. The selected feature in the list will have its attributes displayed.



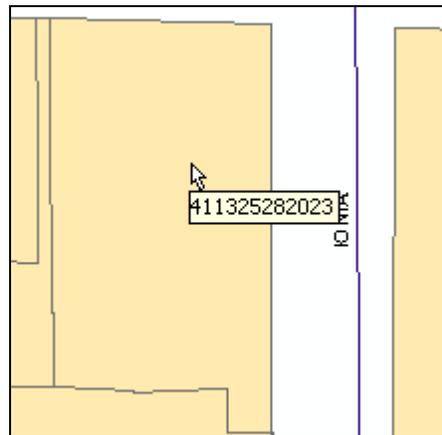


7. In the filed column of the Identify window, you can *right-click* and view several additional options. Choosing **Copy** allows you to copy an attribute value and paste it into a Word document, Excel spreadsheet or another Windows application. Choosing **Sort Fields** will rearrange the fields alphabetically. Choosing **Hide Fields(s)** will remove a field from the display while **Unhide Fields** will add all hidden fields back to the display.



## MapTips Tutorial

1. Move your mouse cursor over a parcel feature. After pausing, a box will appear next to your cursor displaying the parcel number. This is a **MapTip** that has been set up in the Parcels layer by REGIS. It provides a quicker way to view attribute information than using the Identify window. Other REGIS data layers may have MapTips enabled as well. The Advanced GIS Training class will discuss MapTips in more detail.



## Additional Information

See the **Identifying features** and **Displaying MapTips** sections of the ArcGIS Desktop Help manual.

- [-] Working with layers
  - [+] What is a layer?
  - [+] A quick tour of map layers
  - [+] Essential layer vocabulary
- [+] Managing layers
- [-] Interacting with layer contents
  - [+] Identifying features
  - [+] Setting HTML pop-up properties for feature layers
  - [+] Using HTML pop-ups for feature layers
  - [+] Selecting features interactively
  - [+] Using Select By Location
  - [+] Using Select By Attributes
  - [+] Using Select By Graphics
  - [+] Working with selected features
  - [+] Setting the Selection tolerance
  - [+] Feature editing using layers
  - [+] Measuring distances and areas
  - [+] Using the Find tool
  - [+] Displaying MapTips
  - [+] Using Hyperlinks
  - [+] Using the Time Slider tool
  - [+] Exporting features

*End of Exercise 3.1*

## Exercise 3.2 – Finding Features

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In this exercise, you will learn how to:

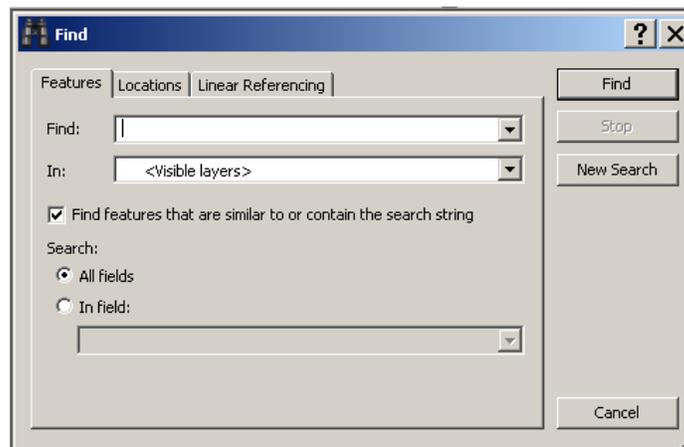
- ◆ Use the Find tool to search data layers and find specific features

### Setup

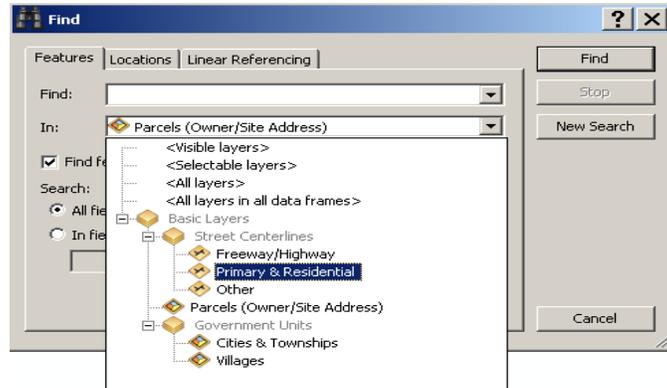
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Finding Features Tutorial

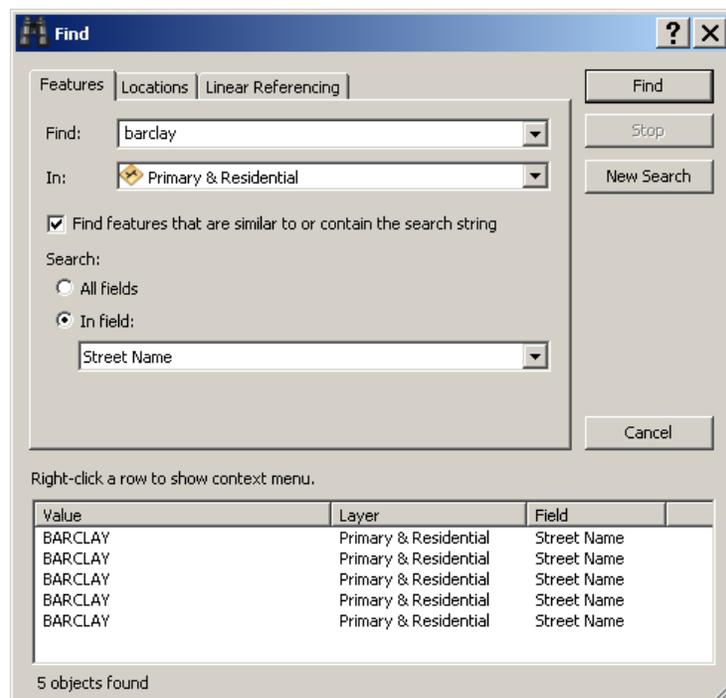
1. Locate the **Find**  button on the Tools toolbar. Double click to display the Find window.



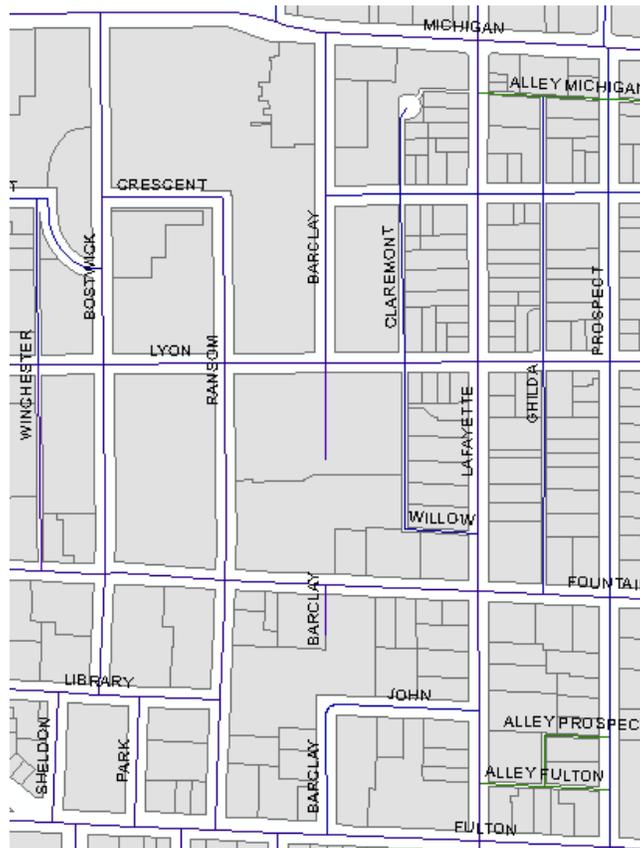
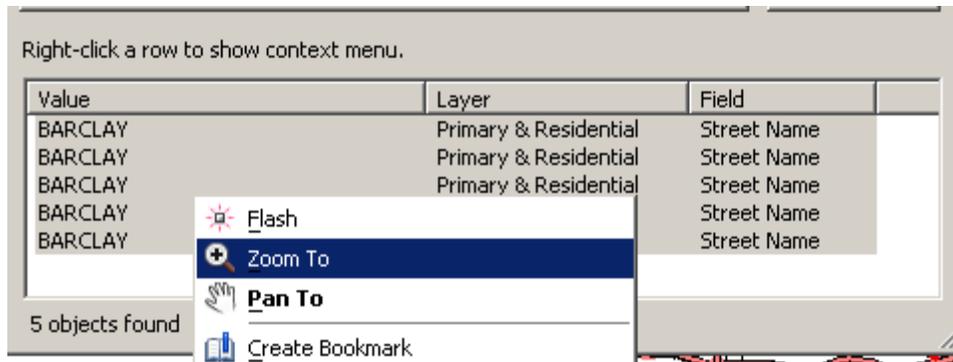
2. To speed up the search, it is best to first choose a layer and a specific field to search. Use the **In** drop-down box to select the layer you will be searching. In this exercise, select **Primary & Residential** in the **Street Centerline** layer. Then select the **In field** option and choose the field named **Street Name**.



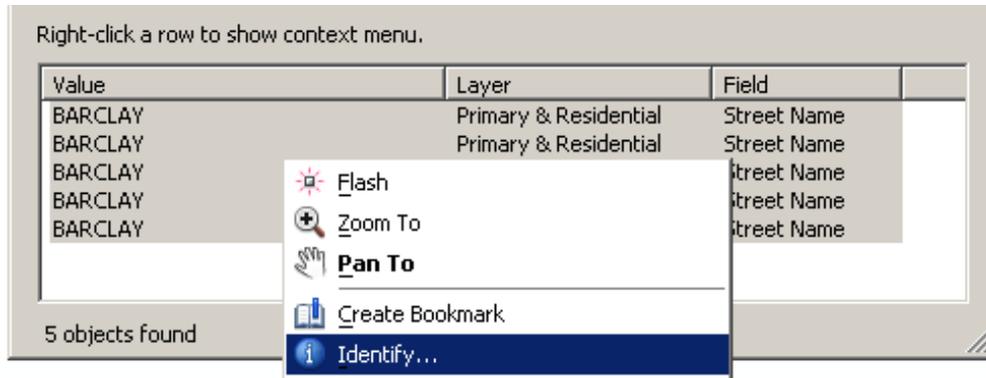
- Now in the **Find** box, enter a full or partial street name such as **barclay**. Press the **Find** button and the tool will search the Street Centerlines layer and display all segments that have barclay in the name.



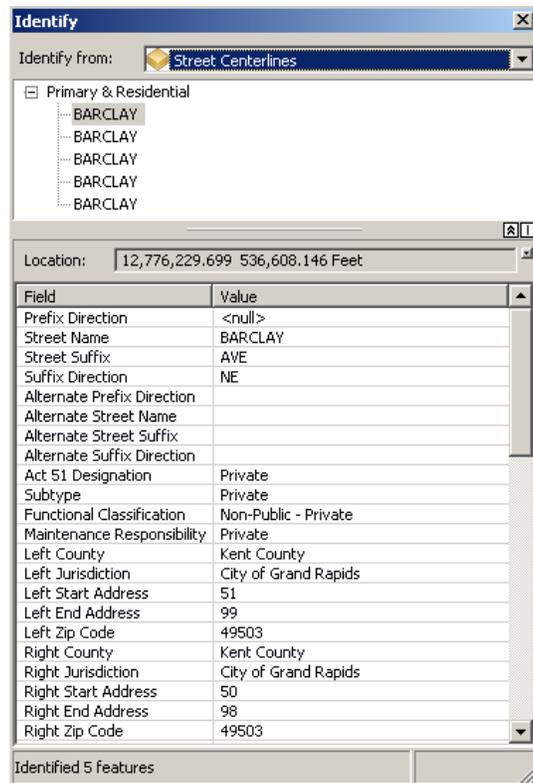
- In this search, five results are returned. Even though there is only one street named BARCLAY, the GIS contains five segments because the centerline is split at several intersections. To zoom to the entire street, all of the results need to be highlighted in the list. Either hold down **SHIFT** or **CTRL** and select them one at a time or draw a box by *left-clicking and holding* around them all. Then *right-click* in the highlighted area and select **Zoom To**. The map will zoom to the entire street and flash the location of the segments.



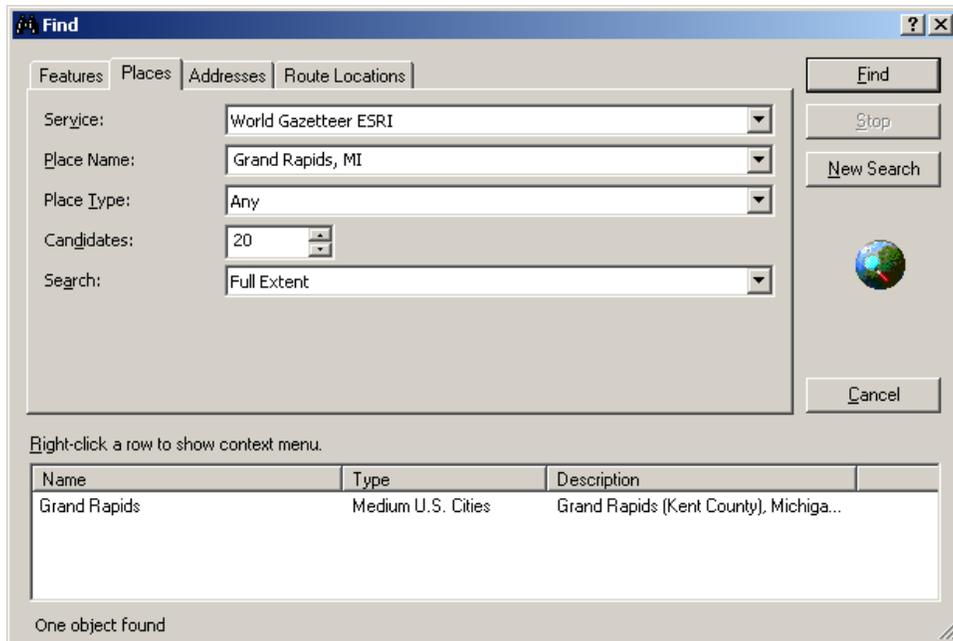
- Another option with the Find results is the ability to identify them from the results window. With all the results still highlighted *right-click* and choose **Identify**.



- The Identify window is displayed with all the search results listed in the window.



- Return to the Find button and select the **Places** tab. If you have an internet connection, you can also search for places using ESRI's online database. Choose the **World Gazetteer ESRI** service and search for a place name like **Grand Rapids, MI**.



8. *Right-click* on the result and select **Zoom To** and the map will zoom to the entire extent of the City of Grand Rapids.

### **Additional Information**

See the **Using the Find tool** section of the ArcGIS Desktop Help manual.

- [-]  Mapping and Visualization
  -  Mapping and visualization in ArcGIS Desktop
  -  What is ArcMap?
  -  A quick tour of ArcMap
  -  Essential ArcMap vocabulary
- [+]  ArcMap basics
- [-]  Working with layers
  -  What is a layer?
  -  A quick tour of map layers
  -  Essential layer vocabulary
- [+]  Managing layers
- [-]  Interacting with layer contents
  -  Identifying features
  -  Setting HTML pop-up properties for feature layers
  -  Using HTML pop-ups for feature layers
  -  Selecting features interactively
  -  Using Select By Location
  -  Using Select By Attributes
  -  Using Select By Graphics
  -  Working with selected features
  -  Setting the Selection tolerance
  -  Feature editing using layers
  -  Measuring distances and areas
  -  **Using the Find tool**
  -  Displaying MapTips
  -  Using Hyperlinks
  -  Using the Time Slider tool
  -  Exporting features

*End of Exercise 3.2*

## Exercise 3.3 – Geocoding

In this exercise, you will learn how to:

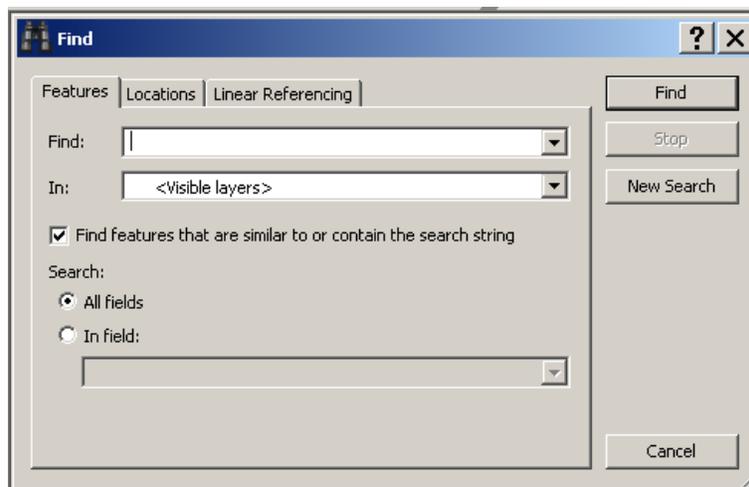
- ◆ Use the Find button to locate addresses, parcels and intersections

### Setup

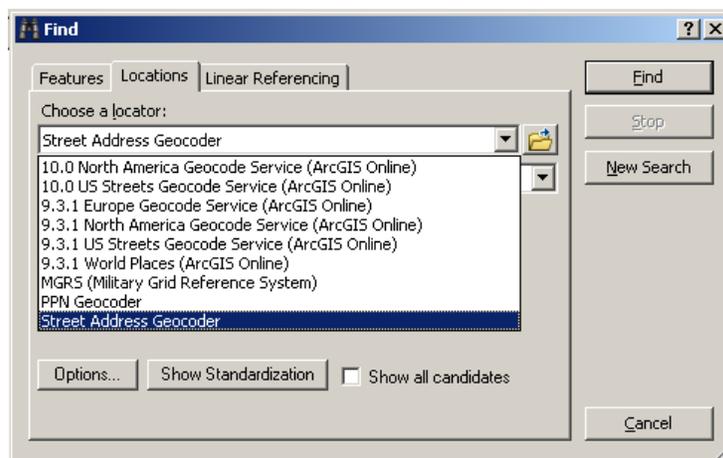
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Geocoding Tutorial

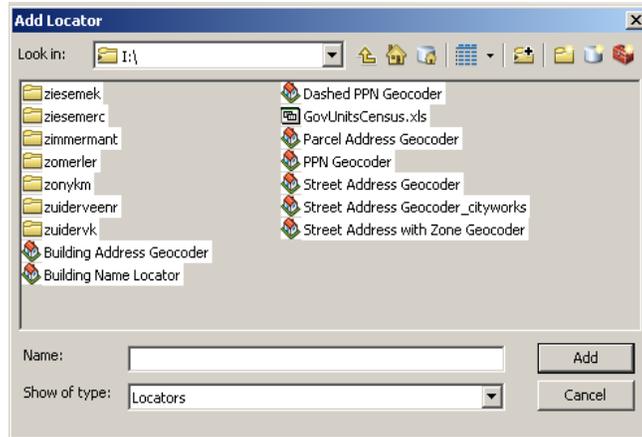
1. Select the **Find**  button on the Tools toolbar to open the Find window.



2. Choose the **Locations** tab. *Click* on the drop-down icon  to the right of the box entitled **Choose an Address Locator**. You can choose from several types of locators depending on your intended use. For this example choose **Street Address Geocoder**.



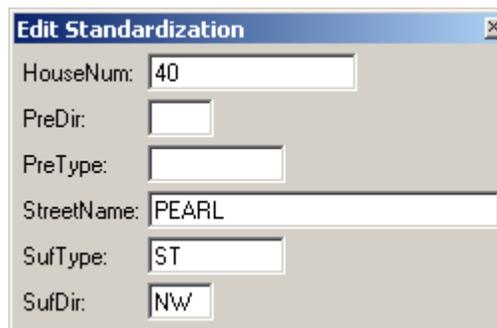
3. If the **Street Address Geocoder** is not listed in the drop down. Add the locator by selecting the folder button next to the drop down. All locators are on the I:\ Drive at the end of the folder list. Scroll to the end of the list and choose **Street Address Geocoder**.



4. In the **Street or Intersection** text box, enter a complete address such as **40 Pearl St NW**.

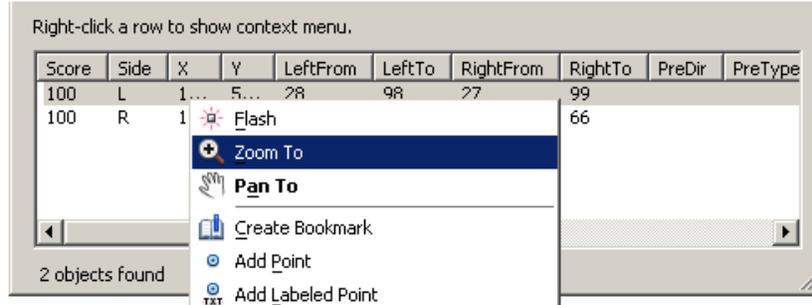


5. To better understand the Geocoding process, select the **Show Standardization** button  to view how your search input is being interpreted. Notice how the number (40), street name (PEARL), suffix type (ST), and suffix direction (NW) have been separated into their appropriate categories. If the Find tool had misinterpreted your input, you could correct it in this **Edit Standardization** window.

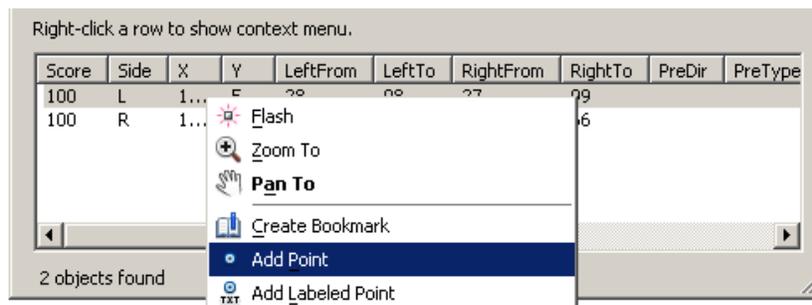


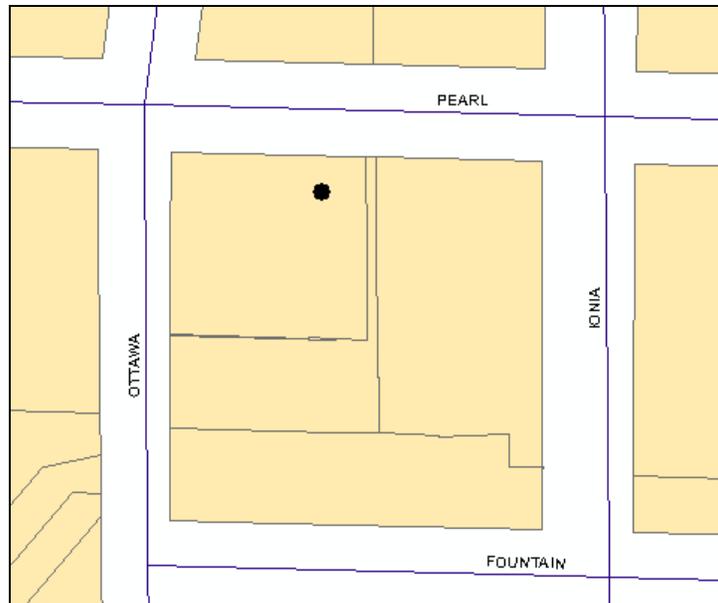
6. Close the Edit Standardization window and press the **Find** button to search for the address within the street centerline address ranges. The search results will appear at the bottom of the Find window with each possible candidate ranked by their matching score. In most cases, the result with the higher score (100 is a perfect match) is the correct location of the address. *Right-click* on the entry with the score of 100 and choose

## Zoom To.

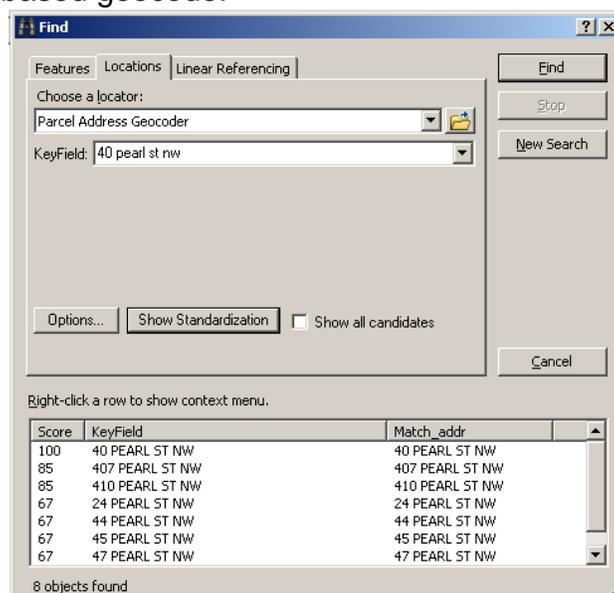


7. In the background, the map will zoom to and flash a point at the address location. Since this geocode was based on the street centerline address ranges, the location may not be exact but usually is close enough for most circumstances. It may be helpful to move the Find window to the corner of the screen and use the **Flash** option to see the location again.
8. *Right-click* on the result in the Find window again and choose **Add Point**. This will add a black dot on the map showing the address location. Notice that the dot is offset from the street centerlines by 60 feet on the correct side of the street. This 60 foot offset is added by REGIS to assist in placing an address as close as possible to its exact location.





9. To compare those results to a parcel address geocode, use the drop-down icon to choose a new Address Locator. Select the **Parcel Address Geocoding**. Type the same address as before and press the **Find** button to view the results. The parcel-based geocode returns possible matching parcels with the exact or similar addresses. The correct parcel received a perfect score of 100 while parcels with similar addresses might be returned but with much lower scores.
  
10. *Right-click* on the correct result and choose **Zoom To**. Next choose the **Add Point** option. The map should now display a second black dot at the center of the parcel. Notice the difference between the results of a street and parcel-based geocode.

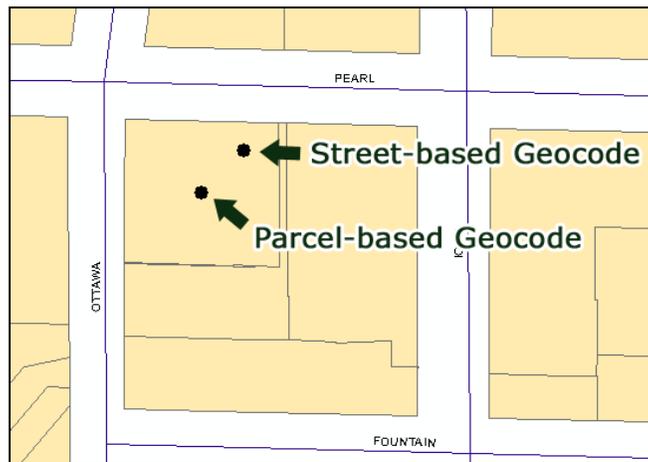


Right-click a row to show context menu.

Score	KeyField	Match_addr
100	40 PEARL ST NW	40 PEARL ST NW
85	407 PEARL ST NW	407 PEARL ST NW
85	410 PEARL ST NW	410 PEARL ST NW
67	24 PEARL ST NW	24 PEARL ST NW
67	44 PEARL ST NW	44 PEARL ST NW
67	45 PEARL ST NW	45 PEARL ST NW
67	47 PEARL ST NW	47 PEARL ST NW

8 objects found

- Flash
- Zoom To**
- Pan To**
- Create Bookmark
- Add Point
- Add Labeled Point
- Add Callout
- Add to My Places



11. If the address is a location that you will return to often, it may be helpful to store the address in your **My Places**. *Right-click* on the result and choose **Add to My Places**.

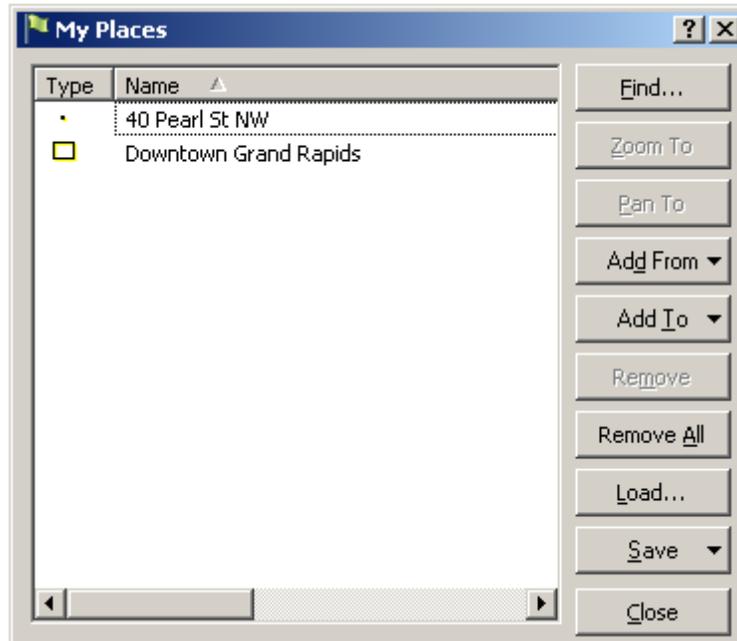
Right-click a row to show context menu.

Score	KeyField	Match_addr
100	40 PEARL ST NW	40 PEARL ST NW
85	407 PEARL ST NW	407 PEARL ST NW
85	410 PEARL ST NW	410 PEARL ST NW
67	24 PEARL ST NW	24 PEARL ST NW
67	44 PEARL ST NW	44 PEARL ST NW
67	45 PEARL ST NW	45 PEARL ST NW
67	47 PEARL ST NW	47 PEARL ST NW

8 objects found

- Flash
- Zoom To
- Pan To
- Create Bookmark
- Add Point
- Add Labeled Point
- Add Callout
- Add to My Places**

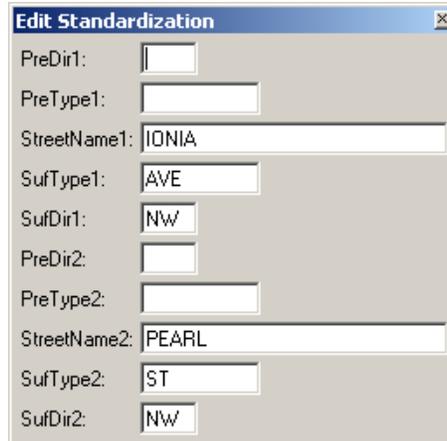
12. Open **My Places** (found in the **Data Frame Tools Toolbar**). The address you choose will now appear as a place alongside other spatial bookmarks you have saved. Notice that it appears with a dot icon to indicate it is a specific location.



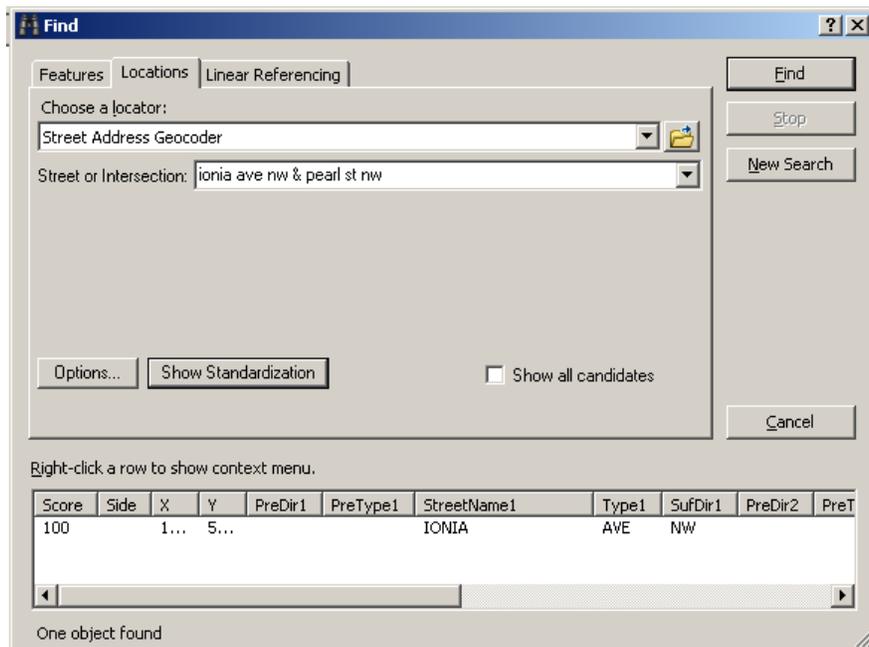
13. The Find tool can also locate intersections if the Streets Address Geocoding locator is selected. Use the drop-down icon to select the **Street Address Geocoding** locator.
14. In the **Street or Intersection** box, enter the complete names of two streets separated by the ampersand (&) character.

Street or Intersection:

15. Again select the **Show Standardization** button. Notice how the search input has been separated into two streets and their appropriate components (e.g., name suffix type, suffix direction) have been identified.



16. Close the Edit Standardization window and press **Find**. The intersection of Ionia Ave NW and Pearl ST NW appears as the first result with a perfect score of 100.

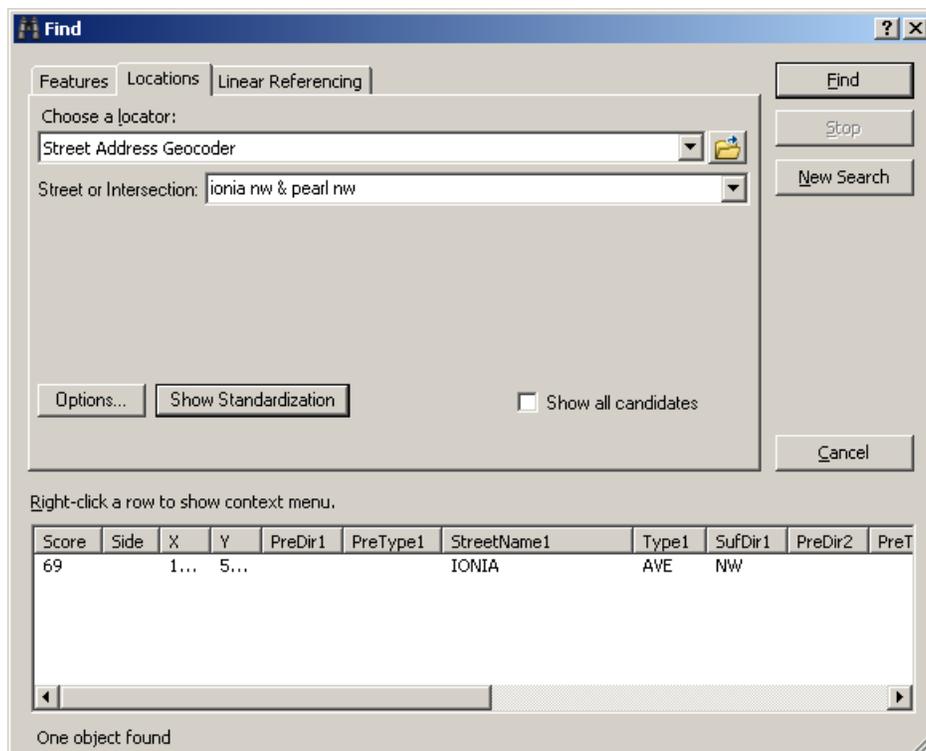


17. *Right-clicking* on the intersection has the same options as the address results. Select the **Zoom To**, **Flash**, and **Add Point** choices and observe the results.

18. Geocoding in ArcMap does not have to accept exact inputs. To test this, change the **Street or Intersection** input to read **ionia nw & pearl nw**.

Street or Intersection:

19. Pressing **Find** now produces the same result except the matching score has decreased to 69. Removing the street suffixes didn't prevent the intersection to be located but it did significantly lower the match score. Experiment with partial addresses and intersections to gain an understanding of the Geocoding process. Also test what happens when a street name is misspelled.



### Additional Information

See the **Geocoding and address management** section of the ArcGIS Desktop Help manual.

- [-]  **Geocoding and address management**
- +  Getting started with geocoding
- +  Understanding geocoding
- +  Preparing for geocoding
- +  Building an address locator
- +  Locating addresses
- +  Additional geocoding techniques
- +  Keeping an address locator current
- +  Distributing your address locator
- +  Adjusting your address locator file
- +  About StreetMap data

*End of Exercise 3.3*

## Exercise 3.4 – Measuring

In this exercise, you will learn how to:

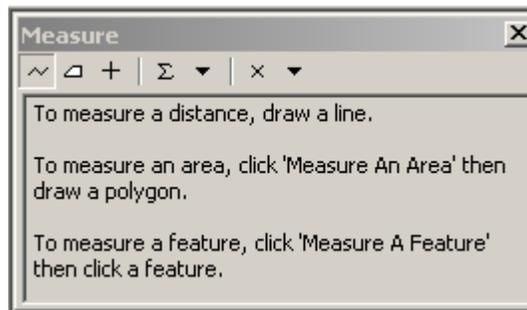
- ◆ Use the Measure tool to find lengths, perimeters and areas in ArcMap

### Setup

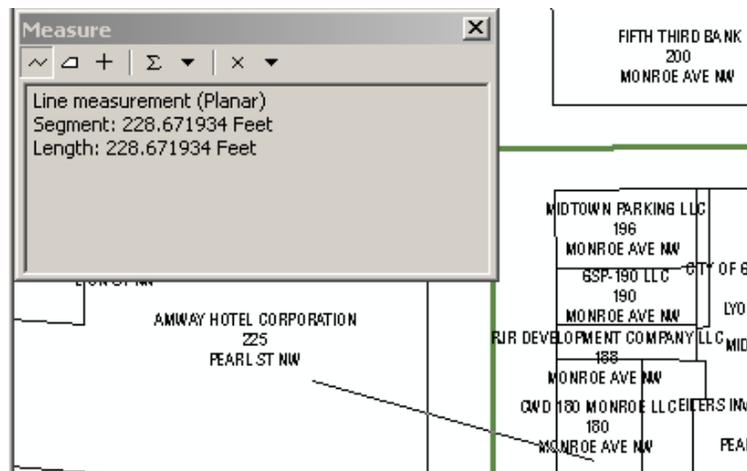
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Measuring Tutorial

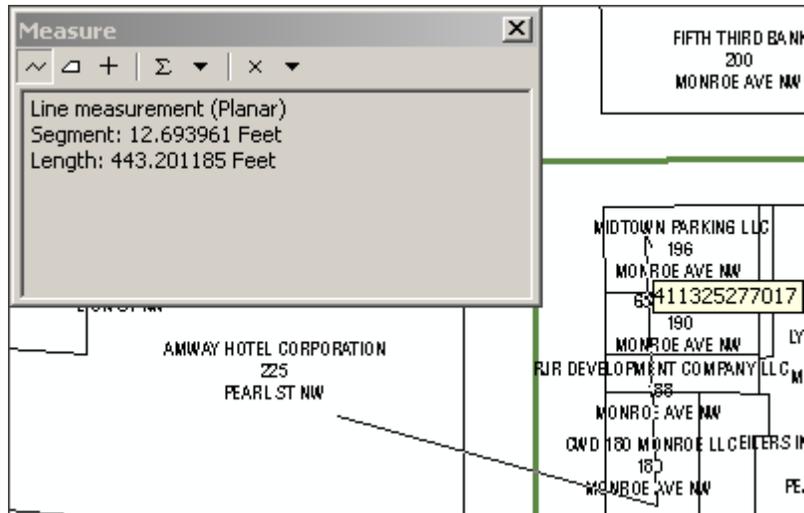
1. Select the **Measure**  tool on the Tools toolbar. The Measure window will appear in the upper-left corner of your Data View.



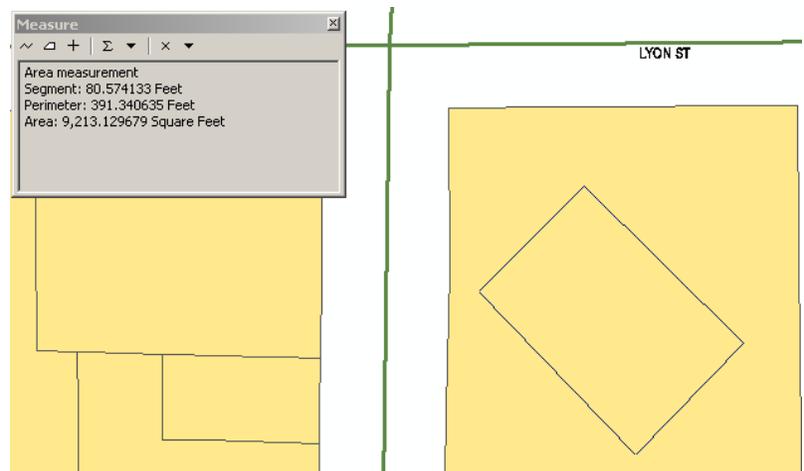
2. By default, the **Measure Line**  option will be selected. This allows you to measure linear distances on the map. Begin a measurement by *left-clicking* on the map and then move the mouse cursor to another location. A gray line is drawn from the starting location to wherever the cursor is while the Measure window is updated with the current length of the segment.



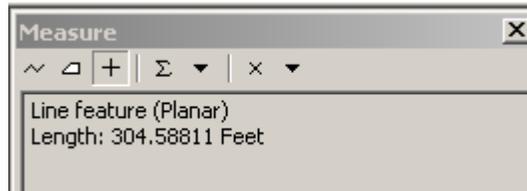
- To change direction and continue measuring, *left-click* once and move the cursor again. The gray measure line changes direction and the Measure window now displays the distances of your current segment and total length of both segments.



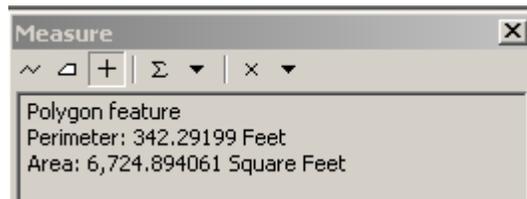
- To end the measurement, *double-click* the left mouse button. The measure line disappears but the distances in the Measure window remain until a new measurement is performed or the box is closed. The measurements can be copied and pasted into other applications if needed.
- To measure an area, choose the **Measure An Area**  option in the Measure window. Return to the map and draw a shape on the map by *left-clicking* to create each corner of the polygon. *Double-click* on the last corner of the shape to finish the area measurement. The Measure window will be updated with the last segment length, perimeter and area of the shape.



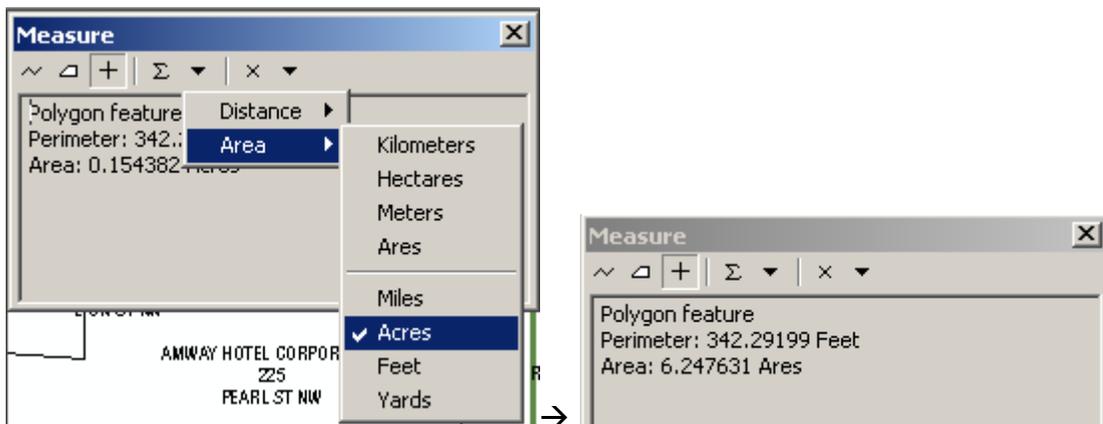
- The third measure option is to measure a specific feature in the map. Select the **Measure A Feature**  button in the Measure window.
- Locate a street centerline segment in your map. Move the measure cursor over it and *left-click*. The Measure window will update with the segment's length.



- Find a parcel in the map and *left-click* on it. The Measure window will display the area and perimeter of the parcel. It is important to note that nowhere in the Measure window does it specify that the Parcels layer was the layer clicked upon. It is the user's responsibility to make sure they have measured the appropriate feature. If the click location is inside multiple polygons of different layer types, the layer on top in the Table of Contents will be measured.



- The units of measure can be changed by selecting the **Units**  icon and choosing Distance or Area. For example, change the **Area** units to **Acres** and identify another parcel.



## Additional Information

See the **Measuring distances and areas** section of the ArcGIS Desktop Help manual.

- [-]  Mapping and Visualization
  -  **Mapping and visualization in ArcGIS Desktop**
  -  What is ArcMap?
  -  A quick tour of ArcMap
  -  Essential ArcMap vocabulary
- [+]  ArcMap basics
- [-]  Working with layers
  -  What is a layer?
  -  A quick tour of map layers
  -  Essential layer vocabulary
- [+]  Managing layers
- [-]  Interacting with layer contents
  -  Identifying features
  -  Setting HTML pop-up properties for feature layers
  -  Using HTML pop-ups for feature layers
  -  Selecting features interactively
  -  Using Select By Location
  -  Using Select By Attributes
  -  Using Select By Graphics
  -  Working with selected features
  -  Setting the Selection tolerance
  -  Feature editing using layers
  -  Measuring distances and areas
  -  Using the Find tool
  -  Displaying MapTips
  -  Using Hyperlinks
  -  Using the Time Slider tool
  -  Exporting features

*End of Exercise 3.4*

## Exercise 3.5 – Using the REGIS Quick Search Tools

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In this exercise, you will learn how to:

- ◆ Use the REGIS toolbar to perform parcel number and parcel owner searches
- ◆ Use the REGIS Acreage Calculator to find the acreage of a selected parcel

### Setup

Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Parcels data layer to the data frame.

### Using the REGIS Quick Search Tools Tutorial

1. The REGIS toolbar contains the ability to quickly search for parcel numbers by its PPN, owner names  or street address .



2. In the **PPN** text box, enter a parcel number as one long number without any dashes.



3. Press the **Enter** key and the tool will locate the parcel and zoom to that location on the map. The parcel will appear with a turquoise boundary to indicate it has been selected.



4. In the **Owner** text box, enter the name of a parcel owner as listed on the tax records.



5. Press **Search** and the tool will find the owner's parcel and zoom to it on the map. The parcel will again appear with a turquoise boundary to indicate that it has been selected.



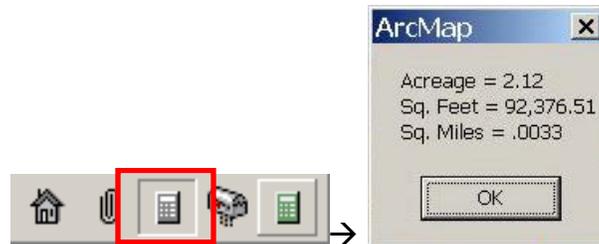
6. In the **Parcel Address** text box, enter an address. This will search only the parcel data for a match. A complete address includes all of the necessary components: building or house number, full and proper street name, street suffix (e.g. St, Rd, Blvd, Ave, Dr, etc.) and, if the address is within most areas of Kent County, the suffix is directional.



7. Press **Search** and the tool will find the parcel that matches that address and zoom to it on the map. The parcel will again appear with a turquoise boundary to indicate that it has been selected.



8. While a parcel is still selected (as shown by the turquoise boundary), the REGIS toolbar offers a quick way to calculate the acreage of that parcel. Select the **Acreage Calculator** on the REGIS toolbar to display the acreage.



9. Use the **Clear Selected Features**  button on the Tools toolbar to clear the parcel selection (i.e., remove the turquoise boundary). The concept of selecting features will be discussed in more detail in the Advanced GIS training class.

### **Additional Information**

For assistance with the REGIS Quick Search tools, contact the REGIS Help Desk.

*End of Exercise 3.5*

## Exercise 3.6 – Creating REGIS Mailing Labels

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In this exercise, you will learn how to:

- ◆ Perform a parcel selection in ArcMap
- ◆ Use the REGIS toolbar to create mailing labels

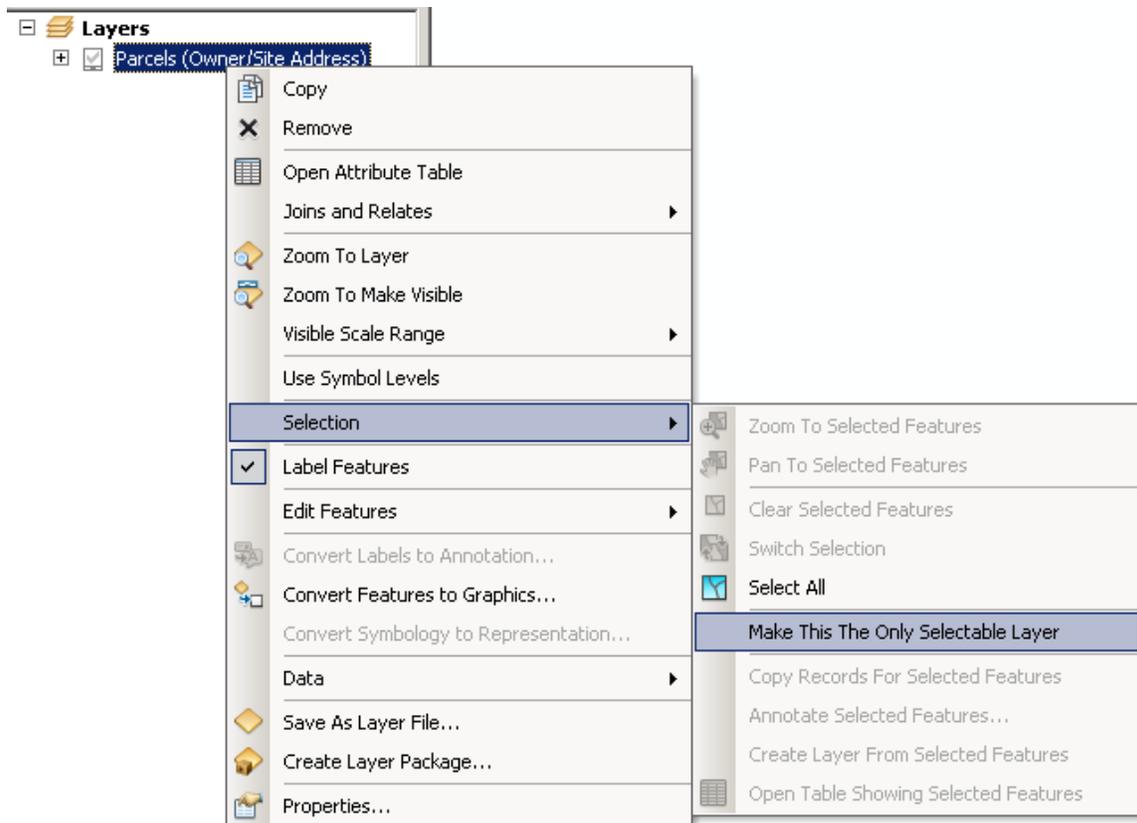
### Setup

Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Parcels data layer to data frame.

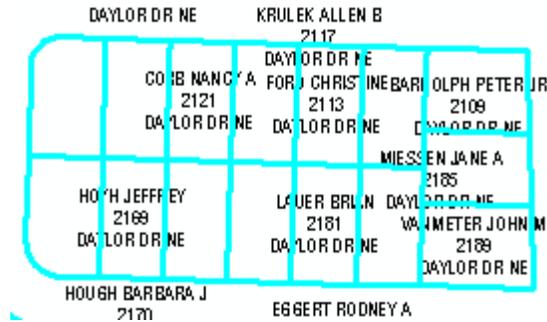
### Creating REGIS Mailing Labels Tutorial

The first three steps describe the concept of selecting features in ArcMap. It is briefly discussed here for the purposes of creating mailing labels but is covered in more detail in the Advanced GIS training class.

1. Select the **Select Features**  tool on the Tools toolbar.
2. In the Table of Contents, *right-click* on the Parcels layer and choose **Selection...Make This The Only Selectable Layer.**



3. Move your mouse cursor onto the map and find a group of parcels. *Left-click and hold* to draw a rectangle around these parcels, release the mouse button, and they will be selected. The selected parcels appear in the map with turquoise boundaries.



4. The Parcels layer must also be highlighted in the Table of Contents for the REGIS Mailing Labels tool to function correctly. *Left-click* once on the layer name to highlight it and change its appearance to a dark blue background with white text.



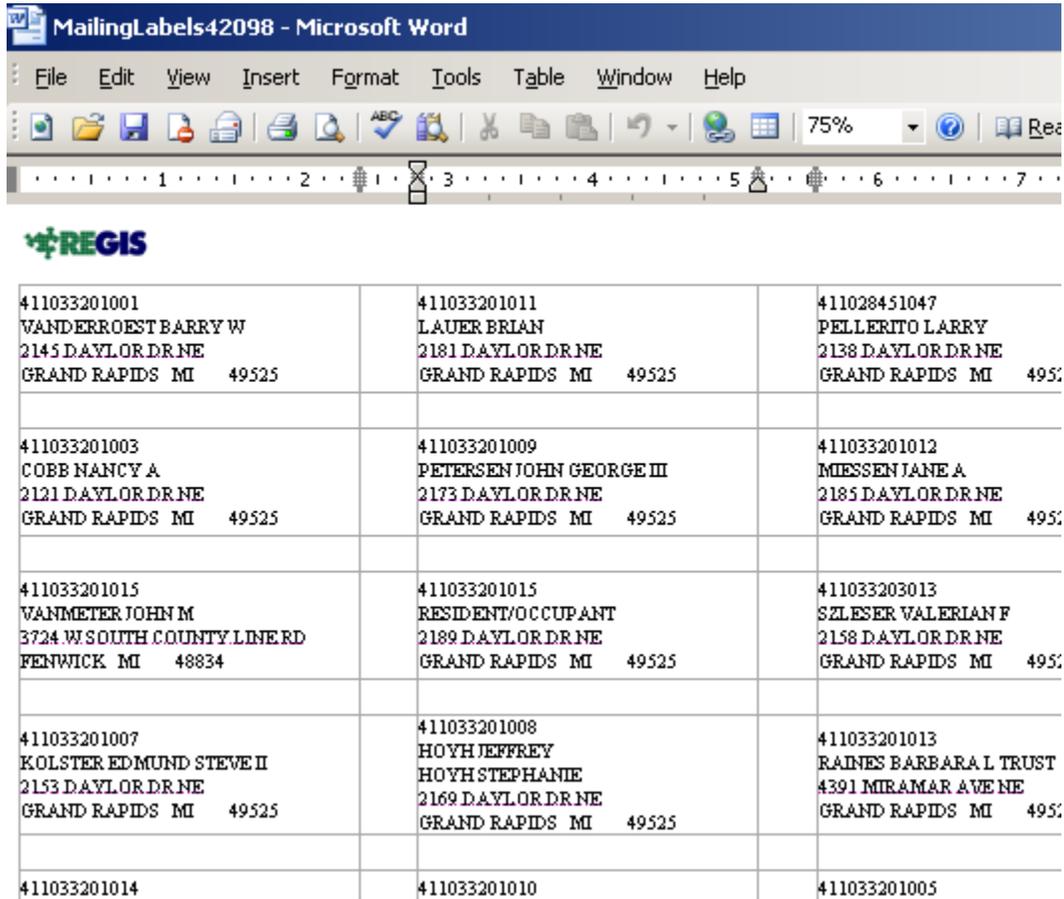
5. With the Parcels layer highlighted in the Table of Contents, click the **Generate Mailing Labels**  button on the REGIS toolbar.



6. The **Mailing Label Generator** window will appear and allow you to choose what label types (e.g., Property Owner, Resident, Taxpayer) will be created. There is also an option as to whether or not to include the parcel number on the mailing labels, and an option to export to Excel.



- Press **OK** to create the mailing labels. The tool will launch Microsoft Word with the labels created and ready to print.



- If necessary, you can save the mailing labels to your own network folder for future reference. Choose **Save As...** from the **File** menu.

## Additional Information

For assistance with the REGIS Mailing Labels tool, contact the REGIS Help Desk.

See the **Selecting features interactively** section in the ArcGIS Desktop Help manual.

- [-]  Mapping and Visualization
  -  Mapping and visualization in ArcGIS Desktop
  -  What is ArcMap?
  -  A quick tour of ArcMap
  -  Essential ArcMap vocabulary
- [+]  ArcMap basics
- [-]  Working with layers
  -  What is a layer?
  -  A quick tour of map layers
  -  Essential layer vocabulary
- [+]  Managing layers
- [-]  Interacting with layer contents
  -  Identifying features
  -  Setting HTML pop-up properties for feature layers
  -  Using HTML pop-ups for feature layers
  -  Selecting features interactively
  -  Using Select By Location
  -  Using Select By Attributes
  -  Using Select By Graphics
  -  Working with selected features
  -  Setting the Selection tolerance
  -  Feature editing using layers
  -  Measuring distances and areas
  -  Using the Find tool
  -  Displaying MapTips
  -  Using Hyperlinks
  -  Using the Time Slider tool
  -  Exporting features

*End of Exercise 3.6*

## Exercise 3.7 – Accessing Linked Documents

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In this exercise, you will learn how to:

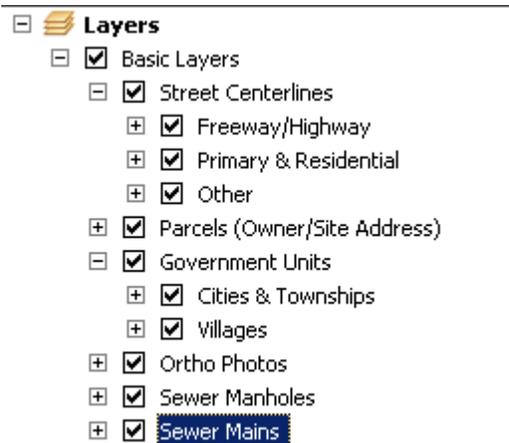
- ◆ Use the REGIS Access Linked Documents tool

### Setup

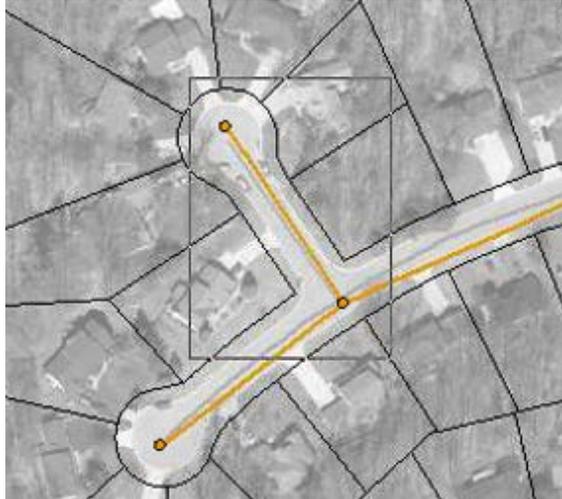
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to data frame. Also add the Sewer Manholes and Sewer Mains data layers to the data frame.

### Accessing Linked Documents Tutorial

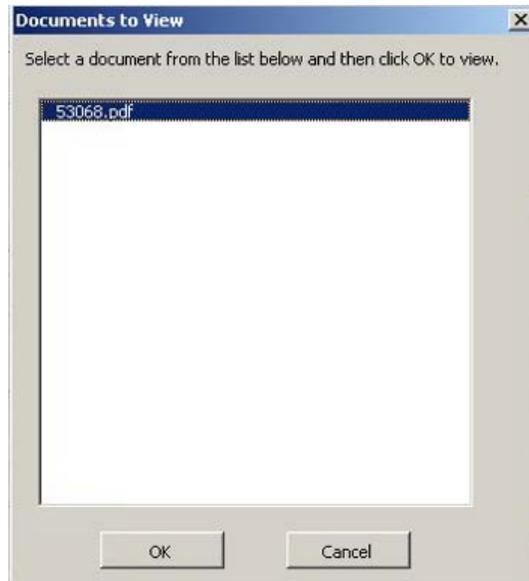
1. Highlight the **Sewer Mains** layer in the Table of Contents by *left-clicking* once on the name. The highlighted layer will appear with a dark blue background and white text. Then zoom in on the map until you are close enough to see individual sewer mains.



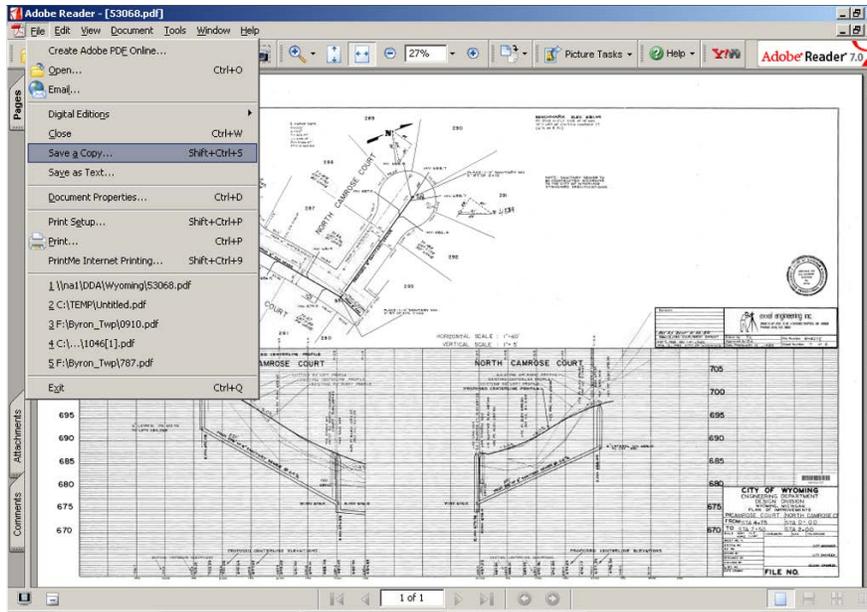
2. Select the **Access Linked Documents**  tool found on the REGIS toolbar. Return to the map and *left-click and hold* to draw a box **through** or **completely** around a sewer main. Release the mouse button after the sewer main is entirely inside the box.



3. A **Documents to View** window will appear showing documents that are linked to the sewer main feature you choose. Select a file name in the list and press **OK**. The linked document will open automatically in the appropriate viewer program (usually Adobe Reader).



4. The document can be printed or saved to your own directory by choosing the **Save a Copy** option in the **File** menu.



### Additional Information

For assistance with the Access Linked Documents tool, contact the REGIS Help Desk.

*End of Exercise 3.7*

## Exercise 4.1 – Page Setup in ArcMap

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In this exercise, you will learn how to:

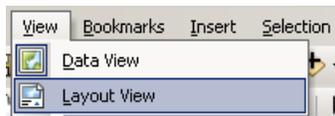
- ◆ Switch between the Data View and Page View
- ◆ Choose a printer and page size for your map

### Setup

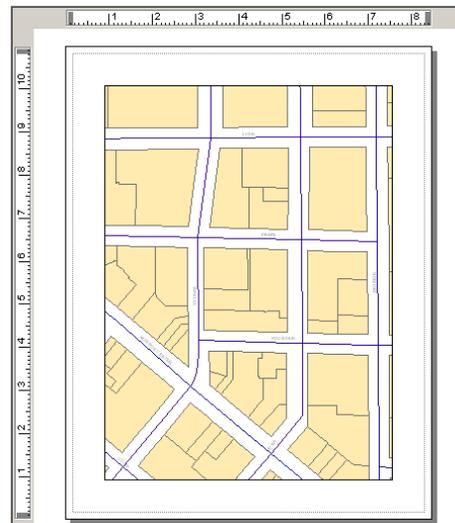
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame.

### Page Setup in ArcMap Tutorial

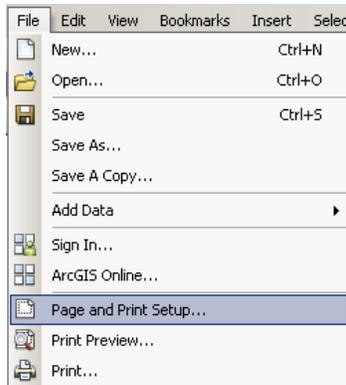
1. Notice in the bottom-left corner of the map area that there are four small buttons.  The first button should be selected to indicate the map-data area is in the **Data View**. Select the page icon  to switch from Data View to **Layout View**. An alternative way of switching between views is going to the View menu and choosing Layout View.



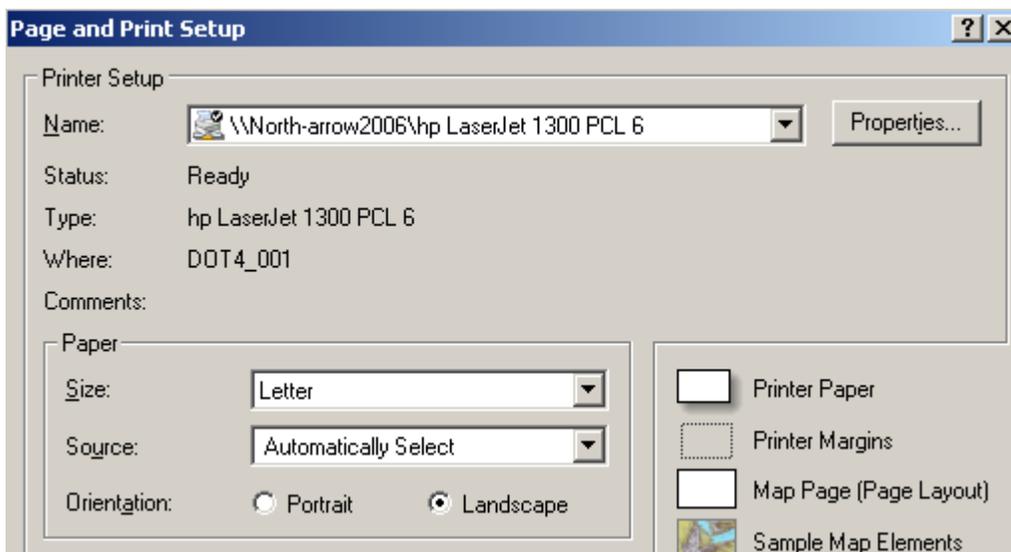
2. The Layout View displays how your map will look when it is printed or exported. The data frame containing your layers is still displayed but within the outline of a page. The default page size is a standard 8.5" x 11" sheet of paper. Verify this by glancing at the **Rulers** that appear on the top and left sides. Additionally, notice there are two borders on the page. The thick black line indicates the page boundary while the dotted gray line represents the printer margins. It is best to keep all page elements within the dotted gray line to avoid clipping errors when printing.



3. To change the page size or orientation, go to the **File** menu and choose **Page and Print Setup**.



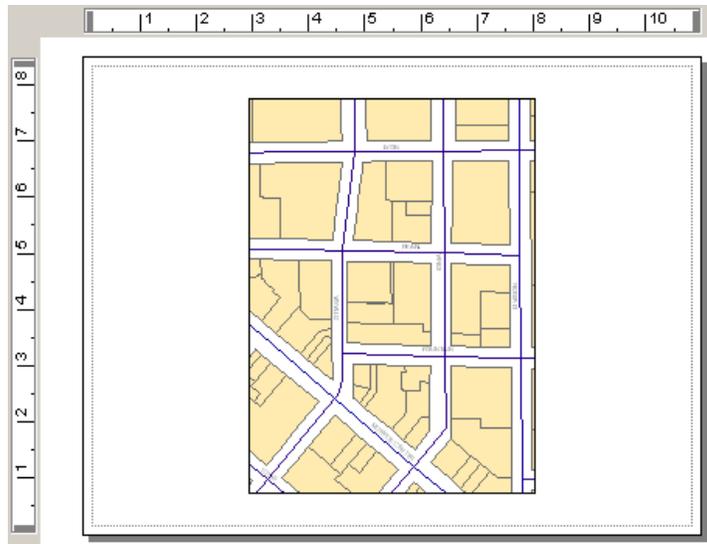
4. Chose an appropriate printer in the **Printer Setup** box. Then pick from the available paper sizes in the **Size** drop-down box. Lastly pick a page orientation. For this exercise, switch from Portrait to **Landscape**.



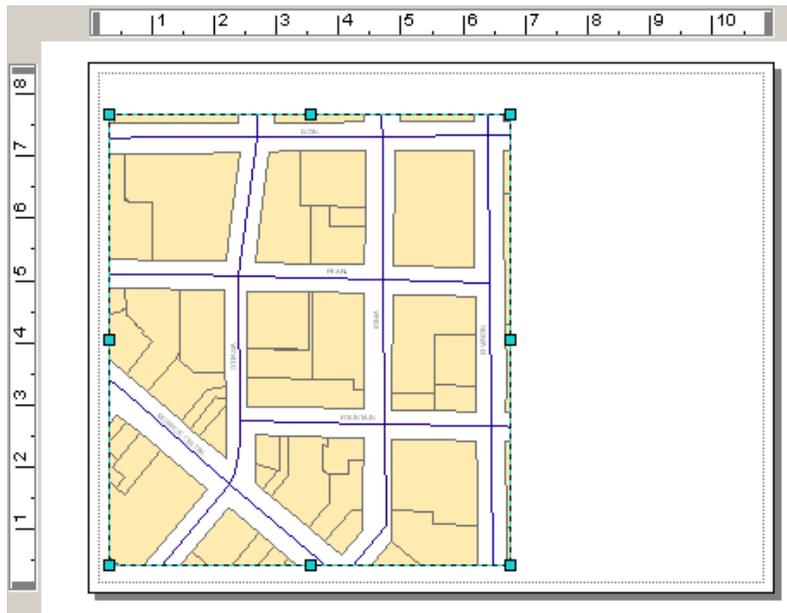
5. Find the checkbox at the bottom of the Page and Print Setup window entitled **Scale Map Elements proportionally to changes in Page Size**. It is good practice to check this box anytime you change the page size or orientation to ensure your map elements are adjusted and resized to stay within the page margins.



6. Press **OK** to close the Page and Print Setup window. The Layout View will be adjusted to landscape and your data frame will be resized to stay inside the margins.



7. Use the **Select Elements**  tool on the Tools toolbar to *left-click and hold* inside your data frame to drag it over to the left side of the page. Use the blue adjustment squares  that appear at the corners and sides of the data frame to resize it. *Left-click and hold* on a square  and drag it to another location.



## Additional Information

See the **Getting started with layout out and printing maps** section of the ArcGIS Desktop Help manual.

- [-]  Mapping and visualization
  - +  An overview of mapping and visualization
  - +  Using ArcMap
  - +  Working with layers
  - +  Navigating and interacting with maps
  - +  Adding graphics and text to maps
  - +  Symbolizing data
  - +  Animation
  - +  Using cartographic representations
- [-]  Page layout and map composition
  - [-]  **Getting started with laying out and printing maps**
    -  About laying out and printing maps
    -  Basics of making maps
    -  Setting up the page
    -  Working with map templates
  - +  Map elements
  - +  Grids and graticules
  - +  Rulers and guides
  - +  Working with data frames in layout view
  - +  Creating interactive and paperless maps
  - +  Map output

*End of Exercise 4.1*

## Exercise 4.2 – Moving Around the Page

---

In this exercise, you will learn how to:

- ◆ Use the Layout toolbar to move around the Layout View
- ◆ Navigate inside your Data View while in Layout View

### Setup

Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame. Switch from the Data View to the Layout View.

### Moving Around the Page Tutorial

1. Locate the Layout toolbar in your ArcMap interface. If it is not visible, turn it on by going to the **View** menu and choosing **Toolbars...Layout**. The Layout toolbar is used to navigate the page layout and does not affect your data frame or data layers in any way.



2. Select the **Zoom In**  tool to zoom in on the page. You can either *left-click* once to zoom in or *left-click and hold* to draw a rectangle to zoom to. The **Zoom Out**  tool works in a similar manner for zooming out from the page.
3. Another approach to zooming is to use the **Fixed Zoom In**  or **Fixed Zoom Out**  buttons. *Left-click* the buttons to zoom the page in or out at a fixed interval. Use the **Zoom Whole Page**  button to return to the full extent of the page layout.
4. Use the **Pan**  tool to move around the page. *Left-click and hold* and then drag the cursor to a different location.
5. Use the **Go back to extent**  and **Go forward to extent**  buttons to cycle between previous page layout extents.
6. It is still possible to navigate inside your data frame while in the page layout. Use the standard navigation tools  to zoom and pan around your data frame. This is useful for making small adjustments to the extent of the data that is displayed on your page. For

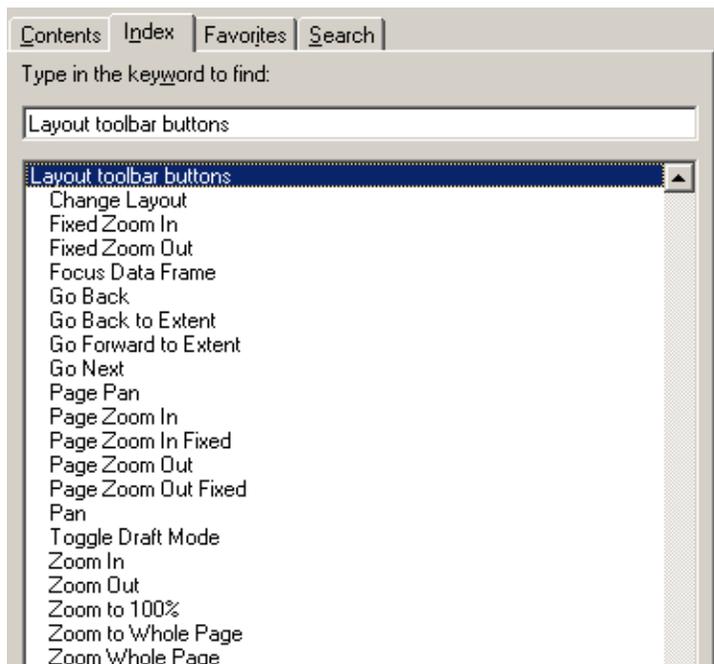
more extensive map changes, it is best to return to the Data View.

7. Switch back and forth between the Data View and Page View.  Notice that the map scale in the scale box  changes slightly between the two views. This change occurs because of the difference in relative proportions (i.e., height and width) between your Data View as it appears on your monitor and the size of your data frame on the page layout. To illustrate why this is important to be aware of, **return to the Data View** and enter an “inches to feet” scale like **1 inch = 400 feet**. Pressing the **Enter** key will convert the scale to the appropriate representative fraction (1:4800). Now **switch to Layout View** and notice that the map scale has changed. In the example below, this would present a problem if it went unnoticed and a map was provided to someone who thought the scale was 1 inch = 400 feet when in fact it was 1 inch = 555.4 feet (i.e., 1:6,665). The solution to this is to **always enter your preferred map scale while in Layout View**. Upcoming exercises will illustrate how to add a scale bar and scale text to the map for additional forms of verification.



### Additional Information

See the [Layout toolbar buttons](#) section of the ArcGIS Desktop Help manual. First select the [Index](#) tab and then enter the phrase [Layout toolbar buttons](#).



*End of Exercise 4.2*

## Exercise 4.3 – Inserting Map Elements

In this exercise, you will learn how to:

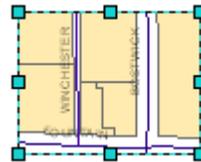
- ◆ Add a title, text, north arrow, scale bar, scale text and images to the Layout View

### Setup

Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame. Switch from the Data View to the Layout View.

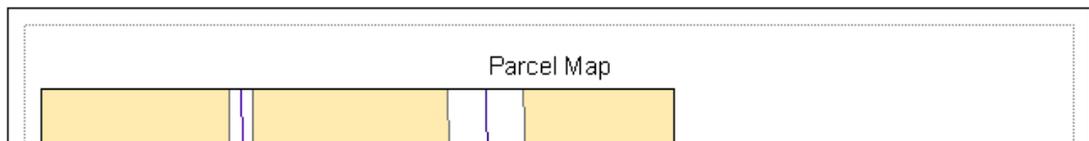
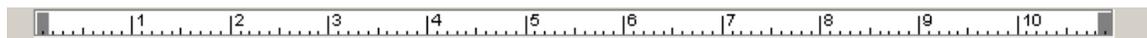
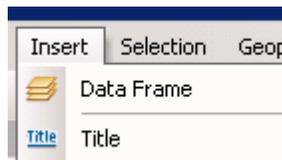
### Inserting Map Elements Tutorial

1. Everything on the page in Layout View is considered a **map element** (or **element** for short). The first time you access the Layout View the only element is the data frame itself. To modify any element on the page,

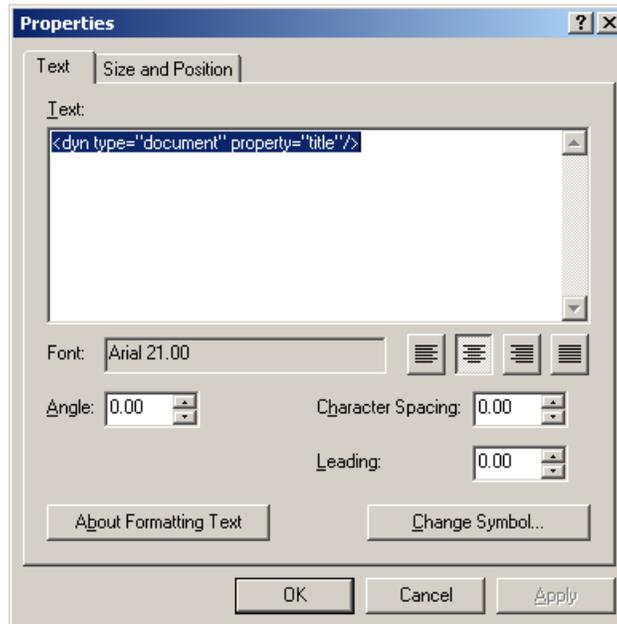


you must first select the **Select Elements**  tool (found on the Tools toolbar) and then *left-click* on the element. A selected element will appear with a dotted border and blue rectangles at the corners and sides.

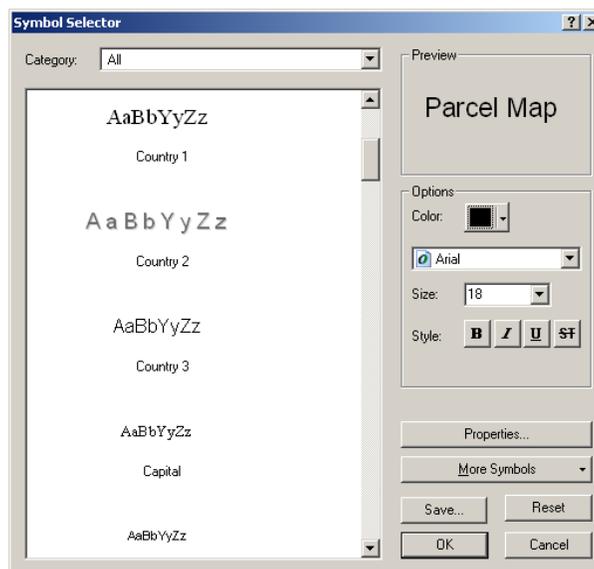
2. **Move an element** by *left-clicking and holding* inside of the element and then dragging it to a new location. **Resize an element** by *left-clicking and holding* on one of the blue rectangles  and dragging it to a new location.
3. To insert a title for the map, go to the **Insert** menu and select **Title**. A text box appears near the top of the page. Type an appropriate title and press enter to finish the title.



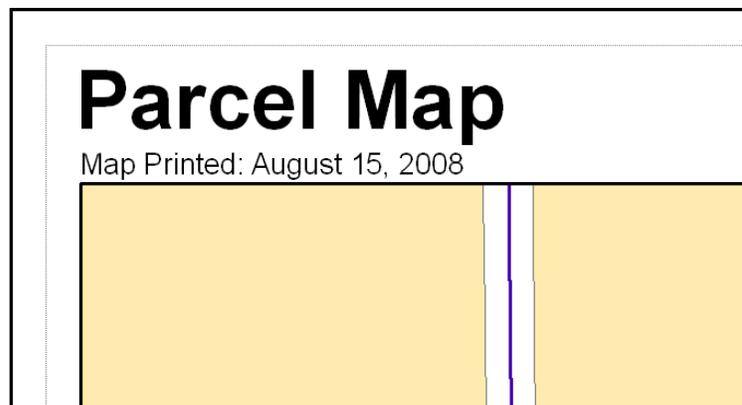
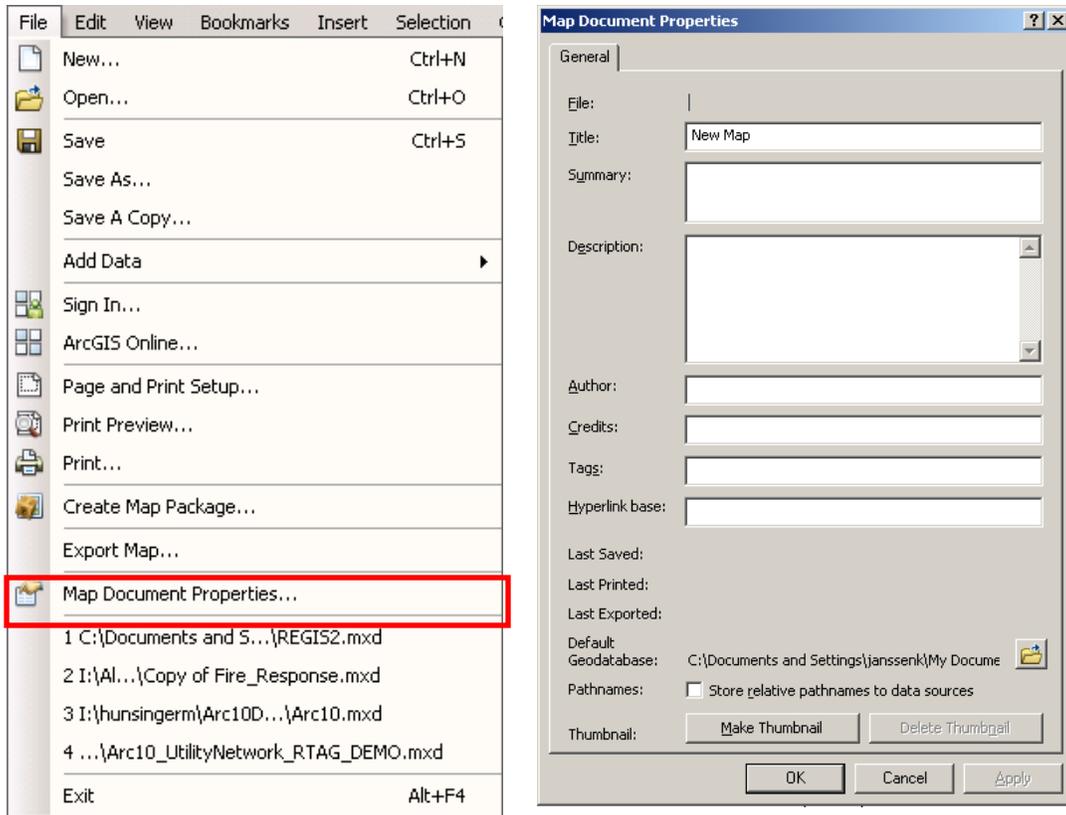
4. Use the **Select Elements**  tool to *right-click* on the title and select **Properties**. The Properties window is displayed where the text properties can be modified if necessary.



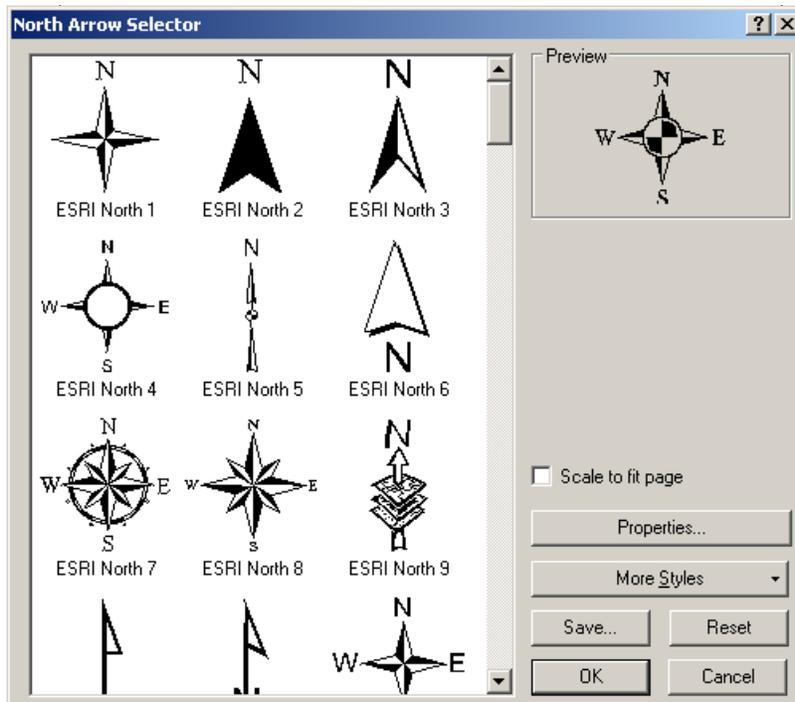
5. Press the **Change Symbol** button to open the Symbol Selector window where the font size type, size, color and style can be adjusted. Change the font size from 18 to **28** and select the **bold B** option. Press **OK** twice to return to the map.



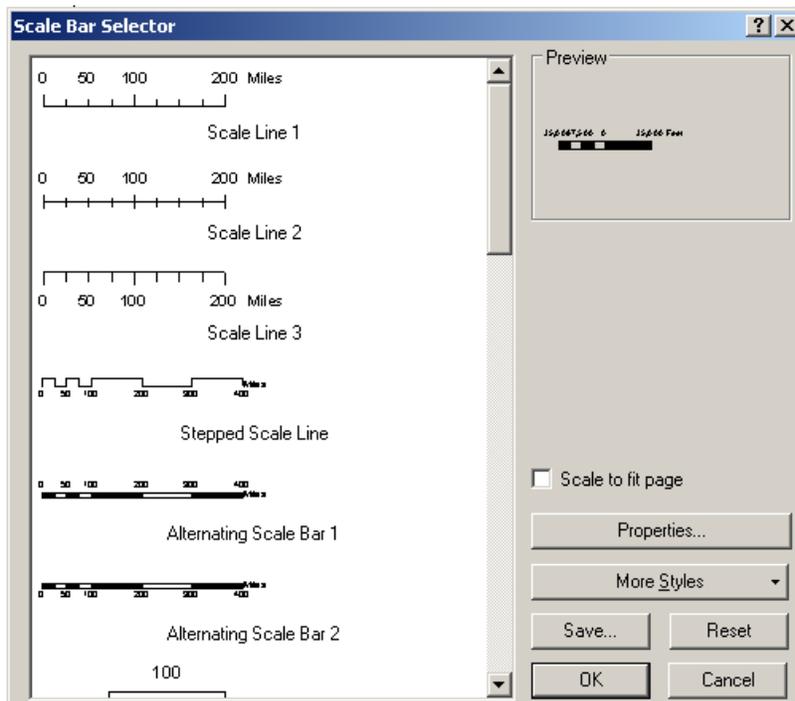
6. Additional text can be added by going to the **File** menu and choosing **Map Document Properties**. The **Select Elements**  tool can be used to modify the text, change the font properties and move it to a different location on the map.



7. Go to the **Insert** menu and choose **North Arrow**. The North Arrow Selector window appears to allow you to choose from a variety of north arrow types. Select one and press **OK** to add it to the page. Adjust its size and location using the **Select Elements**  tool.



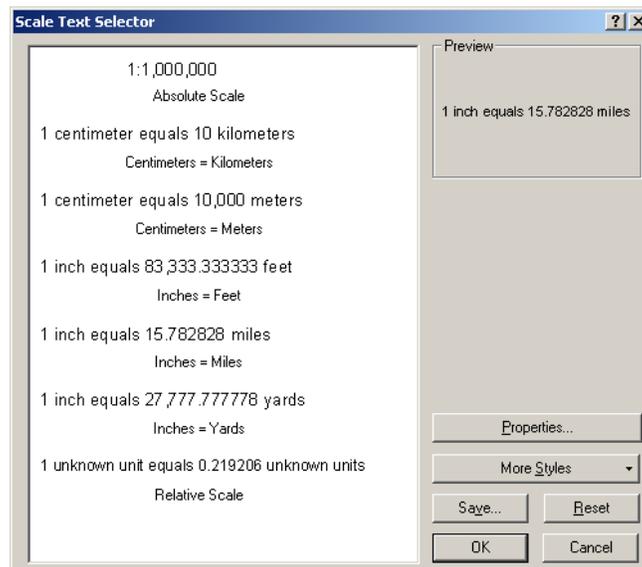
- Go to the **Insert** menu and choose **Scale Bar**. The Scale Bar Selector window appears and allows you pick from a variety of different types of scale bars. Select one and press **OK** to add it to the map. Adjust its size and location using the **Select Elements**  tool.



9. The scale bar is linked to your data frame so it will adjust its numbers automatically whenever the data frame is zoomed in or out. To demonstrate this, first use the **Zoom In**  tool button on the Layout toolbar to zoom in on the scale bar. Note the numbers on the scale bar and then press the **Fixed Zoom In**  button for the map found on the Tools toolbar. The scale bar will adjust its numbers to a smaller range.



10. In addition to a scale bar, scale text (e.g., 1 inch equals 400 feet) can be added to map. Go to the **Insert** menu and choose **Scale Text**. The Scale Text Selector window appears and allows you to pick the units involved. Most often you will want to select the **Inches = Feet** option. Press **OK** and the scale text is added to your map. Just like the scale bar, the scale text is linked to your data frame so experiment with zooming in and out using the map zoom tools  and notice how the scale text changes.



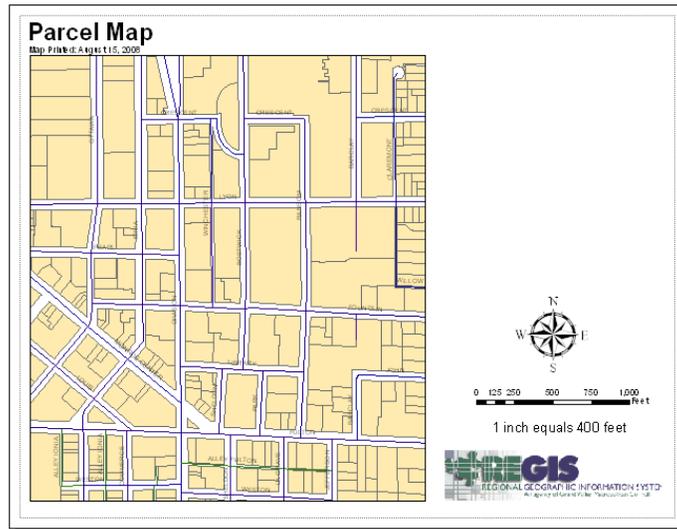
11. Locate the map scale box and type in **1:4800**. Press **Enter** and note that the scale text on the page layout displays the proper conversion of **1 inch equals 400 feet**.



12. Other graphics can be added to the map by going to the **Insert** menu and choosing **Picture**. A variety of image formats are supported, including

JPEG, GIF, TIFF and PNG. Navigate to the image location and press **Open**.

13. At this point, your map should have a title, text, north arrow, scale bar, scale text and possibly an image. The last map element to add is the legend and this will be discussed in the next exercise.



## Additional Information

See the **Map elements** section of the ArcGIS Desktop Help manual.

- [-] Mapping and visualization
  - [+] An overview of mapping and visualization
  - [+] Using ArcMap
  - [+] Working with layers
  - [+] Navigating and interacting with maps
  - [+] Adding graphics and text to maps
  - [+] Symbolizing data
  - [+] Animation
  - [+] Using cartographic representations
- [-] Page layout and map composition
  - [+] Getting started with laying out and printing maps
  - [-] **Map elements**
    - [+] Adding north arrows, scale bars, and other map elements
    - [+] Working with titles
    - [+] Working with legend patch shapes
    - [+] Working with graphic elements, pictures, and neatlines

*End of Exercise 4.3*

## Exercise 4.4 – Inserting a Legend

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In this exercise, you will learn how to:

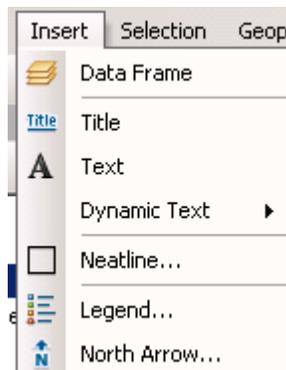
- ◆ Add a map legend to the Layout View

### Setup

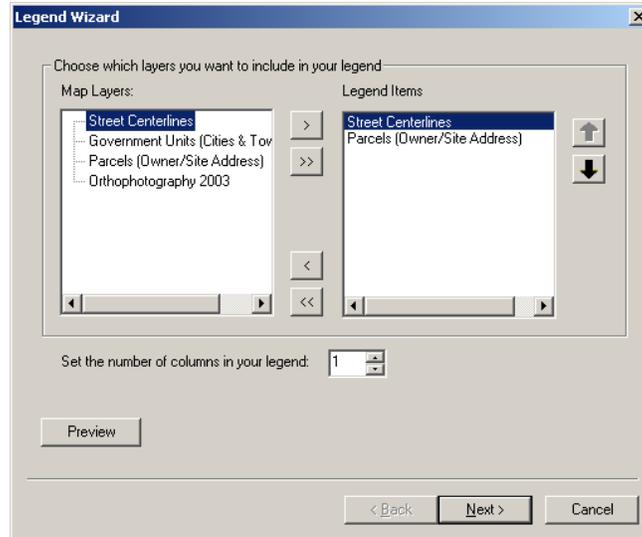
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame. Switch from the Data View to the Layout View.

### Inserting a Legend Tutorial

1. Go to the **Insert** menu and choose **Legend**.



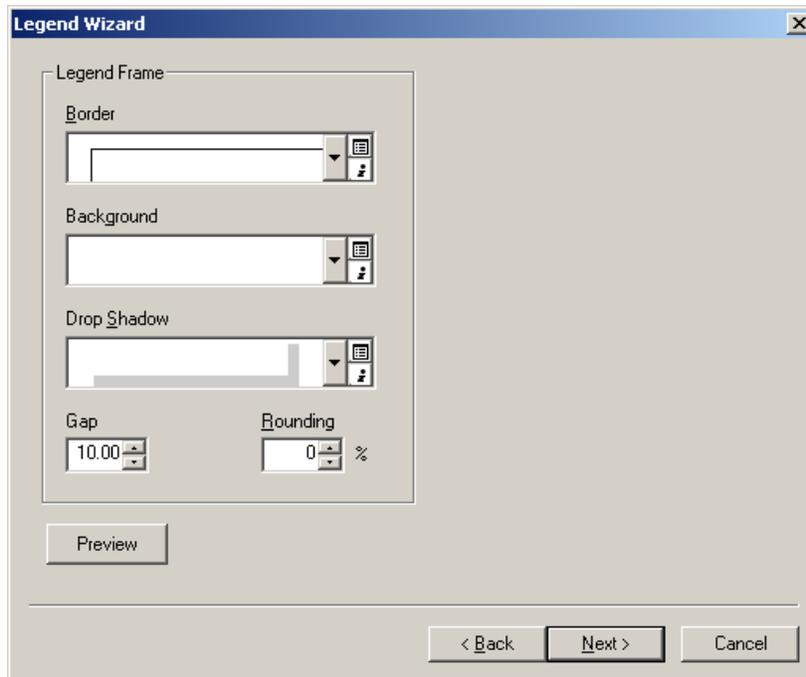
2. The **Legend Wizard** appears with the first screen asking you to choose which layers will be in the legend. All the data layers in your map appear on the left side under **Map Layers** while the **Legend Items** list on the right side contains the layers that will appear in the legend. Initially, only the layers that are turned on will be listed as legend items but you can use the **≥** and **≥≥** buttons to move one or all of the layers into the legend. Click **Next** to continue.



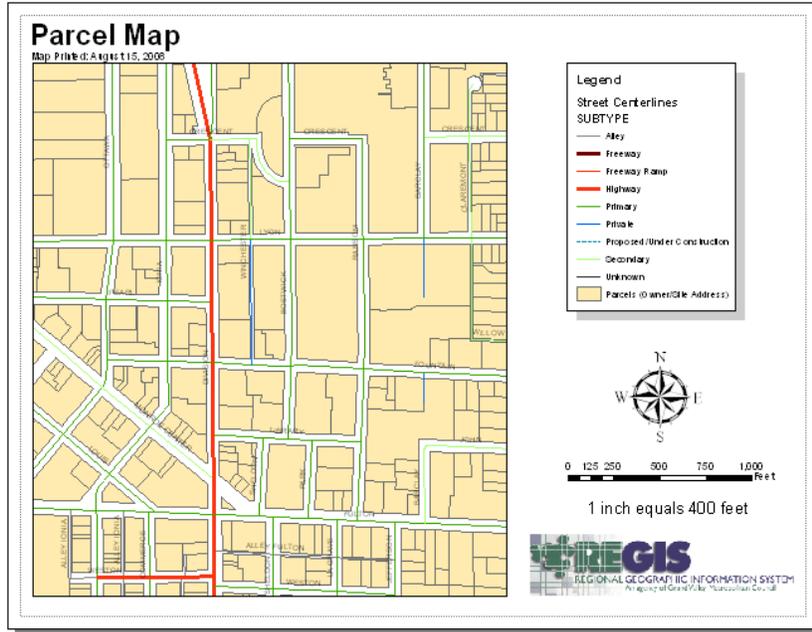
3. The **Legend Title** screen appears and offers you a chance to change the title and font style of the legend. Press **Next** to continue.



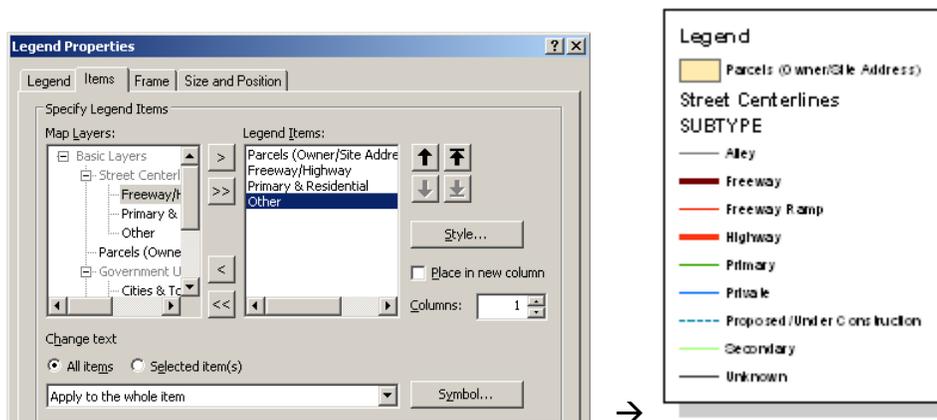
4. The **Legend Frame** screen appears and allows you to add a border, background color or drop shadow to the legend. For example, choose a thin border with a gray drop shadow. Press **Next** to continue.



5. The next screen in the Legend wizard gives you the opportunity to change size and shape of the symbol that will appear next to the layer name in the legend. For now, just press **Next** to continue.
6. The final screen allows you to make spacing adjustments for the components of the legend. For now, just press **Finish** and the legend will be added to the Layout View.
7. Use the **Select Elements**  tool to move the legend to an appropriate location on the page and resize it if necessary.



8. The legend is fully customizable. One common adjustment is to reorder the layers. In the example legend above, the Parcels layer is listed below the street centerlines layer but you may want to move it above the street categories. *Right-click* on the legend and select **Properties**.
9. Select the **Items** tab on the Legend Properties window. The order of layers in the legend is shown in the **Legend Items** list box. Select the parcels layer and *left-click* the up arrow  to move the parcels above the street centerlines. Press **OK** and the legend is updated.

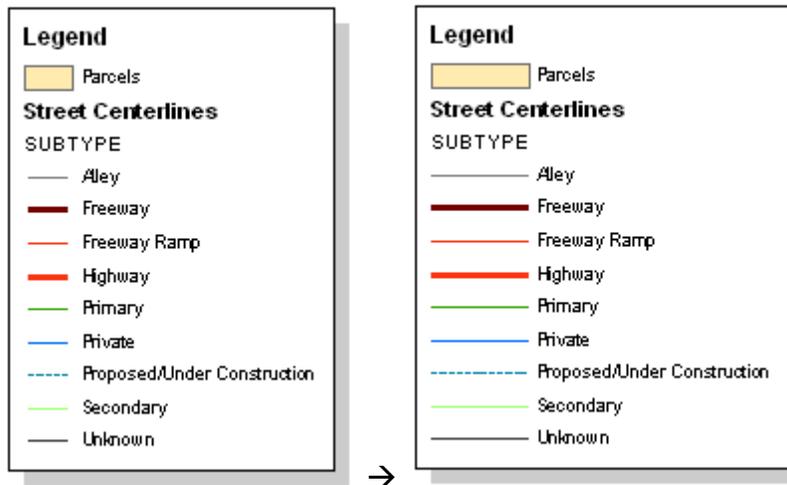
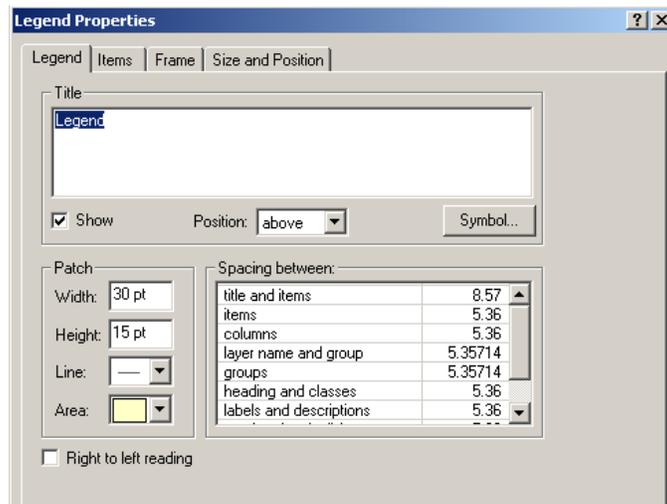


10. Another customization option is to change the layer name in the legend. For example, in the legend above, the parcels layer is named “Parcels (Owners/Site Address).” It would make more sense to shorten this to just Parcels. The easiest solution is to simply rename the layer in the Table of Contents. *Left-click* on the layer name to highlight it, press **F2**, and type a

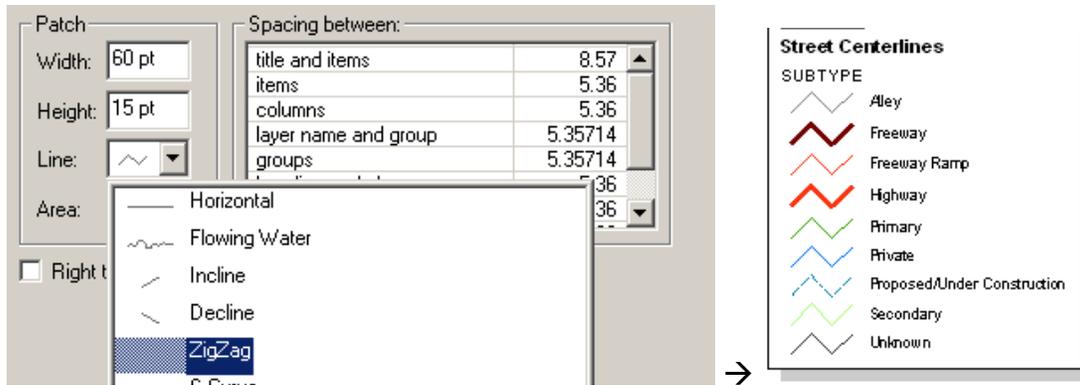
new name for the layer. The legend will automatically update.



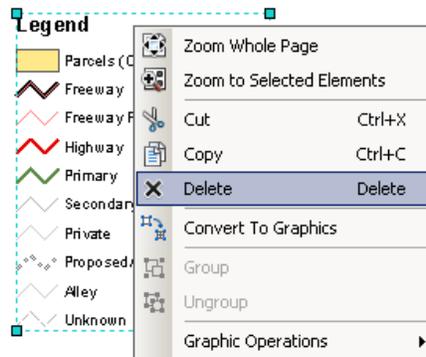
- Return to the Legend Properties window and select the **Legend** tab. Here the legend title can be changed or removed by un-checking the **Show** checkbox. Also, the size of each legend symbol can be adjusted in the **Patch** box. For example, change the **Width** in the text box from 30 to 60 and press **OK**.



- Return to the **Legend** tab again and change the line symbol from Horizontal to **ZigZag**. Press **OK** and notice how the line symbols change their style.



13. To remove the legend or any map element from the Layout View, *right-click* on it and select **Delete**.



### Additional Information

See the **Map elements** section of the ArcGIS Desktop Help manual.

- [-] Mapping and visualization
  - [+] An overview of mapping and visualization
  - [+] Using ArcMap
  - [+] Working with layers
  - [+] Navigating and interacting with maps
  - [+] Adding graphics and text to maps
  - [+] Symbolizing data
  - [+] Animation
  - [+] Using cartographic representations
  - [-] Page layout and map composition
    - [+] Getting started with laying out and printing maps
    - [-] **Map elements**
      - [+] Adding north arrows, scale bars, and other map elements
      - [+] Working with titles
      - [+] Working with legend patch shapes
      - [+] Working with graphic elements, pictures, and neatlines

*End of Exercise 4.4*

## Exercise 4.5 – Printing Maps

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In this exercise, you will learn how to:

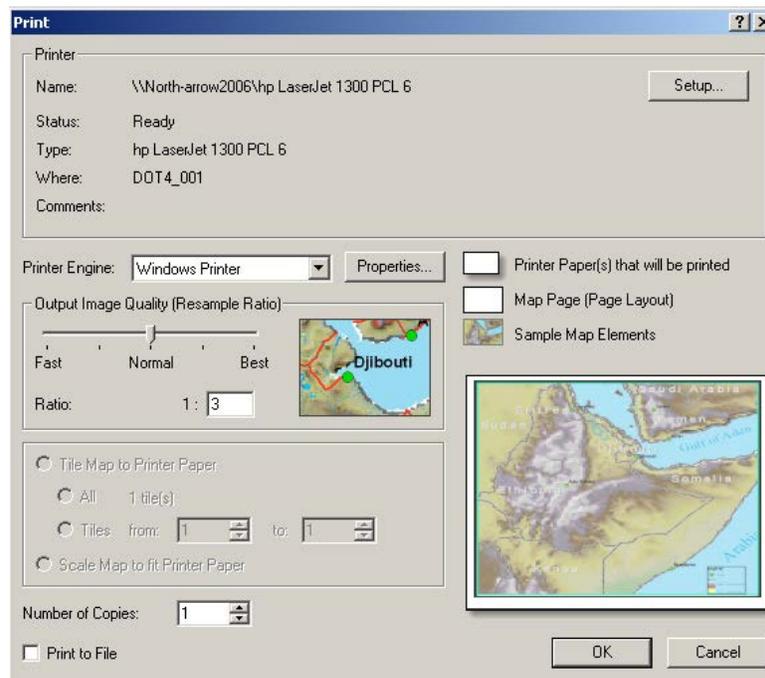
- ◆ Print maps in both the Layout and Data Views

### Setup

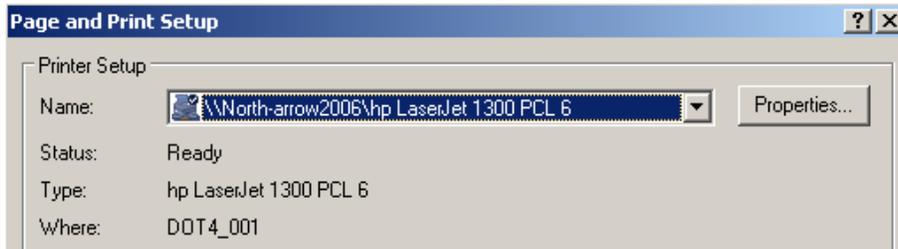
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame. Switch from the Data View to the Layout View and add any additional map elements before printing.

### Printing Maps Tutorial

1. After you have completed setting up your map elements in the Layout View, go to the **File** menu and choose **Print**.



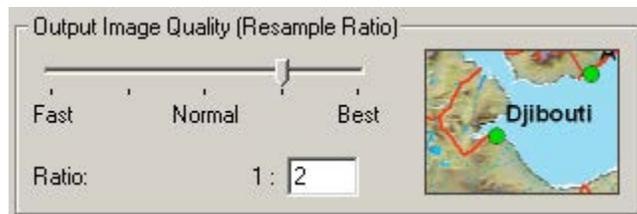
2. The **Printer** box displays the name of the chosen printer. If this is incorrect, select the **Setup** button and choose a different printer from the **Page and Print Setup** window.



3. The **Printer Engine** drop-down box should be set to **Windows Printer** already. Use the **Properties** button next to it to access the standard Windows printer properties to change color settings, paper types, scaling, etc.



4. **If your map contains aerial photography**, you may want to adjust the **Output Image Quality** box. Moving the slider to the Best setting will increase the resolution of the photos when printed but will also increase the printing time and may cause printer memory issues on very large maps. ESRI recommends using the setting between Normal and Best as a compromise. Again, this is only applicable if your data contains aerial photography or other raster datasets.



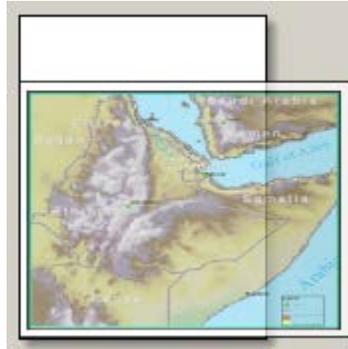
5. Set the **number of copies** to be printed in the lower-left corner of the Print window.



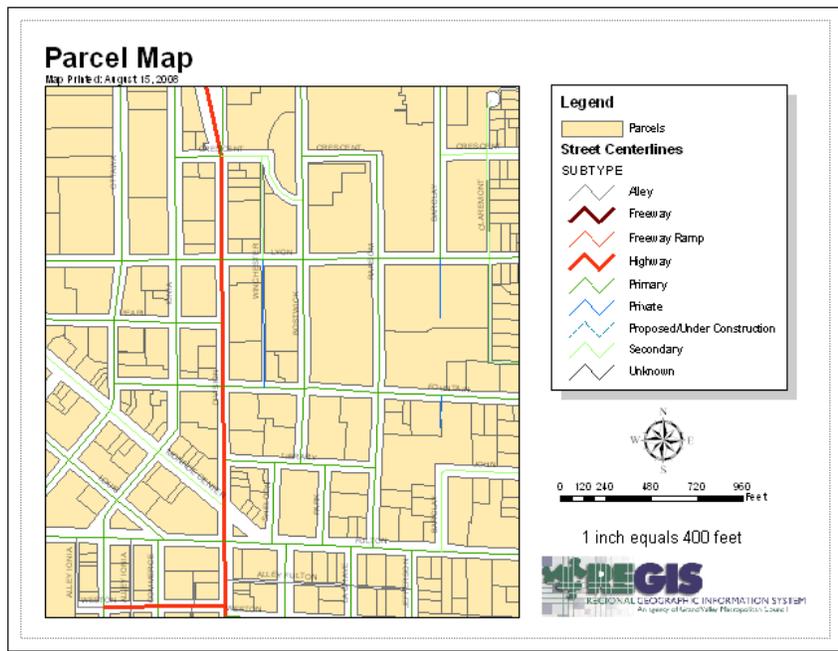
6. The bottom-right side of the Print windows contains a graphic that represents how your page layout is going to be printed in relation to the printer's page settings. Most of the time the image will fill the paper size exactly.



If for some reason the printer page settings have changed, the graphic would indicate the map will not print correctly. Use the **Page and Print Setup** window to correct the page issue.



7. Press the **OK** button to send the map to the printer. This process may take anywhere from several seconds to over 10 minutes depending on the size and complexity of the map.



8. Maps can also be printed from the Data View. Switch back to the Data View      and go to **File** menu and choose **Print**. The Print window appears and all the settings and options are the same as printing from the Layout View. The only difference is the printed map will only contain the data frame portion and not the additional map elements (e.g., legend, scale bar, north arrow, etc.) as shown in the Layout View.

Pressing **OK** will print the data as it appears inside of your Data View and it may add surrounding areas to fill the entire page size of the printer.

## Additional Information

See the **Map output** section of the ArcGIS Desktop Help manual.

- [-]  Mapping and visualization
  - [+]  An overview of mapping and visualization
  - [+]  Using ArcMap
  - [+]  Working with layers
  - [+]  Navigating and interacting with maps
  - [+]  Adding graphics and text to maps
  - [+]  Symbolizing data
  - [+]  Animation
  - [+]  Using cartographic representations
- [-]  Page layout and map composition
  - [+]  Getting started with laying out and printing maps
  - [+]  Map elements
  - [+]  Grids and graticules
  - [+]  Rulers and guides
  - [+]  Working with data frames in layout view
  - [+]  Creating interactive and paperless maps
  - [-]  **Map output**
    -  Printing a map
    -  Printing with the ArcPress printer engine
    -  Exporting a map

*End of Exercise 4.5*

## Exercise 4.6 – Exporting Maps

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In this exercise, you will learn how to:

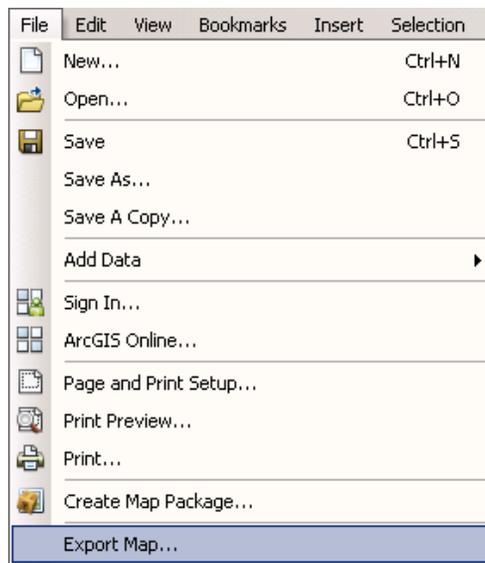
- ◆ Export maps to image formats such as JPEG, GIF and TIFF
- ◆ Export maps to PDF
- ◆ Control layer visibility in PDF maps

### Setup

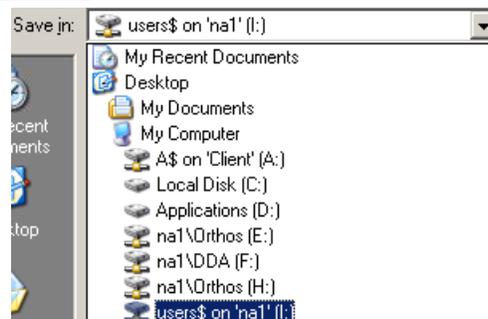
Log in to the REGIS Application Web Interface and launch ArcView 10. Use the Layer Manager button on the REGIS toolbar to add the Basic Layers (Group Layer) to the data frame. Switch to the Layout View and add any additional map elements before exporting.

### Exporting Maps Tutorial

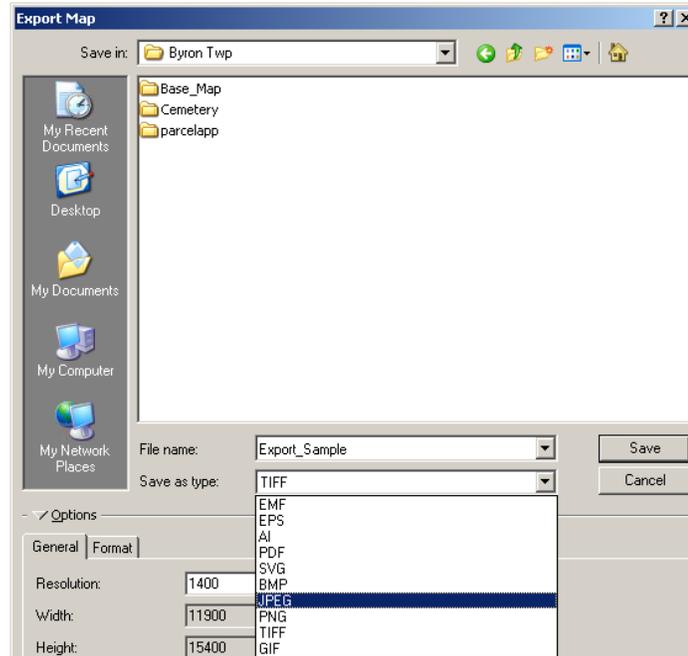
1. Either the Data View or Layout View can be exported to image formats such as JPEG, GIF and TIFF. Go to the **File** menu and choose **Export Map**.

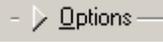


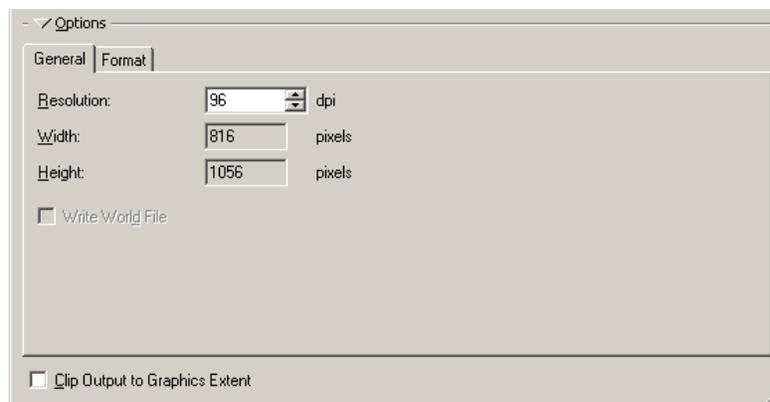
2. The **Export Map** window will appear and allow you to pick a location to save the exported map. Select the drop-down icon next to where it says **Save in:** Choose **users\$ on 'Na1' (I:)**.



- You will see a series of folders with everyone's user names. Navigate to your username or your community's folder, and double click. Use the **Save as type** drop-down box to select a file type. For this example, choose **JPEG (\*.jpg)**. Then enter a file name.



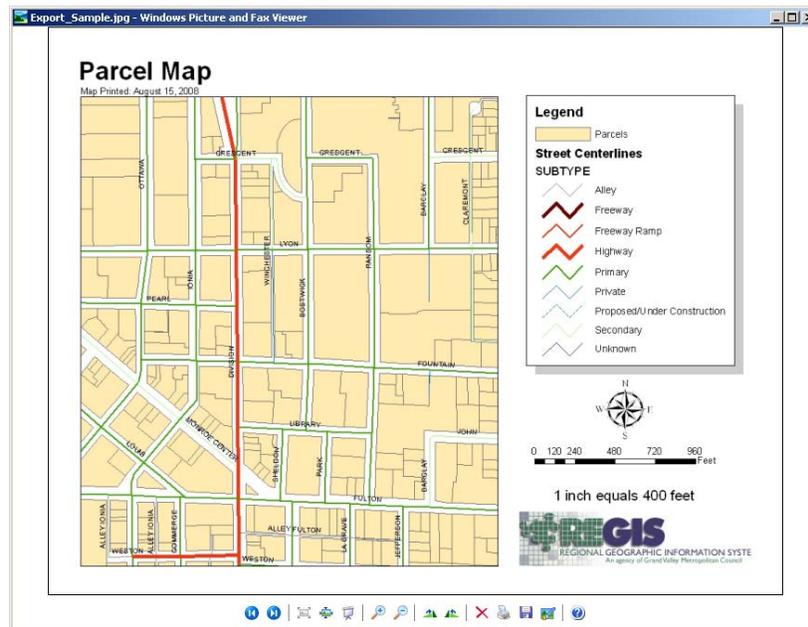
- If the **Options** portion of the window is not shown , click on the triangle or the Options text to expand the section. All image formats will have a **Resolution** box that can be adjusted using the arrows or typing a new value into the text box. Increasing the dpi will increase the file size and vice versa. Resolution often becomes important when you are emailing an exported map. If the file size is too large to email, reducing the resolution will decrease the file size. It may take several exports to determine the optimal resolution.



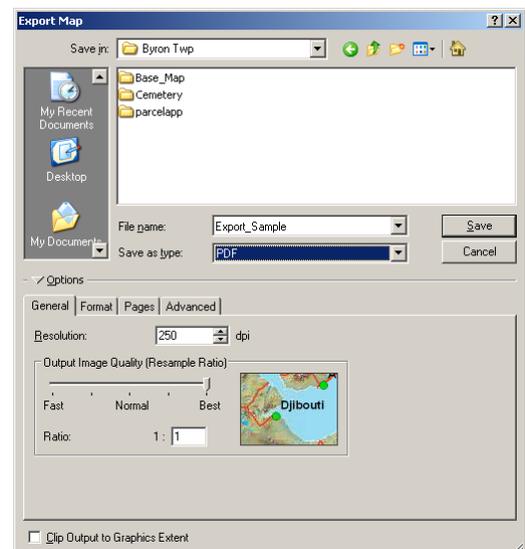
- Press **Save** to start the export. The export could take anywhere from several seconds to minutes depending on the map size, complexity and resolution of the export. The export progress will be displayed at the far-left portion of the status bar found at the bottom of the ArcMap interface. The status bar will display Export complete when it is finished.

Export complete

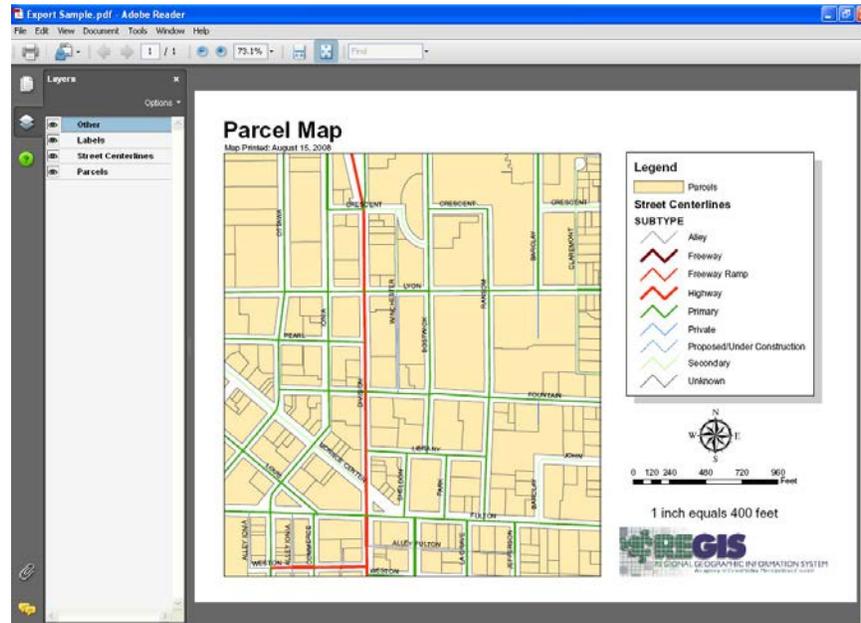
- The exported image can be opened in any Windows program that can read JPEG images.



- Maps can also be exported to PDF. Return to the **Export Map** window and choose **PDF (\*.pdf)** as the Save as type.
- PDF exports also have an Options section where the **Resolution** can be set. The best resolution again depends on the circumstances and how the map will be used. Unlike the image format exports, there is also an **Output Image Quality** box. This setting is only used when a raster layer like the aerial photographs are present in the map. Increasing it from Normal to Best will improve the output PDF but increase the file size and vice versa.



9. Press **Save** to run the export. Locate the exported PDF and open it in Adobe Reader.



10. An added feature in PDF exports is the ability to control layer visibility. If the **Layers** side panel is not visible, go to the **View** menu and choose **Navigational Panels** and then **Layers**.



11. The Adobe Reader Layers list should be similar to your ArcMap Table of Contents. Each layer that was turned on in ArcMap for the export will show up as an individual item that can be turned on or off in the PDF. All of the other map elements (e.g., legend, scale bar, north arrow, etc.) will appear in the **Other** layer while all the labels on your map will show up in the **Labels** layer. Click the eye icon  to turn each layer on or off.

## Additional Information

See the **Exporting a map** section of the ArcGIS Desktop Help manual.

- [-]  Mapping and visualization
  - [+]  An overview of mapping and visualization
  - [+]  Using ArcMap
  - [+]  Working with layers
  - [+]  Navigating and interacting with maps
  - [+]  Adding graphics and text to maps
  - [+]  Symbolizing data
  - [+]  Animation
  - [+]  Using cartographic representations
- [-]  Page layout and map composition
  - [+]  Getting started with laying out and printing maps
  - [+]  Map elements
  - [+]  Grids and graticules
  - [+]  Rulers and guides
  - [+]  Working with data frames in layout view
  - [+]  Creating interactive and paperless maps
- [-]  Map output
  -  Printing a map
  -  Printing with the ArcPress printer engine
  -  **Exporting a map**

*End of Exercise 4.6*