Introduction to Coastal GIS

Event was held on Tues, 1/8/13 - Thurs, 1/10/13
Time: 9:00 am to 5:00 pm
Location: Roger Williams University, Bristol, RI

Audience: The intended audiences for this course are federal and state personnel, municipal staff and officials, and NGOs. This course is not open to private companies or students.

Description: This three-day NOAA Coastal Services Center instructor-led course provides students with knowledge and skills to successfully use ArcGIS version 10.1 desktop software. Framed in a coastal management context, the course begins with geographic information system (GIS) fundamentals and introduces tools and techniques useful for addressing coastal issues.
In addition to lectures, demonstrations, and exercises in ArcGIS, the course incorporates small group activities and class discussion to reinforce concepts learned in lecture and exercises.
At the conclusion of this course, participants will be able to:

- Understand basic GIS concepts and terminology
- Explore spatial data in ArcGIS using basic navigation tools
- Use ArcGIS tools and methods to create and edit spatial data
- Analyze spatial data using basic selection and geoprocessing tools
- Design a map that incorporates basic elements

Cost: $70.00. This cost includes class materials and a light breakfast, lunch, and afternoon snacks each day.

Registration is required.

Course Instructor*:* **Michael Rink**
Geo On The Go, LLC provides GIS training and consulting services to customers throughout the US. The company is headed by Michael Rink - a GIS Analyst and Instructor who has over 25 years of experience in GIS technologies. Mike worked eight years at the NC state government GIS data clearinghouse. He then worked at NOAA's Coastal Services Center for over 10 years as a GIS Analyst and Instructor. Mike formed Geo On The Go in 2006 as his own consulting company to provide quality GIS training and geoservices to professionals across the US. Mike received his BS degree in Geography at Appalachian State University and a Masters in GIS degree through Pennsylvania State University. Additionally, Mike is an Esri-authorized instructor in various ArcGIS courses and is a registered GIS Professional (GISP) as established by the GIS Certification Institute.

Introduction to Coastal GIS
Course Outline

Course Schedule

- We will begin each morning at 8:30 and end at 5:00 PM
- We will break for lunch at approximately 12:00 PM for 1-hour
- Each day will include a 15-minute morning and afternoon break

Course Objectives

At the conclusion of this course, participants will be able to:

- Understand basic GIS concepts and terminology
- Explore spatial data in ArcGIS using basic navigation tools
- Use ArcGIS tools and methods to create and edit spatial data
- Analyze spatial data using basic selection and geoprocessing tools
- Design a map in ArcMap that incorporates basic map elements

Day 1

Course Introduction

- Instructor and Student Introductions
- Logistics
- Course Objectives
- What to Expect

Module 1 – GIS Theory and Basics

- **Lecture:**
  - What is GIS?
  - Modeling Spatial Phenomena
  - GIS Data Properties
  - Spatial Reference
- **Demonstration:**
  - Scale, Resolution, and the Temporal Aspect of Spatial Data
- **Lecture:**
  - Data Formats
- **Demonstration:**

- Data Exploration in ArcCatalog
- **Class Activity:**
  - Class Exercise Introduction

Module 2 – Data Management

- **Lecture:**
  - Introduction to ArcCatalog
  - Data Management in ArcMap
  - Obtaining Spatial Data
  - Data Conversion
- **Exercise 1:** Obtaining Spatial Data
  1. Find Data Online
  2. Access Data Using ArcIMS
  3. Data Conversion
- **Lecture:**
  - Metadata and Data Quality
- **Class Activity:**
  - Assessing Data for Your Coastal Application

Day 2

Module 3 – Exploring Spatial Data

- **Lecture:**
  - Introduction to ArcMap
- **Exercise 2:** Exploring ArcMap
  1. Explore the Table of Contents
  2. Explore the Tools Toolbar
  3. Explore the Layer Properties Dialog
- **Demonstration:**
  - Additional ArcMap Functionality
- **Lecture:**
  - Attribute Tables
  - Table Associations
- **Exercise 3:** Exploring Tables
  1. Explore the Table Window
  2. Perform a Table Association
  3. Perform Field Calculations
- **Class Activity:**
  - Assess data attribution for your coastal application

Module 4 – Working with Spatial Data

- **Lecture:**
  - Data Creation Techniques
- **Exercise 4:** Spatial Data Creation
  1. Create a New Feature Class
  2. Digitize Point Features
  3. Add X,Y Data
- **Lecture:**
  - Map Projections
- **Exercise 5:** Spatial Reference
  1. Examine Spatial Reference Information
  2. Change Spatial Reference
- **Lecture:**
  - Editing in ArcMap
- **Demonstration:**
  - Editing Tools and Workflows
- **Exercise 6:** Editing Data
  1. Create New Polygon Features
  2. Modify Line Features
  3. Modify Polygon Features

Day 3

Module 5 – Spatial Analysis and Geoprocessing

- **Lecture:**
  - Spatial Analysis Defined
  - Selections in ArcGIS
- **Exercise 7:** Selection Tools
  1. Feature Extraction
  2. Location-based Selections
- **Lecture:** Geoprocessing
  - Geoprocessing Overview
  - Geoprocessing Tools
- **Exercise 8:** Geoprocessing
  1. Prepare Analysis Inputs
  2. Perform Overlay Analysis

- **Demonstration:**
  - ModelBuilder
- **Class Activity:**
  - Tools for your Coastal Application

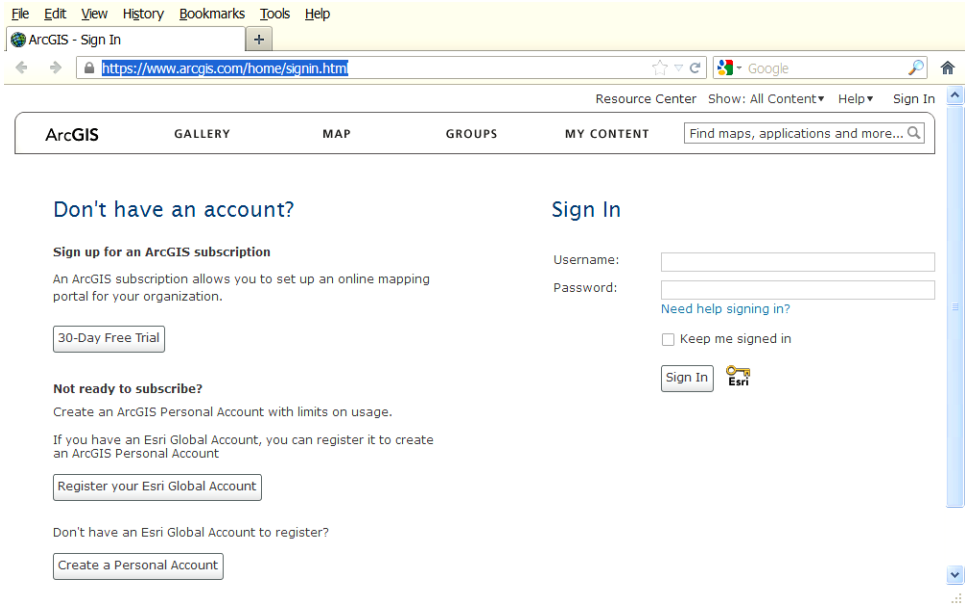
Module 6 – Cartography

- **Lecture:**
  - Symbolizing Spatial Data
  - Data Classification
- **Demonstration:**
  - Classification Methods
- **Exercise 9:** Symbology
  1. Qualitative Symbolization
  2. Quantitative Symbolization

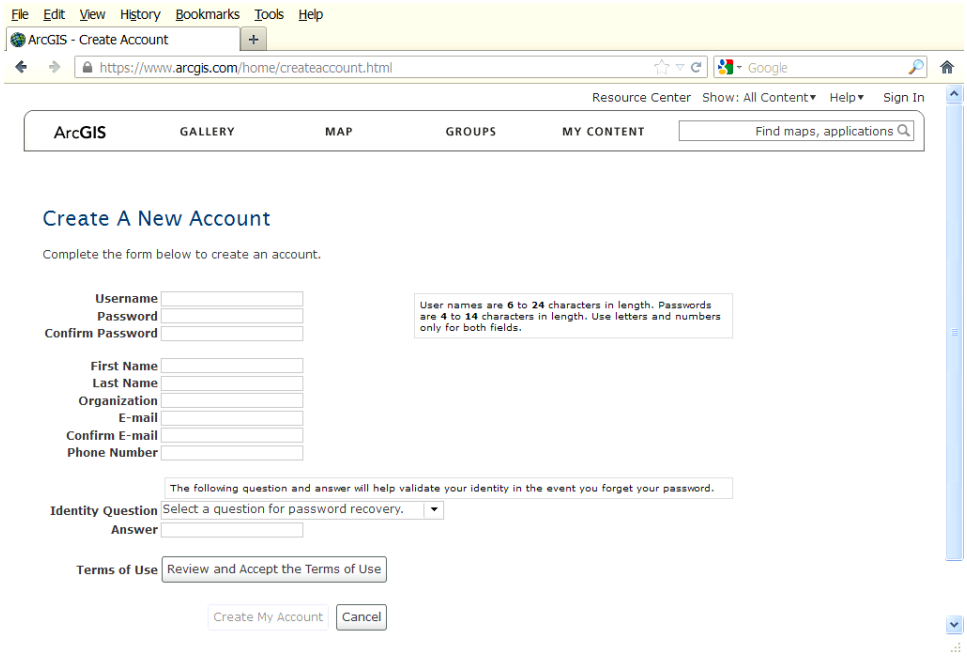
- **Lecture:**
  - Labeling and Annotation
- **Exercise 10:** Labels and Annotation
  1. Prepare Layers for Labeling
  2. Label Features
  3. Create Annotation
- **Demonstration:**
  - Additional Labeling and Annotation Features
- **Lecture:**
  - Map Design
- **Discussion:**
  - Map Critique
- **Lecture:**
  - Map Development
- **Exercise 11:** Map Layouts
  1. Set Up Data Frames
  2. Layout Map Page
  3. Add Map Elements
- **Class Activity:**
  - Create a map for your coastal application

Getting Started with ArcGIS Online

- Open a web browser and go to https://www.arcgis.com/home/signin.html. If you've already established a user account on the ArcGIS website you can sign-in, otherwise click on **Create a Personal Account** in the lower left corner.

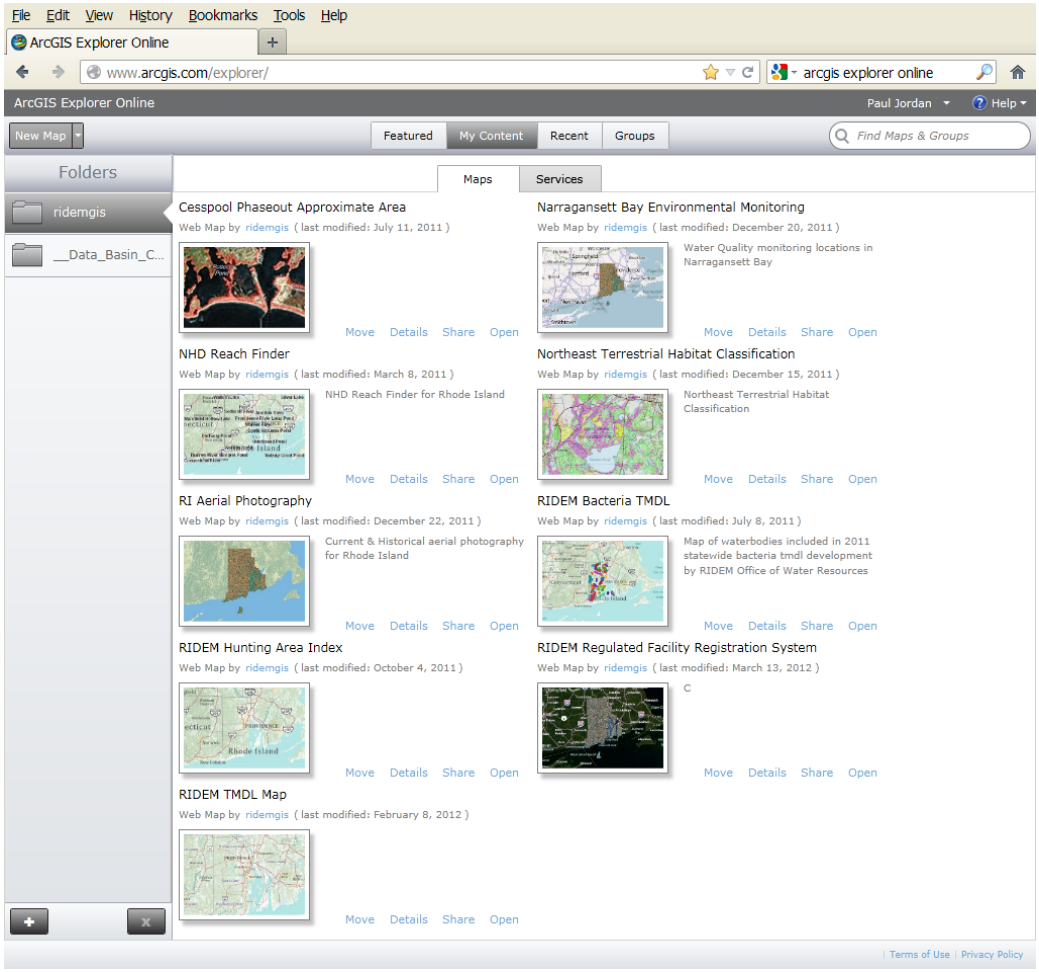


- Click on Create a Personal Account and fill out the form completely, review and accept the Terms of Use, and click **Create My Account**.



- The page will automatically redirect, but not to where we want to be for this demo. Navigate to http://www.arcgis.com/explorer/. You should already be logged in, but if not do so now.

- Your screen will look something like this if you've already created content using ArcGIS Online; otherwise it should be blank.

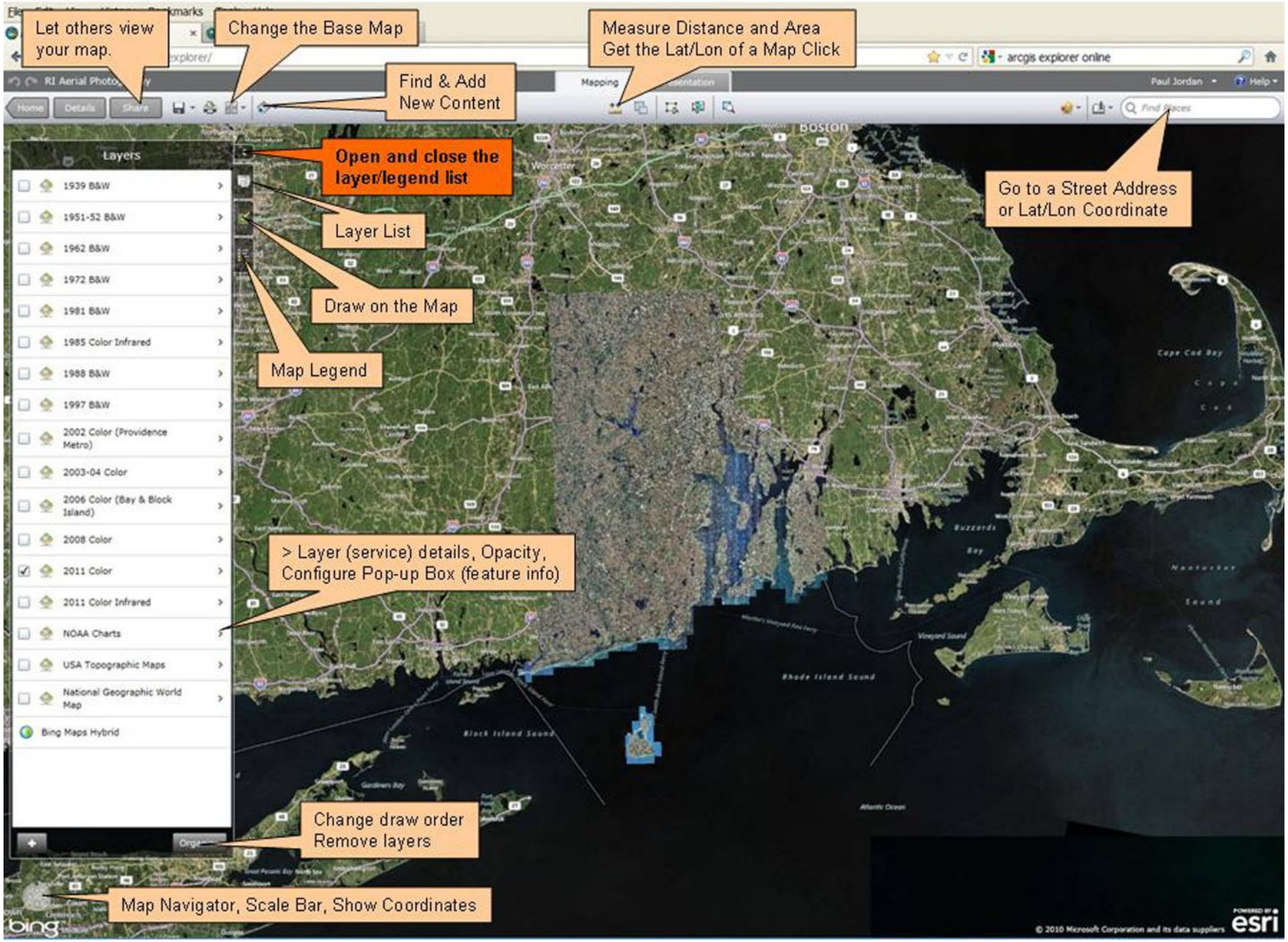


- The easiest way to begin is to piggyback off of an existing map. In the upper right corner, find the search box labeled **Find Maps & Groups** and enter **Rhode Island**. You should get back a page similar to the one above, listing over 100 maps made to date featuring RI-specific information.

- Open the one named **RI Aerial Photography**. Take a few moments to look over the application window. As you mouse over the buttons and controls, a pop-up box will tell you a little something about each tool's function. Note the **Help** button in the top right corner. The Help files are extensive and include several **Quick Tours** to get you going quickly without having to read the manual in its entirety.

- Probably the single most frustrating feature of the application is that the map opens without a legend or layer pick list displayed; and there's nothing intuitive about working out how you do that. Look in the upper left corner of the map window, just under the word Home. Click on the small button marked with the > symbol. From here the rest is easy!

The next page is a screen capture of the ArcGIS Online Map Window with most of the tools labeled. After that you'll find a page with some useful data sources and if you're feeling ambitious, an advanced lesson to try on your own later.


Let others view your map.
Change the Base Map
Find & Add New Content
Measure Distance and Area
Get the Lat/Lon of a Map Click
Open and close the layer/legend list
Layer List
Draw on the Map
Map Legend
Go to a Street Address or Lat/Lon Coordinate
> Layer (service) details, Opacity, Configure Pop-up Box (feature info)
Change draw order
Remove layers
Map Navigator, Scale Bar, Show Coordinates
Layers
1939 B&W
1951-52 B&W
1962 B&W
1972 B&W
1981 B&W
1985 Color Infrared
1988 B&W
1997 B&W
2002 Color (Providence Metro)
2003-04 Color
2006 Color (Bay & Block Island)
2008 Color
2011 Color
2011 Color Infrared
NOAA Charts
USA Topographic Maps
National Geographic World Map
Bing Maps Hybrid
Boston
Worcester
Cape Cod Bay
Buzzards Bay
Nantucket Sound
Vineyard Sound
Rhode Island Sound
Block Island Sound
Atlantic Ocean
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Some Data Sources to Explore

Click the **Add Content** button and type one of the following into the Search Box:

Rhode Island, RIGIS, National Map, NOAA, USDA, USGS, or enter one of the full URLs found below.

- RIGIS: http://maps.edc.uri.edu/arcgis/rest/services
- USGS: http://services.nationalmap.gov/ArcGIS/rest/services
- NOAA Hurricanes and Critical Facilities: http://maps.csc.noaa.gov/arcgis/rest/services
- NOAA Charts: http://egisws02.nos.noaa.gov/ArcGIS/rest/services/RNC/NOAA_RNC/MapServer

Advanced Lesson

1) Type **USEPA** in the Add Content search box.

2) Look in the results for **USA Facilities Regulated by EPA.**

3) Don't click the add button; instead move your mouse over the Layer Name. You should see a dialog box appear with some basic information about the layer and a couple of options for loading.

4) Click on **Add sub layer as features** then click **OK** in the next dialog box.

5) Now go back to the map **Layer List**. Your map should now include a layer of blue cross-hatch symbols showing the location of EPA Regulated Facilities. Note that it includes points in neighboring states. The layer is nationwide in scope.

6) Click on the > symbol next to the layer name in the layer list to bring up the **Layer Details** tab. You will apply a filter to limit the layer to RI facilities.

7) Click the **Add** button under the **Filter** option. In the dialog box, click the down arrow in the **Field** box and select **State.** In the **Operator** box select **Equals.** For **Value** type **RI** then click **Add.** A new tab will display with the statement **State Equal RI**. Click **OK** at the bottom right of the dialog box.

8) The map should redraw with only the RI facilities showing.

9) Now go back to the **Layer Details** tab and select **Configure** under the **Display** option. Here you can change the symbol and its size and color. When you're satisfied with the symbol, go back to **Layer Details** and select **Configure** under the **Pop-ups** option.

10) Play around with the various options for displaying fields. You have a great deal of control over what is or is not included in the pop-up, the field name and even links to external web pages.