Exercise 2 – Using ArcGIS 10 to View and Manage GPS Data

Session Objectives - At the conclusion of this session you will be able to:

- ❑ Add data to the Table of Contents and change symbology
- ❑ Navigate (zoom and pan) in the data view
- ❑ View, modify and summarize tabular data in ArcMap
- ❑ View layers in ArcCatalog
- ❑ Create metadata in ArcCatalog

Materials created by*:* Eric Kelchlin (July 2011)

Revision: November 2013

Software: ArcGIS 10, SP5

Directory Path: CSP7101\GPS_Data

CSP7101\Exercise2

Imagery: ArcGIS Online Imagery (Bing)

Data: Waypoints created by the student, metadata.docx

SECTION 1 - Create a New Map Document (MXD)

1. Launch ArcMap

from the desktop.

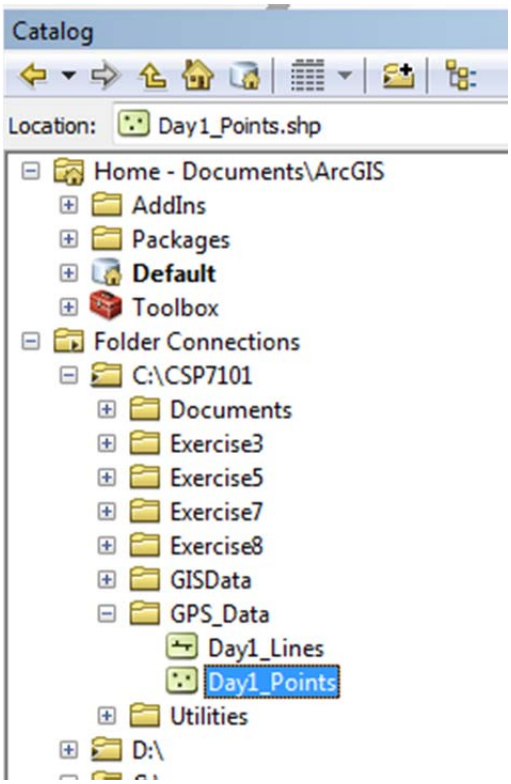
2. Click the **Cancel** button on the ArcMap Getting Started Dialog. This is the quick way to start with a new blank map.

3. Let's add our GPS data and some imagery to our new map. There are two ways to add data. The first way is to drag-n-drop from ArcCatalog, which is docked to the right-side of your screen.

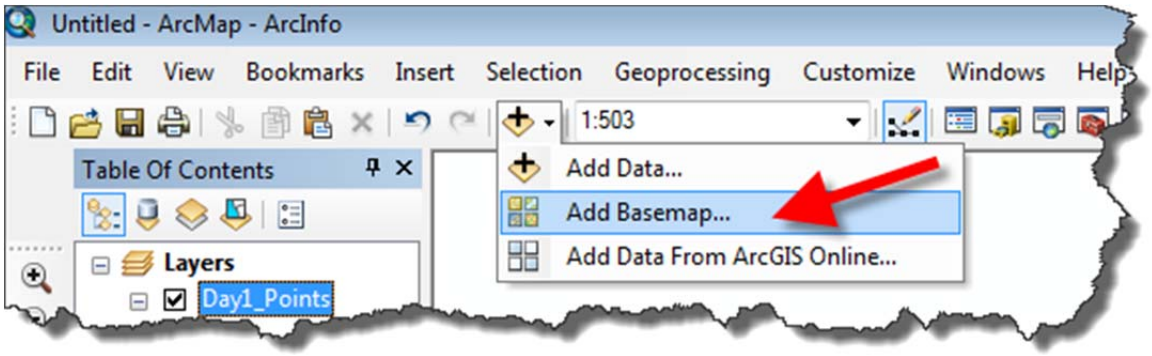
   - Scroll your arrow over the docked Catalog button and click on the **Connect To Folder** button. We first need to tell where ArcCatalog should look for our GPS data, before we can add it to our map.

   - Browse to the location of the **CSP7101** folder and click **OK**. You should now have a connection to this folder.

   - Open ArcCatalog again, browse down to the **GPS_Data** folder. Select the shapefile and drag-n-drop onto the blank map. For multiple shapefiles, you will need to drop-n-drop one at a time; no Ctrl or Shift keys for grouping.

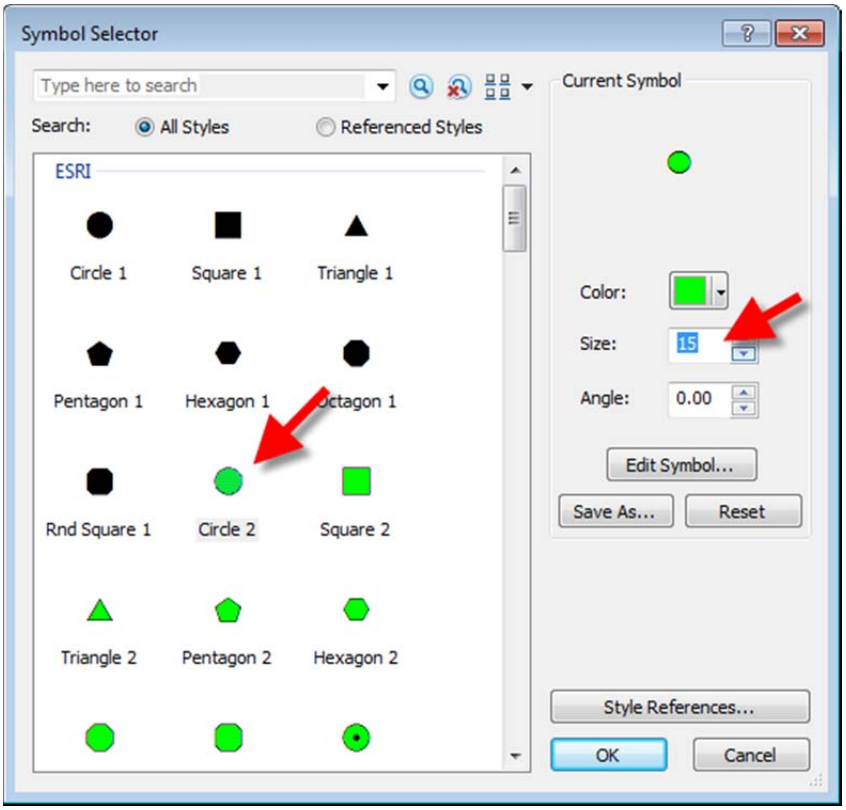


- Add online imagery next by clicking the **Add Data** button and selecting **Add Basemap**. Select **Bing Maps Aerial** and click Add. Double-clicking on the image works just as well and even saves you time.



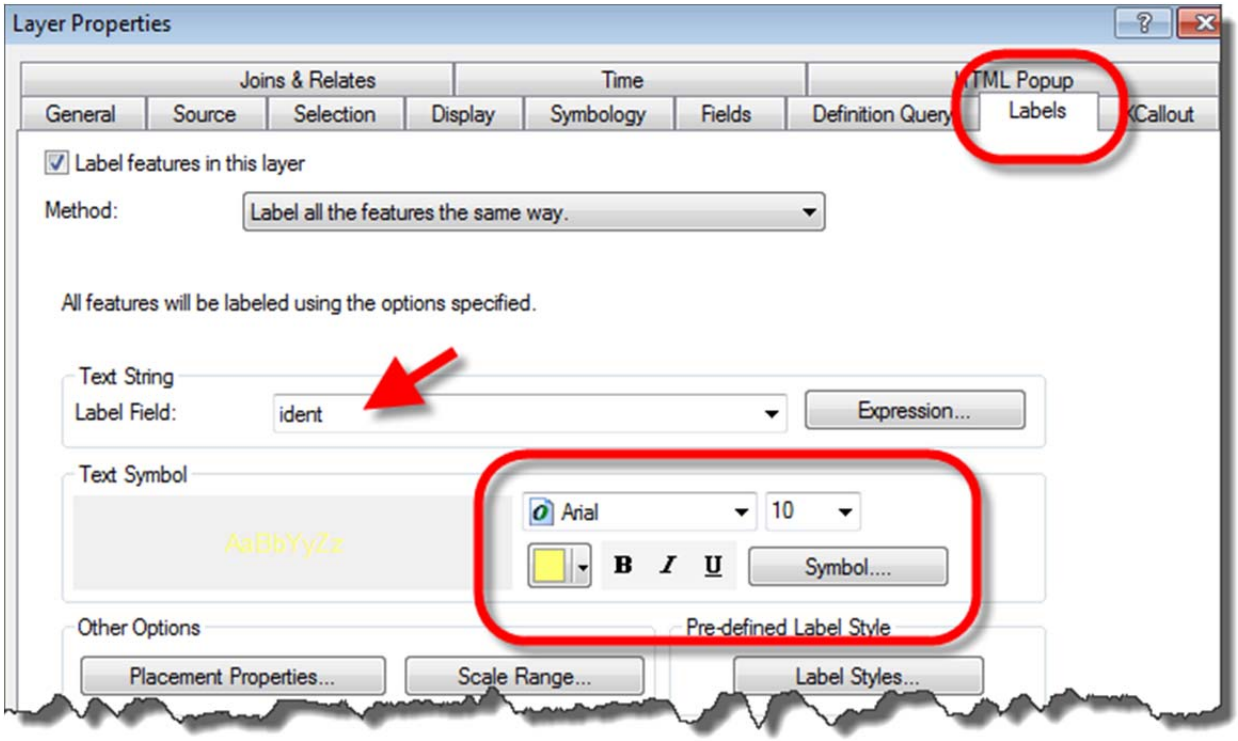
4. Zoom into the area of interest by clicking the **Zoom In** Tool on the Tools Toolbar and dragging a box around you're data. Alternatively, you can right-click on your layer in the Table of Contents and choose **Zoom to Layer** to get a good view of your field data.

5. Let's change the symbology of the layers to something easier to see. Single click on the symbol under your point layer. The **Symbol Selector** dialog will appear. Select the **Circle 2** symbol and change the size to **15**. Click **OK**.



6. To label each point, simply right-click on the point layer in the Table of Contents (TOC) and select **Label Features**.

   - Right-click on the **Day1_Point** layer and select **Properties**. Select the **Labels Tab**. Change the Label Field to **Ident**, beef-up the font to a **10** and change the color to yellow. Click **OK**.



7. Change the symbology of the line/polygon layers you added to the map to make them more visible.

8. Click the **Save** button to save your new map document in the **CSP7101** folder. Name it **Day1**.

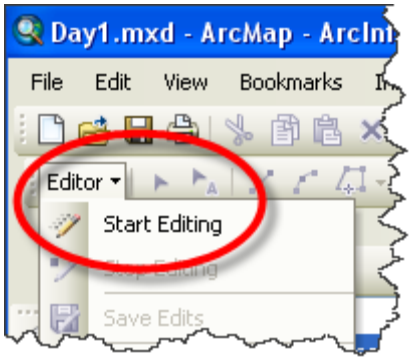
SECTION 2 – View, Modify and Summarize Tabular Data

This section introduces you to the most commonly used features when working with tabular data.

1. Right-click on your **Day1_Point** layer and select **Open Attribute Table**.

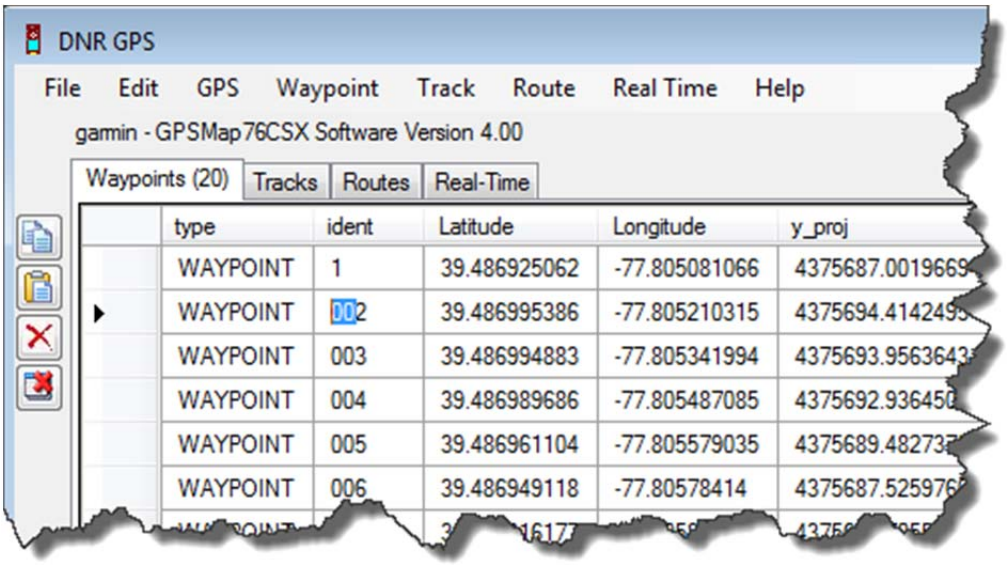
2. Expand the table to view all the columns (known as fields in Arc speak). You can sort any field by simply double-clicking on the field header.

3. Let's say you didn't like the labels and you wanted to change the values in the **ident** field. First you need to start an editing session; to do so just select the drop-down arrow on the **Editor Toolbar** and select **Start Editing**.



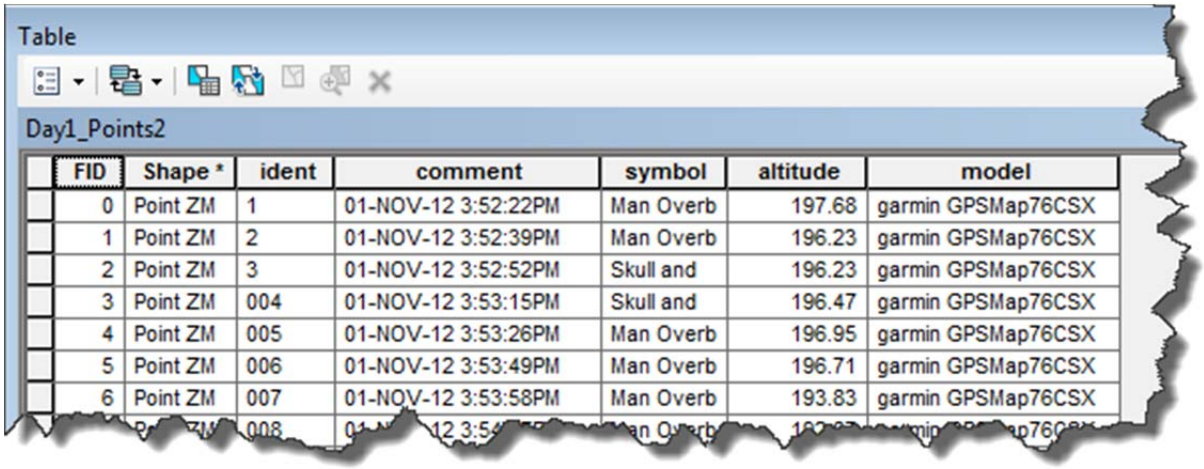
4. Next, simply click on the value you want the change and edit it. For example, say you want to remove all the zeros in the labels.

   - When you're done editing the values, select the drop-down arrow on the Editor Tool again and simply select **Stop Editing** and click **Yes** to save your edits.



5. Let's delete some fields and clean-up the dataset. To delete an entire field make sure you are NOT in edit mode (I know, it's counter intuitive). Right-click on the header of the field you want to delete and select **Delete Field**.

   - Delete the **Type**, **Latitude**, **Longitude**, **y-proj** and **x-proj** fields. The only fields you can NOT delete in this table are **FID** (feature identity) and **Shape.** This latter field contains the geometry information for ArcMap, delete it and the spatial data are toast!

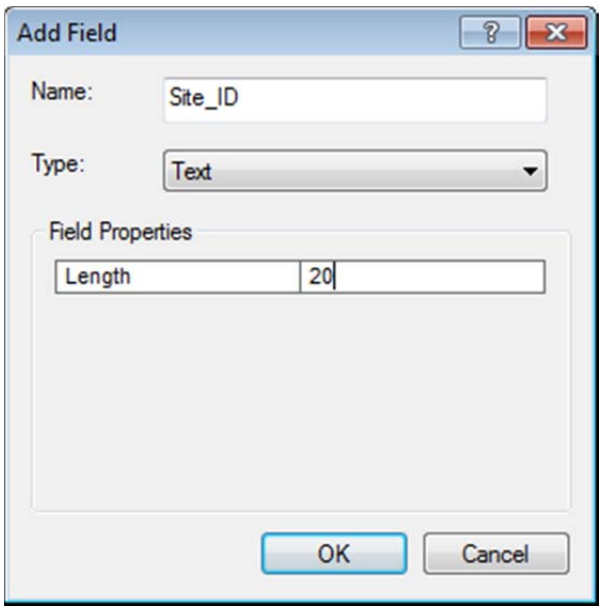


Table

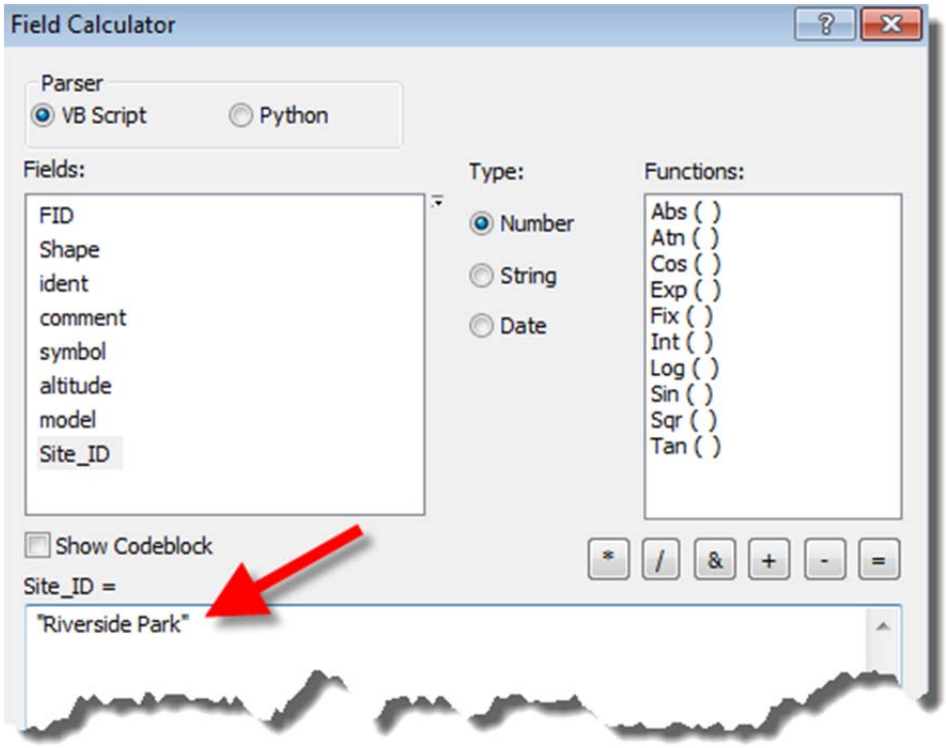
Day1_Points2

FID	Shape *	ident	comment	symbol	altitude	model
0	Point ZM	1	01-NOV-12 3:52:22PM	Man Overb	197.68	garmin GPSMap76CSX
1	Point ZM	2	01-NOV-12 3:52:39PM	Man Overb	196.23	garmin GPSMap76CSX
2	Point ZM	3	01-NOV-12 3:52:52PM	Skull and	196.23	garmin GPSMap76CSX
3	Point ZM	004	01-NOV-12 3:53:15PM	Skull and	196.47	garmin GPSMap76CSX
4	Point ZM	005	01-NOV-12 3:53:26PM	Man Overb	196.95	garmin GPSMap76CSX
5	Point ZM	006	01-NOV-12 3:53:49PM	Man Overb	196.71	garmin GPSMap76CSX
6	Point ZM	007	01-NOV-12 3:53:58PM	Man Overb	193.83	garmin GPSMap76CSX

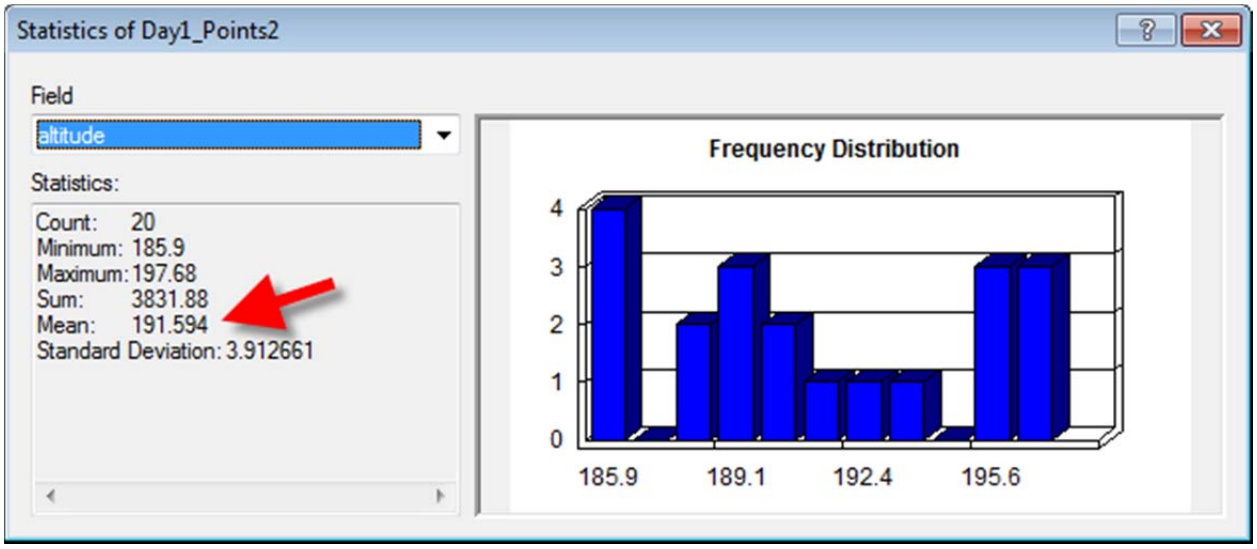
6. To add a new field select the **Table Options** button and choose **Add Field.** Let's make this a **Text** field. Name it **Site_ID** and make it **20** characters in length. Click **OK** when done.



7. Let's fill-in the new field with using a method much quicker than typing text in each cell. Right-click on the **Site_ID** field header and select **Field Calculator**. Type **"Riverside Park"** in the location as shown below (with the **" "** marks on the ends) and select **OK**.



8. Summarizing data in the table is quick and easy as well. Let's say that **Altitude** is important to you and all you need is the mean value. Simply right-click on the header of the **Altitude** field and select **Statistics**.



9. Close the attribute table by clicking the in the top right corner of the table.

10. Save your map document again and close ArcMap.

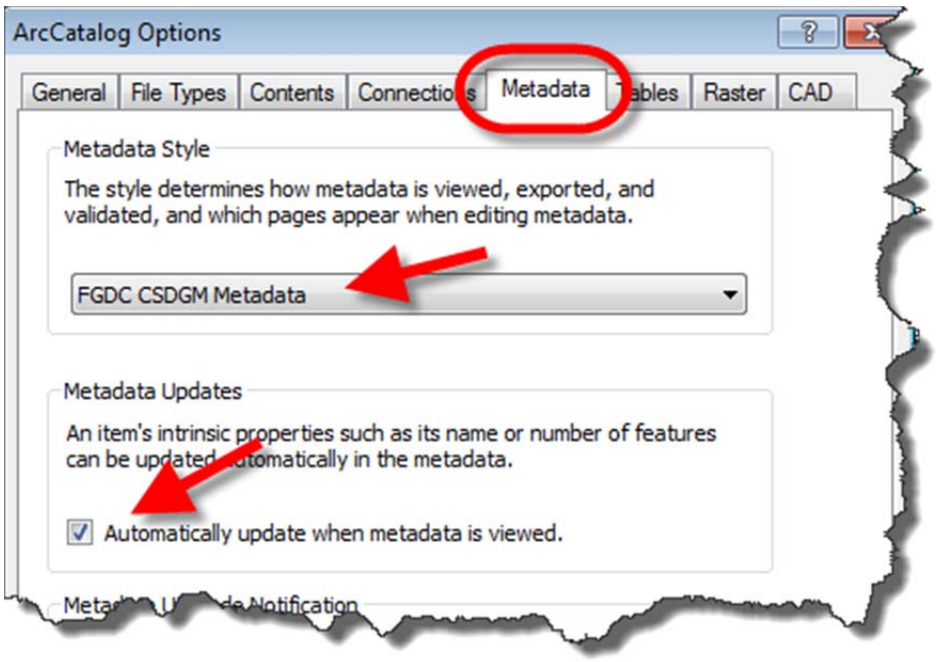
SECTION 3 – Creating Metadata in ArcCatalog 10

In this section, you will utilize the metadata editor in ArcCatalog 10 to generate "quick and dirty" metadata for your GPS layer. Not all the mandatory fields are populated, only the bare minimum. It's possible and recommended to paste text from reports into text fields. A GPS project summary report would be perfect fodder for metadata!

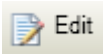
1. Launch ArcCatalog from the desktop.

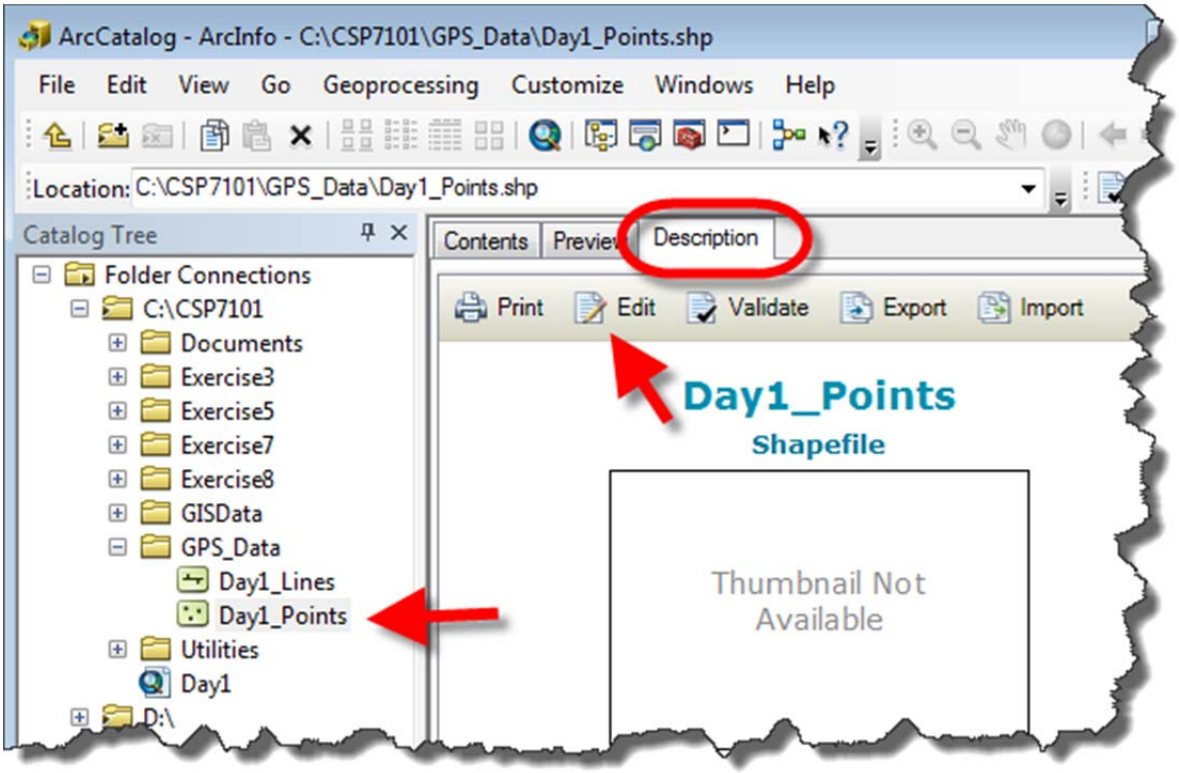
2. From the **Customize** menu, select **ArcCatalog Options.**

3. Click the **Metadata tab** and change the metadata style is **FGDC CSDGM Metadata.** Also make sure that the metadata updates box is checked as shown below. Click **OK**.



4. In the catalog tree on the left hand side of the screen, navigate to the **GPS_Data** folder and find the layer of interest, which is **Day1_Points** in this example.

5. To start editing metadata, simply highlight the **Day 1_Points** layer, select the **Description** tab and select the **Edit** tool  in the Items Description window. See the example on the next page.



6. Open the **Metadata** Word document in the **Exercise2** folder. Copy the **blue** text items and paste in the appropriate sections.

   Click **Item Descriptions** in the Overview section and add the following items:

   Tags – add subject keywords separated by commas.

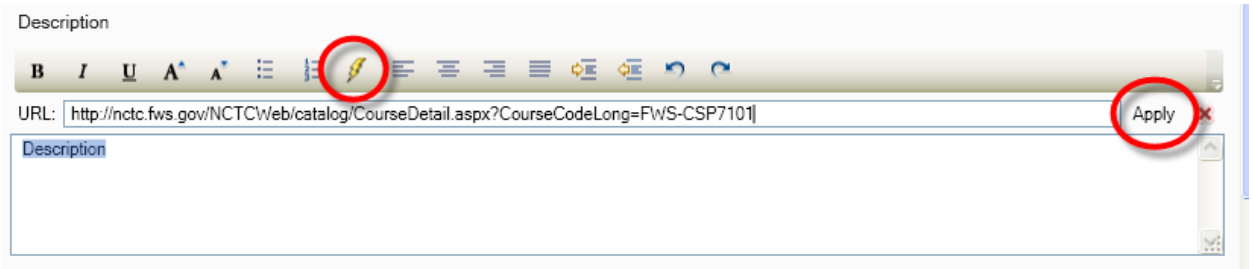
   USFWS, Riverside Park, Vero Beach, GPS, Garmin Map76CSx

   Summary – add a brief summary of the data.

   GPS field data collected as part of the GPS I class (CSP7101) in February 2012. Data were collected via a Garmin Map76CSx. Averaging was enabled for most points (10 seconds/point). WAAS was enabled to improve accuracy. No PDOP limit was applied. Mission planning was not conducted. Data were not post-processed or edited in anyway.

Description – add an abstract explaining its data and purpose. Let's add a URL and hyperlink the text. To do this, type **Description,** then highlight the text and click the hyperlink tool . Next copy and paste this URL and click **Apply**.

http://nctc.fws.gov/NCTCWeb/catalog/CourseDetail.aspx?CourseCodeLong=FWS-CSP7101



Credits – add the person(s) name or organization name.

USFWS National Conservation Training Center

Use Limitations – add the following statement:

Although these data and information have been processed successfully on a computer system at the USFWS, no warranty expressed or implied is made regarding the accuracy or utility of the data and information on any other system or for general or scientific purposes, nor shall the act of distribution constitute any such warranty. This disclaimer applies both to individual use of the data, and information, and aggregate use with other data and information. It is also strongly recommended that careful attention be paid to the contents of the metadata file associated with these data and information. The USFWS shall not be held liable for improper or incorrect use of the data and information described and/or contained herein.

7. Select **Topics & Keywords** and fill-out the following sections:

Topics - check the Structure and Transportation boxes

Theme Keywords – type keywords separated by commas

USFWS, GPS, GarminMap76CSx

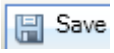
Place Keywords - type keywords separated by commas

Riverside Park, Vero Beach, Florida

8. Click on **Citation Contacts** and type your contact and contact information.

9. Click on **Details** in the Resource section and change the Status to **Completed**.

10. Next, click on **Data Quality** in the Resource section. This is a great place to add entire documents that document the quality of your GPS data. Since this is our first day and the data are pretty spare, just leave it alone and mode on.

11. Click the **Save** button 

when finished.

12. Test out your **Description** URL.

13. To add a thumbnail image to your metadata, simply click on the **Preview Tab** and select the **Add Thumbnail** icon on the Geography Toolbar. Click back on the **Details Tab** to view the thumbnail.

Congratulations! You just created metadata for your GPS data.

Note: You can modify the .xml document that goes along with your shapefile to use as a metadata template for other datasets to save time. Ask your instructors how this is done.

GPS Data for your Metadata

If you plan your GPS data collection project, set objectives and created a geodatabase with domains and relationship tables, then most of this data should already exist in the attribute tables. If not, much of these data can be copied and pasted from Trimble Pathfinder Office output files or manually input into the XML metadata file through ArcCatalog.

Most of these data should be added to the **Data Quality** sections in your metadata. No GPS section exists, so we have to make the best of it.

GPS Project Planning

- ❑ Project purpose and objective(s)
- ❑ Datum and projection used to collected the field data
- ❑ Date(s) and time data were collected
- ❑ Data collector name(s) or initials
- ❑ GPS receiver make and model (i.e. Trimble GeoXM 2005 Series)
- ❑ GPS receiver firmware version and last date updated
- ❑ GPS field software and version

Data Collection Techniques

Cite any GPS field data collection protocols if you used them.

- ❑ Did you perform missing planning, if so what were the results?
- ❑ What were the GPS data collection settings? In ArcPad refer to your GPS Preferences or Trimble GPSCorrect settings.
- ❑ Logging rate used for lines and polygons
- ❑ Did you use offsets, if so what were the conditions and settings?
- ❑ Mode of data collection (walking, vehicle, ATV, boat, plane, hoarse, etc.)

Differential Correction

- ❑ Correction Type (real-time WAAS, Real-time beacon, post-processed)
- ❑ Post-processing software and version
- ❑ Name of the base station(s) used for correction
- ❑ Settings used to perform the differential correction

Accuracy Indices

These are automatically created with Trimble Pathfinder Office if the data are post-process, however, the indices do not carry over to the attribute table(s) when using ShapeCorrect. This is one major draw-back when using ArcPad.

- ❑ Average Positional Dilution Of Precision (PDOP)
- ❑ Maximum PDOP
- ❑ Average Horizontal Precision (95% or 68% confidence ellipse)
- ❑ Worst Horizontal Precision (95% or 68% confidence ellipse)
- ❑ Vertical Precision (95% or 68% confidence ellipse)
- ❑ Number of points recorded per feature

Deliverables

- ❑ Was the original GPS field data reprojected, if so what software and transformations did you use?
- ❑ Did you edit the raw data to create the final layer, if so what process steps did you use?
- ❑ Who or what organization will maintain and distribute the dataset?
- ❑ Is this dataset updated on a regular schedule, or is this complete?

Can you think of any additional data that would be useful to include in the GPS metadata? If so, write them down below:

1. _____
2. _____
3. _____
4. _____
5. _____