

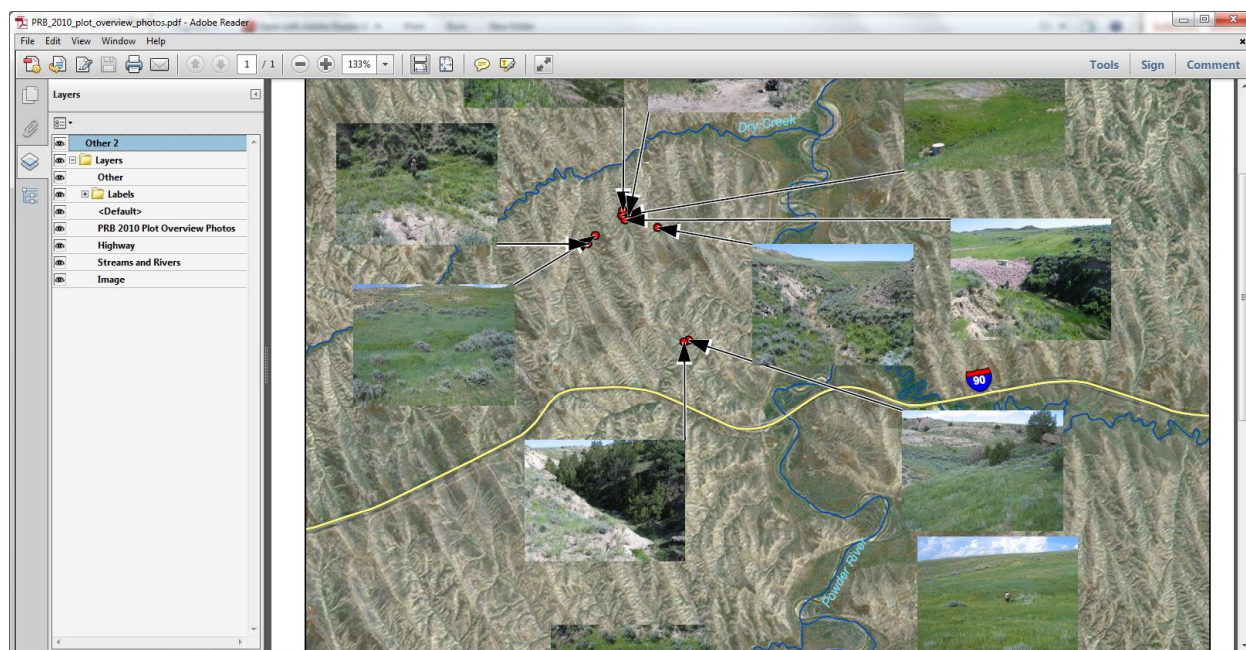


# Geospatial PDFs and Geo-tagged photos: A basic how to guide to create and view geospatial PDFs with geo-referenced photos

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## Introduction

This guide is designed to walk a user through creating and/or viewing a geospatial PDF that has associated geo-tagged photos. A *Geospatial PDF* (sometimes referred to as the TerraGo branded name, GeoPDF) is an easily distributable and recognized portable document format that retains geo-referenced information associated with a physical location on the earth. It provides the ability to show or hide vector and raster layers it may contain in addition to showing any associated attribute data of the graphical features. A *Geo-tagged photo* is a photo that has a spatial reference to the location at which it was taken. This document is not a complete guide to the full functionality of a Geospatial PDFs or Geo-tagged photos. Please refer to the additional references sections for more information on both of these topics.

## Software requirements

For creating a Geospatial PDF, you'll need a geographic information system (GIS) that has the ability to save map documents as a geospatial PDF (in this guide, we will be using ArcMap version 10.0). This guide also requires the use of an ArcGIS Toolbox (ArcPhoto) that is not included in the standard install of ArcGIS. For viewing a Geospatial PDF, the only software you'll need to have is a software that can read a PDF file. In this example, we will be using Adobe Reader.

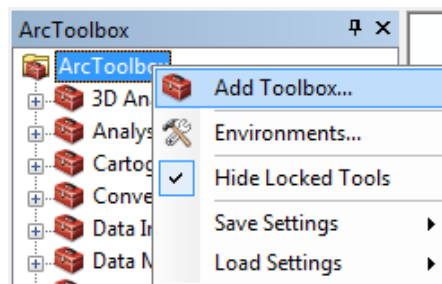
## Creating a Geospatial PDF

This guide assumes you have ArcGIS version 10 installed on your working computer and are familiar with basic functions in ArcGIS. ArcPhoto requires the use of geodatabases. Before you continue create a new geodatabase that will be used to store photo feature classes that you will create.

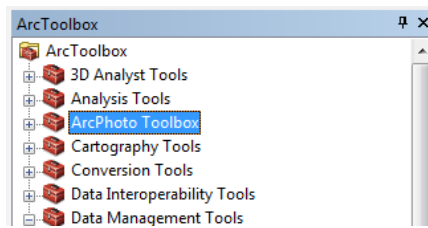
## Download ArcPhoto

First you will need to download a custom toolbox to work with photos in ArcGIS. This tool is called ArcPhoto and can be found at <http://arcscripts.esri.com/details.asp?dbid=14856>. Download and install the toolbox to your working computer. When you download ArcPhoto a html page ([ArcPhoto.htm](#)) is included that provides more information on the tool.

Once you've downloaded the toolbox, you need to add it to the toolboxes. Open a new ArcMap and then add the new toolbox by right clicking **ArcToolbox**→**Add Toolbox...** and then navigate to where you downloaded ArcPhoto.



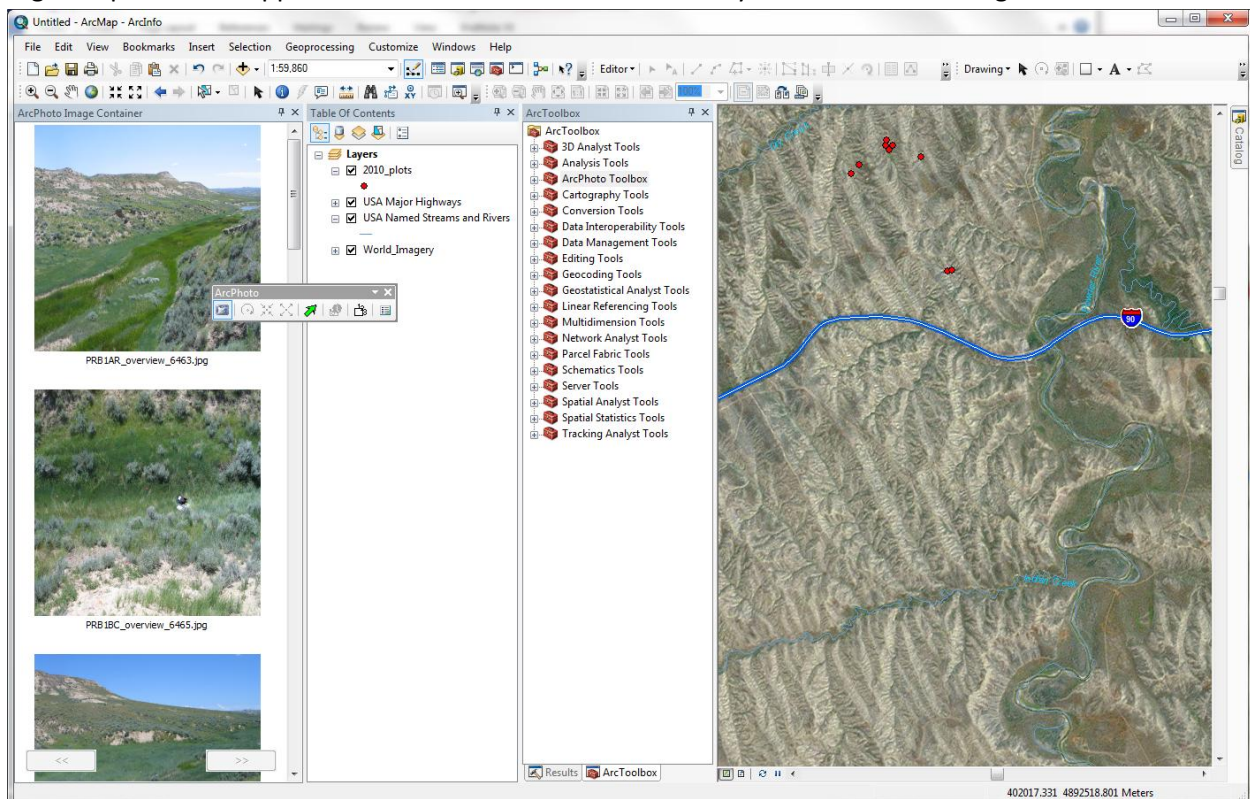
Note that the toolbox will be located in a geodatabase and is normally downloaded to **Program Files (x86)\ESRI\ArcPhoto Tools\Data\ArcPhotoDesktop.gdb**. Now you should have a new toolbox listed in your ArcToolbox window named **"ArcPhoto Toolbox"**



### *Loading photos into ArcGIS*

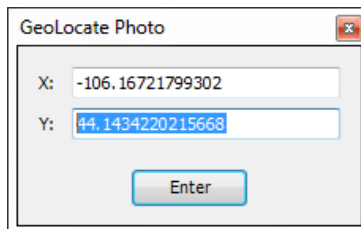
Before adding any photos to the map, add all other ancillary data that will be associated with the map (e.g., roads, streams, background imagery, etc.). You will also want to be sure you have a list of geographic coordinates for the photos you want to georeference.

Once you have your ancillary data added to the map, you can add the photos you want to geo-tag. To do this, go to **Customize→Toolbars→ArcPhoto**. This will bring up the ArcPhoto toolbar. Then click the **Show/Hide ArcPhoto window** (camera icon) which will bring up a new window. To add photos to this window, right click in the window and select **Add photos...** then navigate to the photos you want to geo-tag. The photos will appear in the ArcPhoto window once they have finished loading.



### Geo-tagging photos

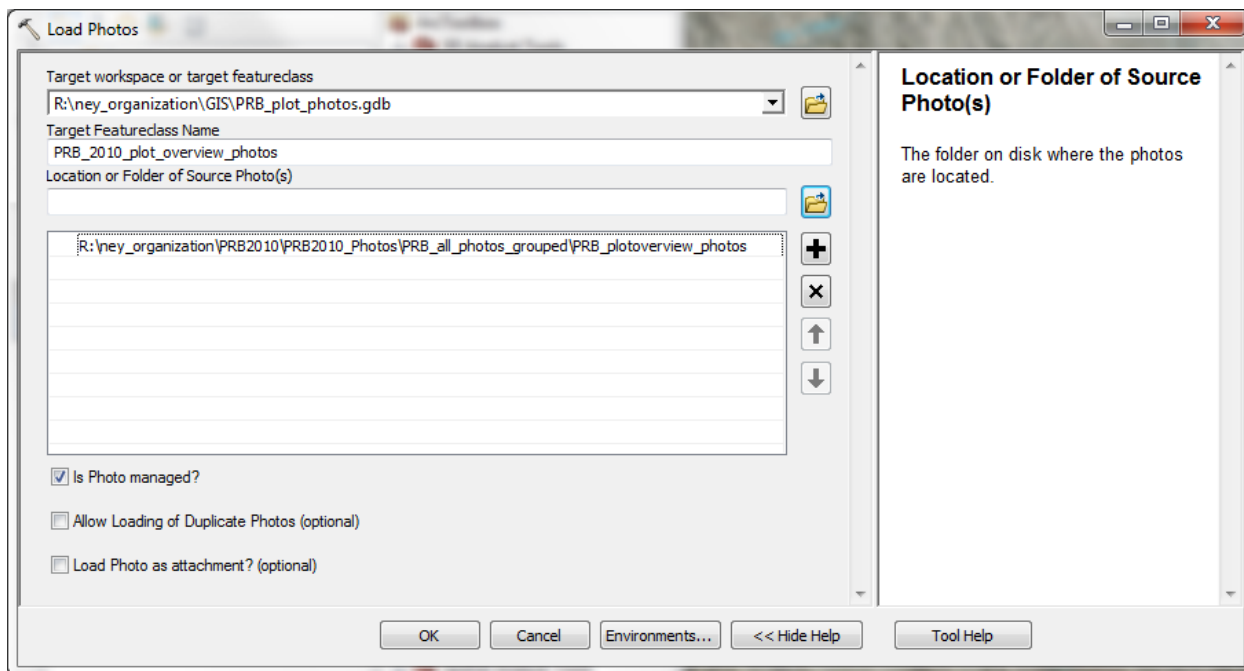
Once the photos are loaded into the ArcPhoto window, you can add geographic coordinates to each photo manually (**note**: there are more streamlined methods using ArcPhoto or other software packages to perform this operation that are not discussed in this guide). To do this, right click on the photo of interest and select **Add XY Location Manually**. This will bring up a window where you can enter the latitude and longitude associated with the photo.

A small dialog box titled "GeoLocate Photo" with a close button in the top right corner. It contains two text input fields: "X:" with the value "-106.16721799302" and "Y:" with the value "44.1434220215668". Below the fields is an "Enter" button.

Continue this process for all the photos you want to add to the map. Note that you can also add a photo description and other attributes.

### Creating a photo feature class

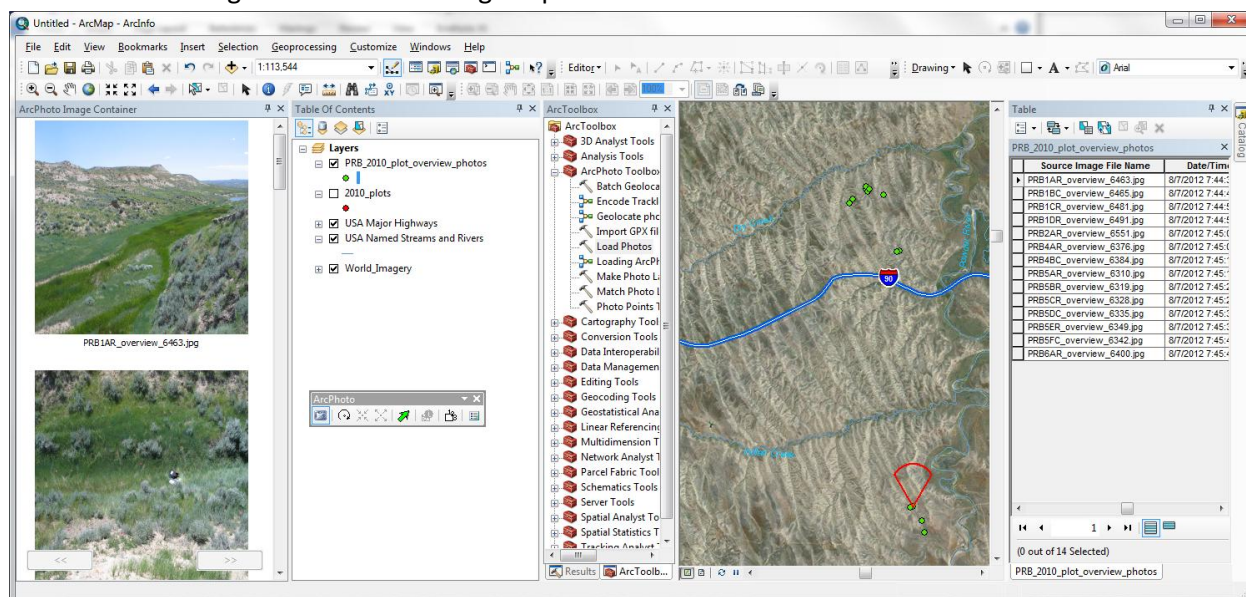
Now that all the photos have been geo-tagged, you can create a *photo feature class*. As stated above, this will require a *geodatabase* to function correctly. To create the photo feature class, open the **Load Photos** tool in the ArcPhoto Toolbox. The tool requires you to enter the geodatabase to save the photo feature class to, the name you want to give the new feature class and, the location of where the photos are stored.

A dialog box titled "Load Photos" with a toolbar at the top containing icons for file operations. The main area is divided into two sections. The left section has three text input fields: "Target workspace or target featureclass" with the value "R:\ney\_organization\GIS\PRB\_plot\_photos.gdb", "Target Featureclass Name" with the value "PRB\_2010\_plot\_overview\_photos", and "Location or Folder of Source Photo(s)" with the value "R:\ney\_organization\PRB2010\PRB2010\_Photos\PRB\_all\_photos\_grouped\PRB\_plotoverview\_photos". Below these fields are several empty rows for additional source photo locations. The right section is titled "Location or Folder of Source Photo(s)" and contains a text area with the instruction "The folder on disk where the photos are located." At the bottom of the dialog are buttons for "OK", "Cancel", "Environments...", "<< Hide Help", and "Tool Help". There are also three checkboxes: "Is Photo managed?" (checked), "Allow Loading of Duplicate Photos (optional)" (unchecked), and "Load Photo as attachment? (optional)" (unchecked).

For this example, **PRB\_plot\_photos.gdb** is the geodatabase, **PRB\_2010\_plot\_overview\_photos** is the name give for the feature class that will be created and the photos are located in the folder **PRB\_plotoverview\_photos**.



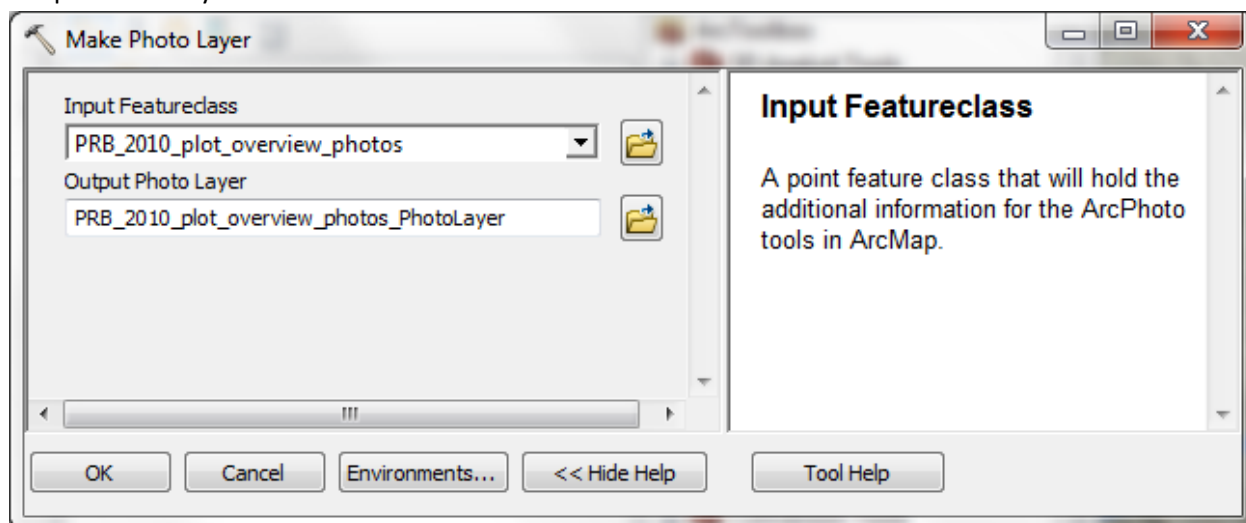
After the tool is finished running, a new layer will be added to the table of contents that shows the location of all the photos that were uploaded. If you look at the attribute table, you can find a long list of attributes including the name of the original photo.



The new layer stores the EXIF information and the imagery for each photo as attributes.

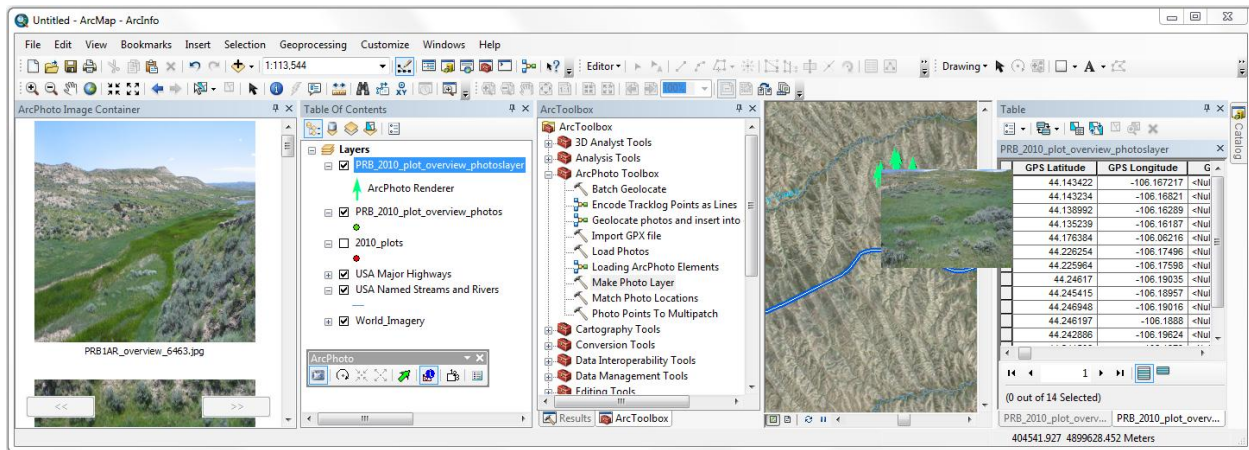
### Creating a photo layer

The next step is to create a *photo layer* so that the photos can be viewed on the map. Once again, we will use a tool in the ArcPhoto toolbox to do this. Open the **Make Photo Layer** tool and select the photo feature class you just created for the Input Feature class and set where you want to save the file for the Output Photo layer.



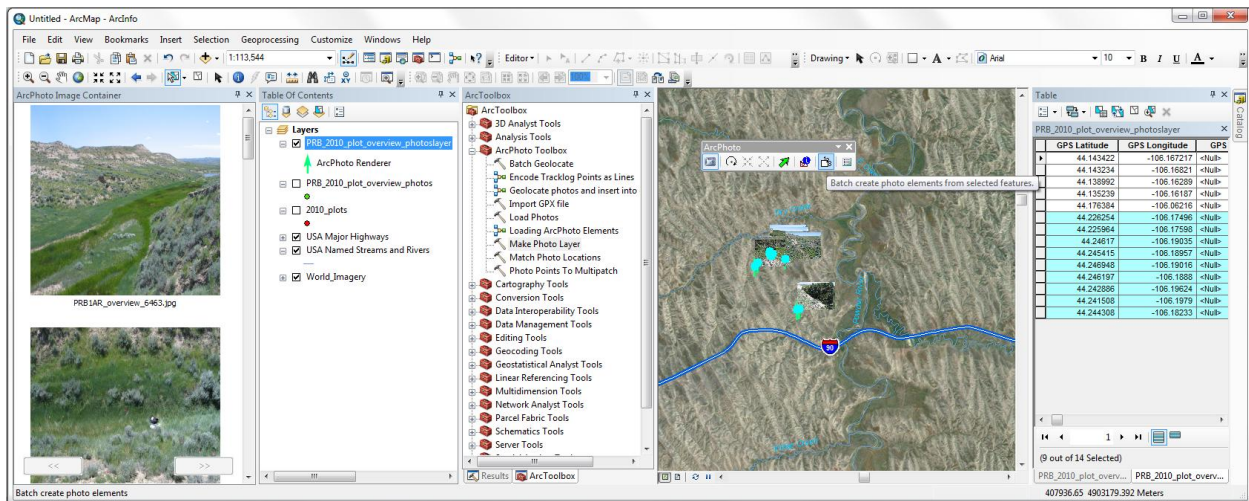
Click **OK** after you have entered each field. After the tool finishes running a new layer will be added to the table of contents with a green arrow as its symbol (this can be changed to another symbol). You can

now use the **Show Photo Tooltips** button in the ArcPhoto toolbar to hover over the location of the photos to see the photos.

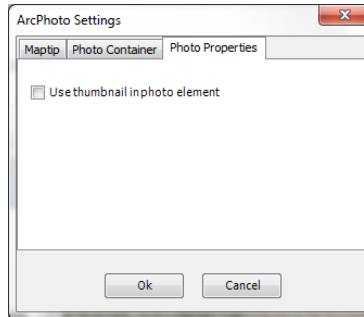


### Adding photos to the map

Now that the photolayer is added to the table of contents you can easily show all the photos on the map. To do this, select the selection tool and select all the photo locations you want to show and then click the **Batch create photo elements from selected features** (note: you will need to be in the data view to accomplish this function). This will display the photos on the map.

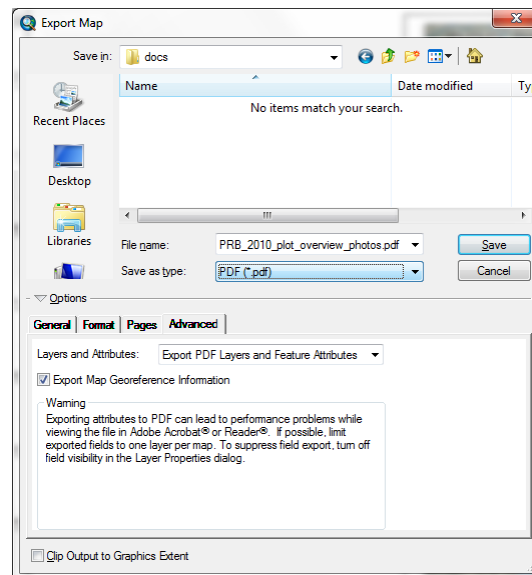


Once the photos are loaded on the map, you can manually move the photos around for the best display. To keep the resolution quality of the photos you can change the photo properties by de-checking the **Use thumbnail in photo element** option box in the **ArcPhoto settings**



### ***Saving as a Geospatial PDF***

Now that your photos are loaded and arranged for your final map, you can save your map to a geospatial PDF format. This can be accomplished by going to **File** → **Export Map...** Under the Save as type: choose **PDF (\*.pdf)** and then under the advanced tab make sure the **Export Map Georeference Information** box is checked. Name the file and then click **Save**.



Depending on the number of photos in the document, it may take some time to export the map. Once finished you will have created a geospatial PDF

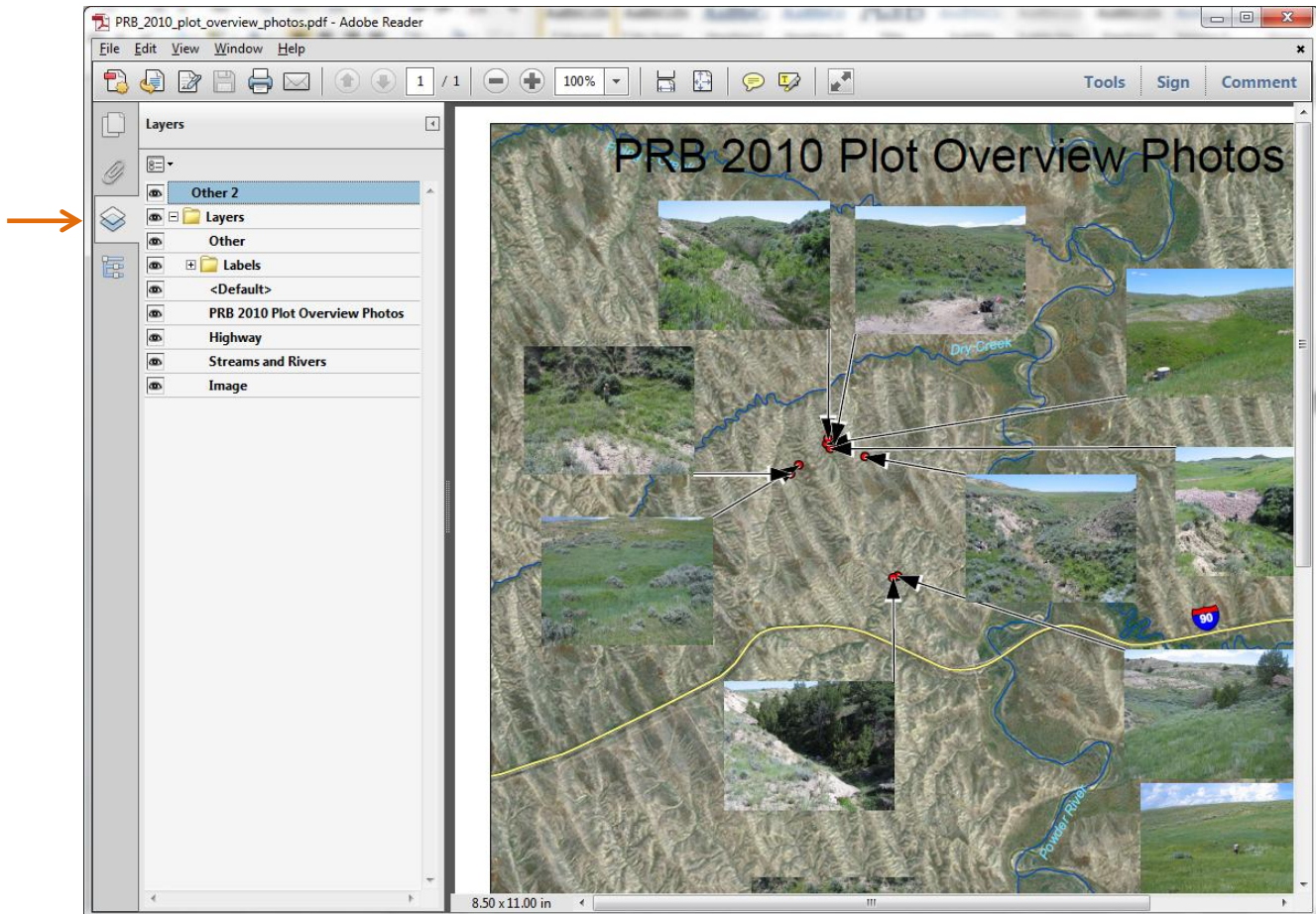
### **Viewing a Geospatial PDF**

This next section of the guide will take you through viewing and interacting with a geospatial PDF. This section assumes you have a geospatial PDF and that you have downloaded Adobe reader (<http://get.adobe.com/reader/>)



### *Show\Hide layers*

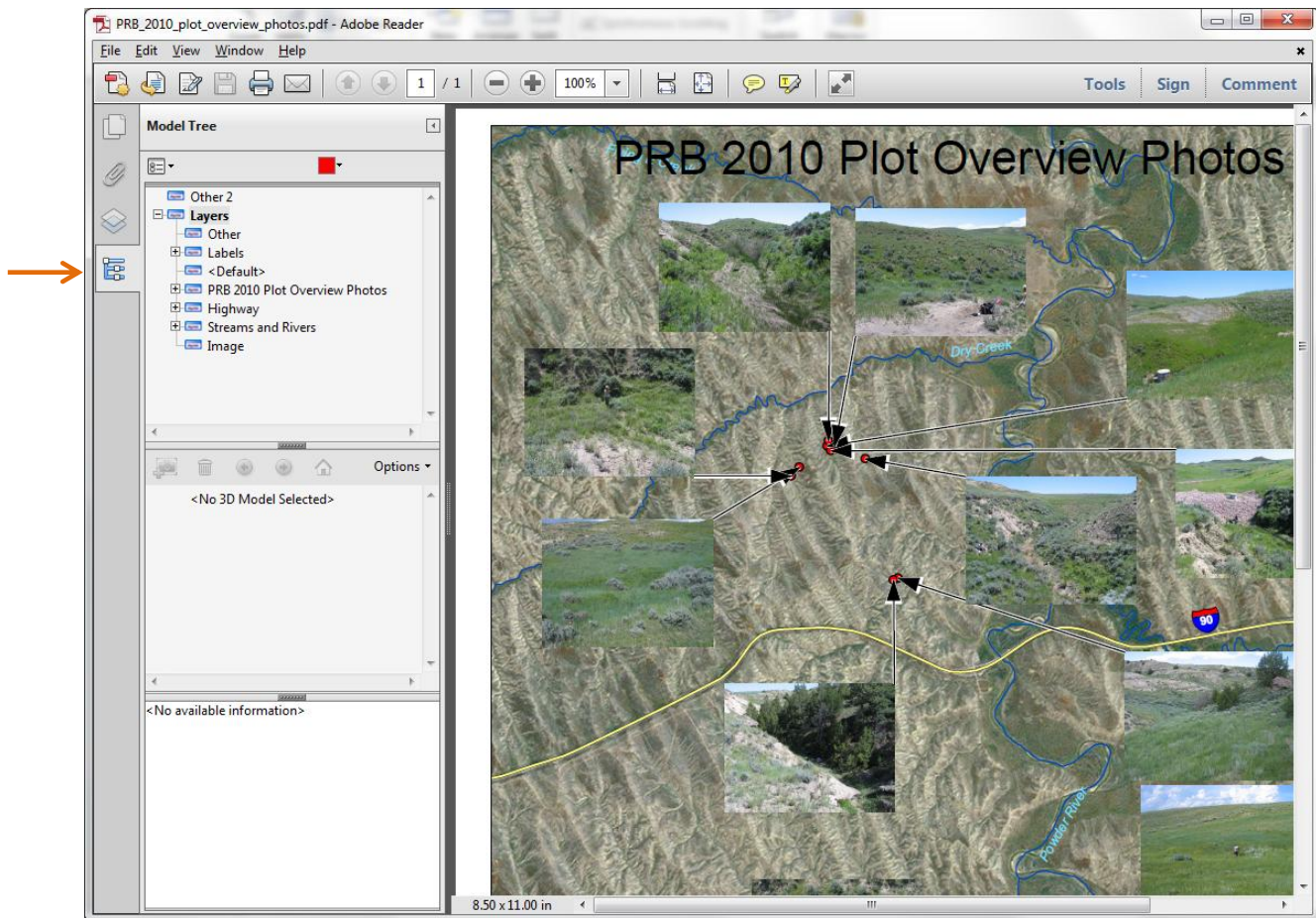
Open the geospatial PDF that you are interested in viewing. When you first open the file, none of the windows will be display. First, look at the layers window by clicking the **layer icon** on the left hand side of the document.



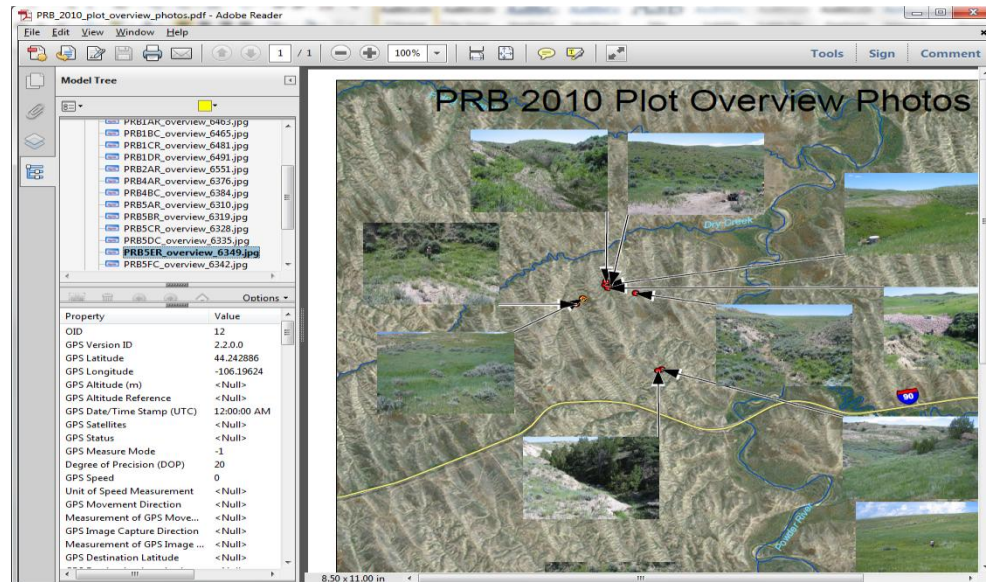
You can now see all the geospatial layers that are associated with the PDF file. Each one of these layers can be toggled to show/ hide by clicking the **eye icon** to the left of the name of the layer

### *Layer Attributes*

In addition to showing / hiding layers, you can view the attributes that are associated with each layer. To view these attributes, click on the **Model tree icon** on the left hand side of the document and expand the Layers.



For an example, if you expand the photos layer (PRB 2010 Plot Overview Photos) you can select each photo and view their geographic location, date taken and other associated attributes (see image below). As you click through the features of a specific layer, that feature will be highlighted in red (or another color you choose) when selected.



## **Additional References**

ArcPhoto - <http://arcscripts.esri.com/details.asp?dbid=14856>

GeoPDF fact sheet - [http://www.agc.army.mil/fact\\_sheet/GeoPDF\\_Fact\\_Sheet.pdf](http://www.agc.army.mil/fact_sheet/GeoPDF_Fact_Sheet.pdf)

TerraGo - <http://www.terragotech.com/>

Thesis on creating GeoPDF -

[http://www.nwmissouri.edu/library/theses/cervantesdanielle/final\\_thesis.pdf](http://www.nwmissouri.edu/library/theses/cervantesdanielle/final_thesis.pdf)