APFO's Public ArcGIS Server: Set-up and Use

I. Adding Data from APFO's Public ArcGIS Server into ArcMap 10.x

APFO provides the most current year of NAIP imagery in a web service for public GIS users. The service also offers imagery for Hawaii and some other maps. There are a number of other layers, which could be useful in researching NAIP or historical film photography from the NAPP or NHAP programs archived at APFO, or for finding some basic map information, such as county or PLSS boundaries, cities, highways, and water bodies.

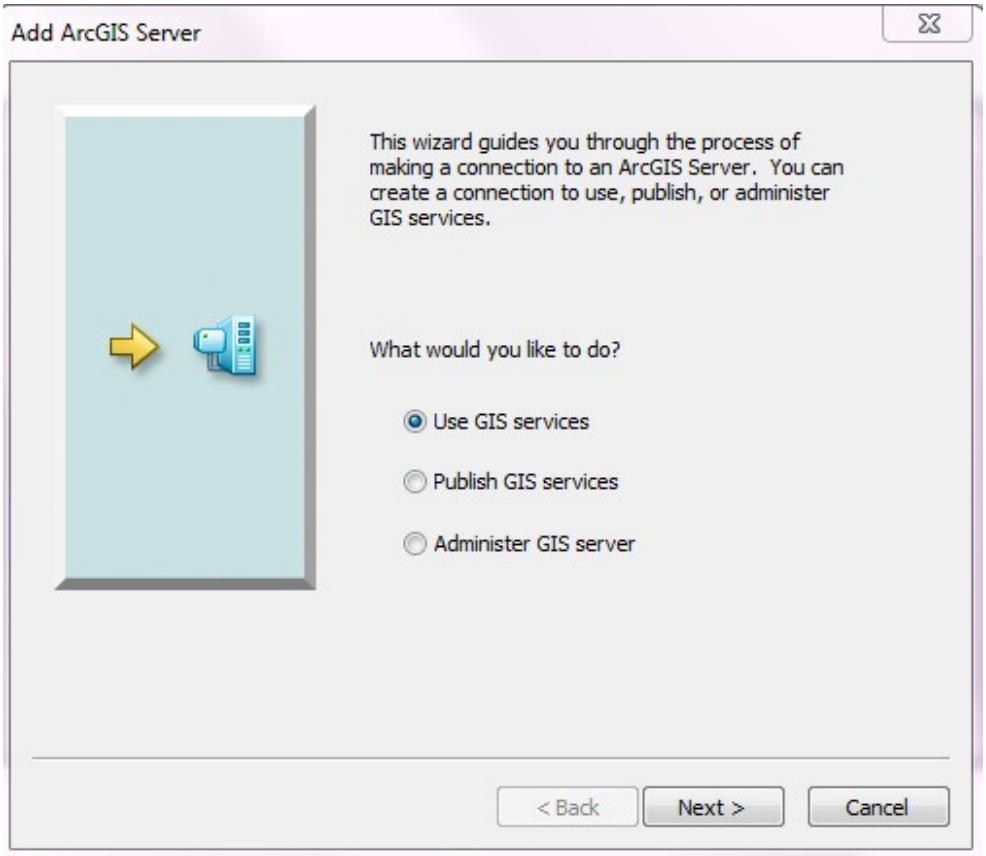
A. The "short instructions" for accessing this service consist of stating that the **URL is *http://gis.apfo.usda.gov/arcgis/services***

B. The detailed instructions for adding the service into ArcGIS 10.x:

1) Open ArcMap and Click the *Add Data* button.

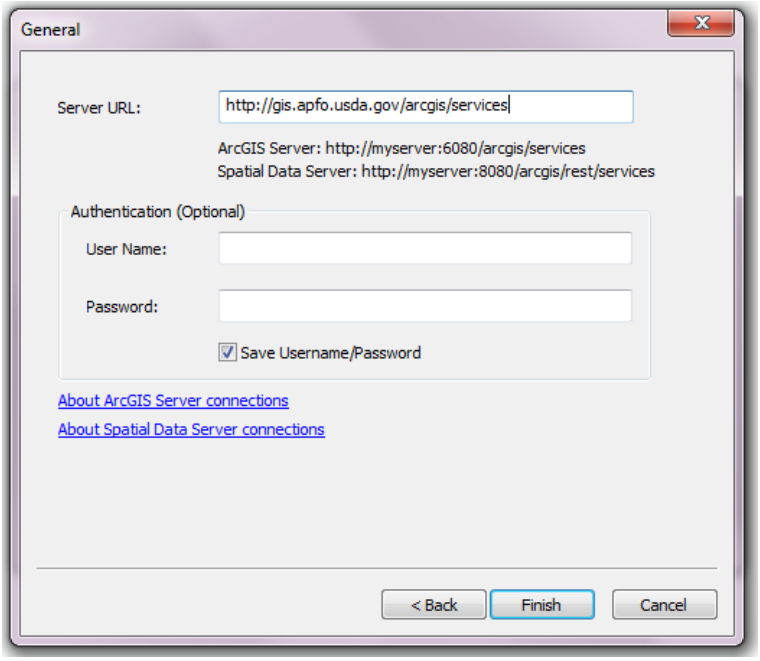
2) Select *GIS Servers* and then *Add ArcGIS Server.* Click *Add*.

3) Click the *Use GIS Services* radio button, and then click *Next.*



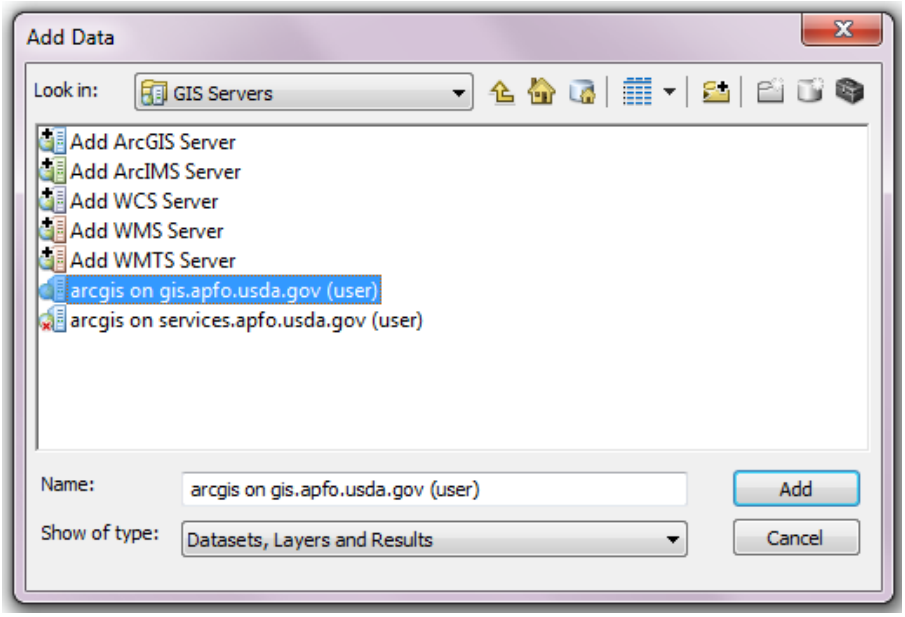
4) The *General* Dialog will open.

4a) In the Server URL: text box enter *http://gis.apfo.usda.gov/arcgis/services*
4b) Click *Finish.*



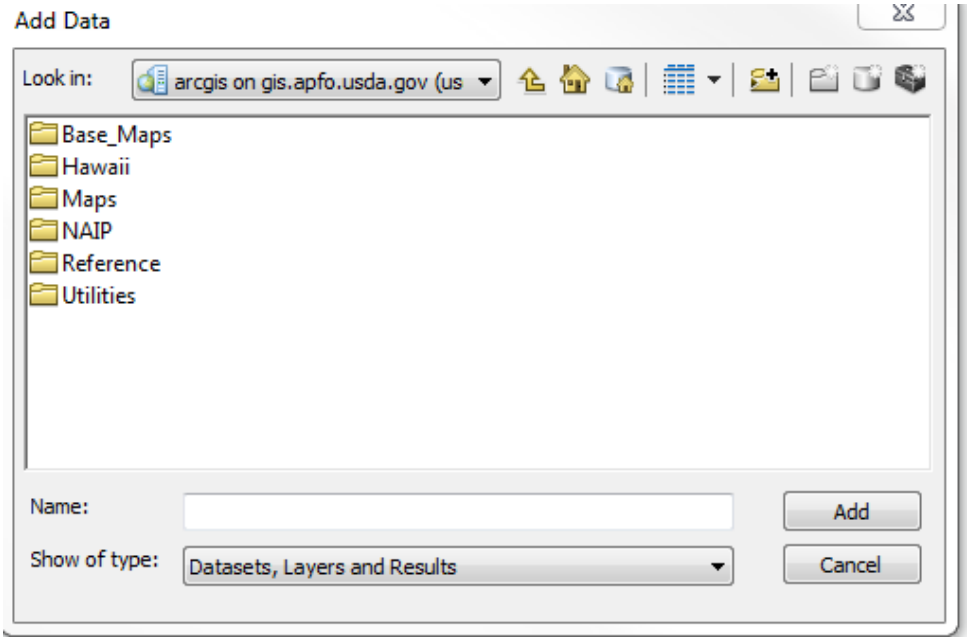
5) A new server, *arcgis on gis.apfo.usda.gov,* has been added to the GIS Servers list.

6) Double Click the new ArcGIS Server connection to access the server.



The server will probably be used most frequently to access the most current NAIP imagery for a state or states. There is also imagery available for Hawaii.

The server has several additional map layers, displaying information such as state and county boundaries, water bodies, cities, highways, UTM zone lines, and NAIP acquisition and inspection status maps. These layers may change from time to time, and cannot be edited.



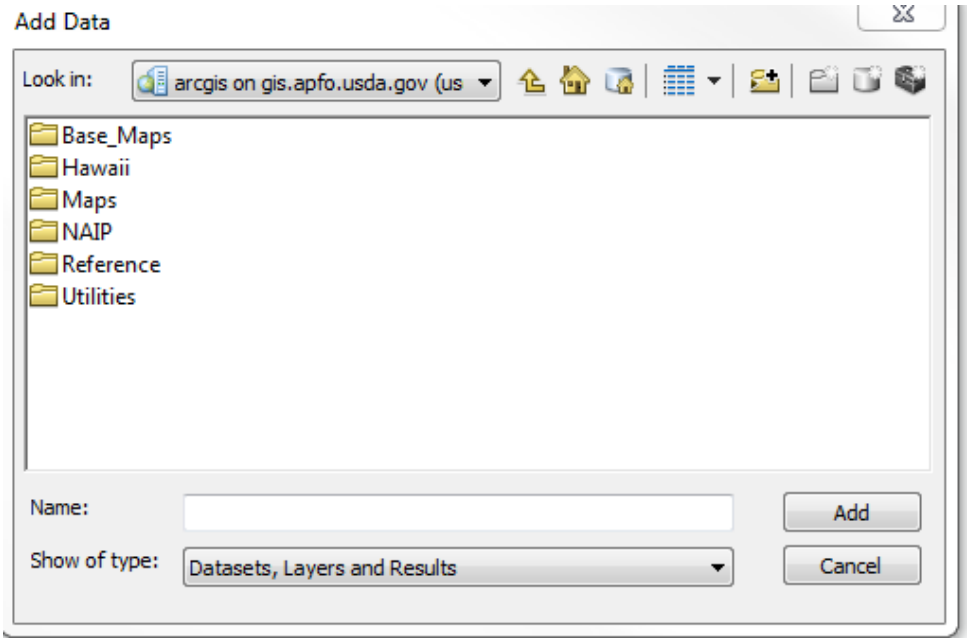
The instructions will discuss the folders shown above in the following order:

The **Utilities** folder is empty.

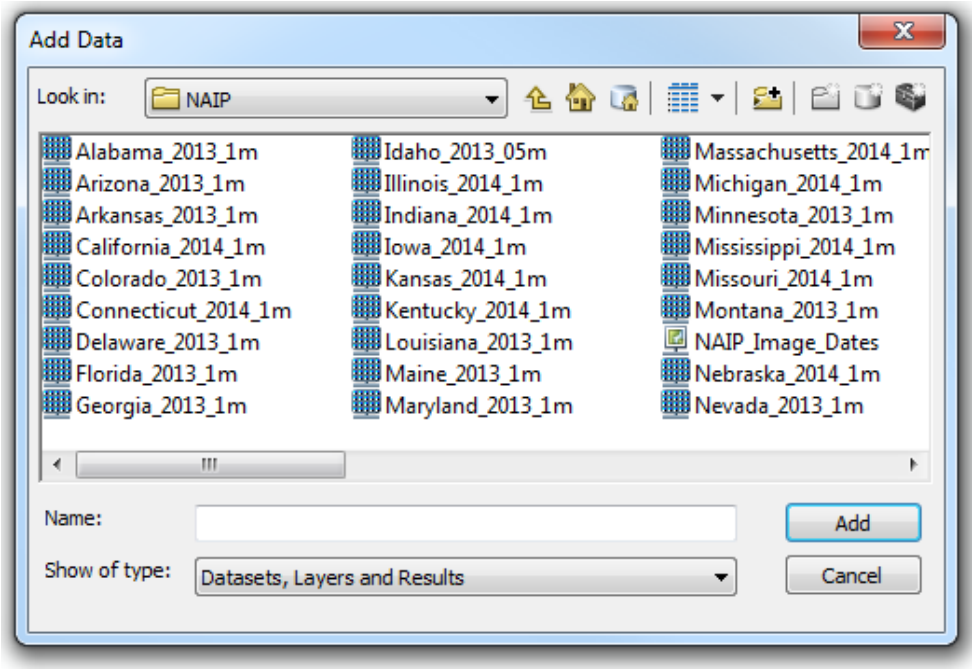
The first three folders display imagery, and the last two display vector data.

II. NAIP Imagery Available on the Server

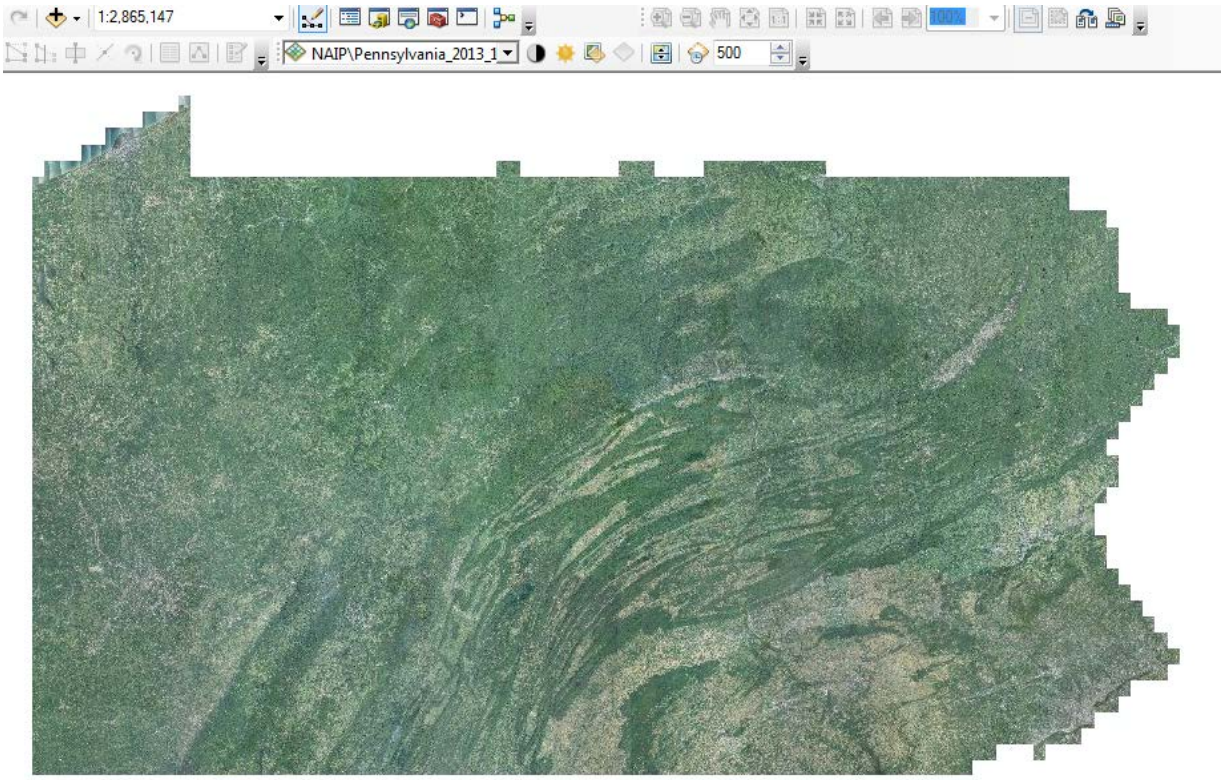
1) After connecting to the server, double click the NAIP folder to see the state based imagery services.



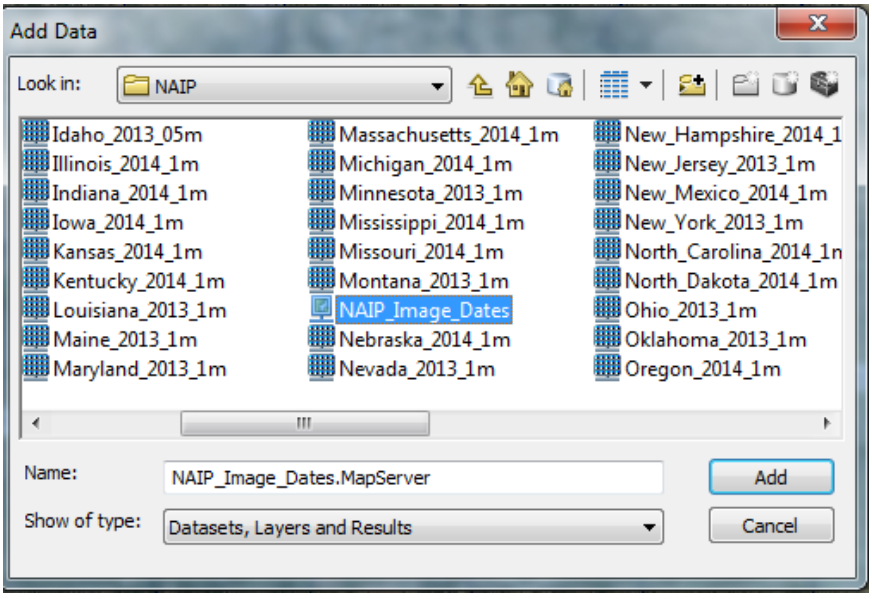
2) A list of state based image services in natural color format for the most current flying year will open. Select from the list, and view the selected state in a GIS document.



3) The server displays only the most current year of imagery; for Pennsylvania, that was 2013.

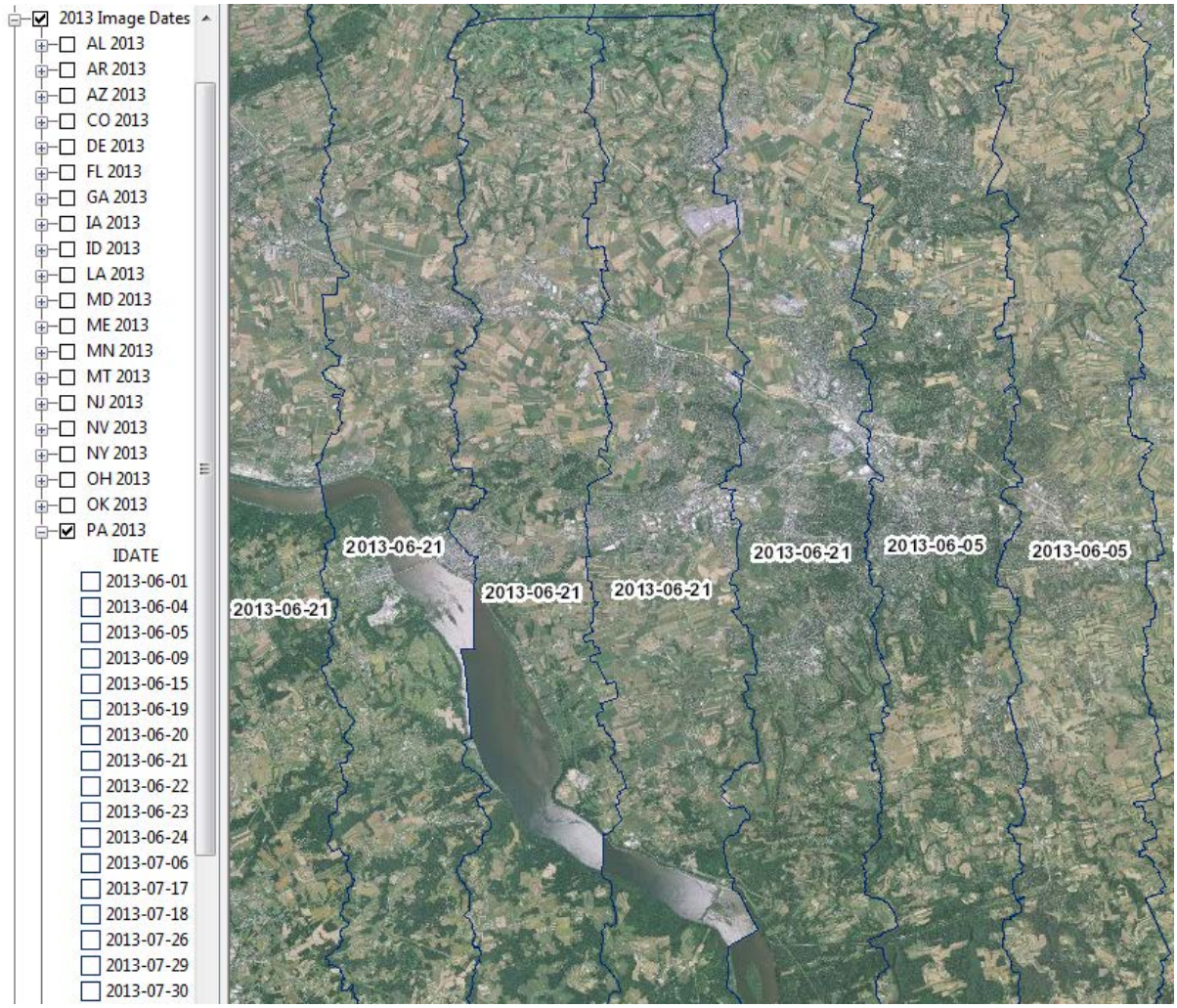


4) In addition to the most current year of imagery, the web service also offers a vector layer, called NAIP Image Dates, giving information about the project's acquisitions in every part of the state. These "seamlines" delineate the flight lines or "exposures" (this varies with the sensor) which captured the area of the image lying within its boundaries.



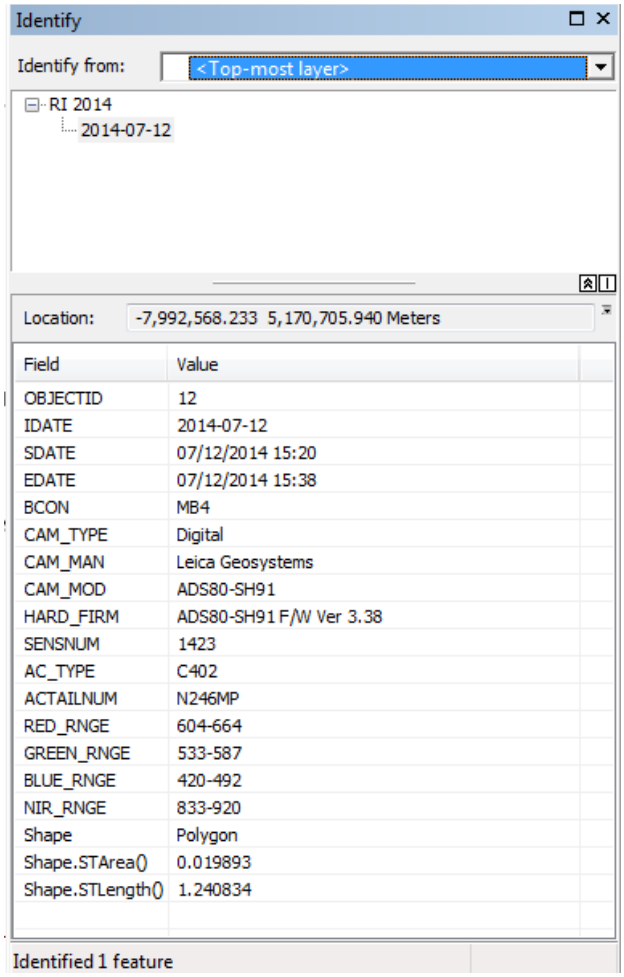
The seamline files are listed by year, for 2012, 2013, and 2014, and then by state. The year and state will need to be selected by checking the box next to the name.

The colors for the seamlines cannot be changed, and the lines may be difficult to see. The labels can be selected by right clicking next to the state name and checking *Show Labels*. The labels will display at a scale of 1:250,000 or larger.



The attributes for each polygon can be accessed. They will tell the date of flight (IDATE), the starting and ending times, with the date (SDATE and EDATE), and the band content (BCON – this will be MB4, which indicates four bands – red, blue, green and color infrared.) The web display can be changed from the natural color version to color infrared. Four band DOQQs can be purchased from APFO if users want to process the imagery.

The attributes also include the camera type, manufacturer, and model (CAM_TYPE, CAM_MAN, and CAM_MOD), the camera hardware firmware (HARD_FIRM), the sensor number (SENSNUM), and the aircraft type and tail number (AC_TYPE, ACTAILNUM). The vendor's name is not given.

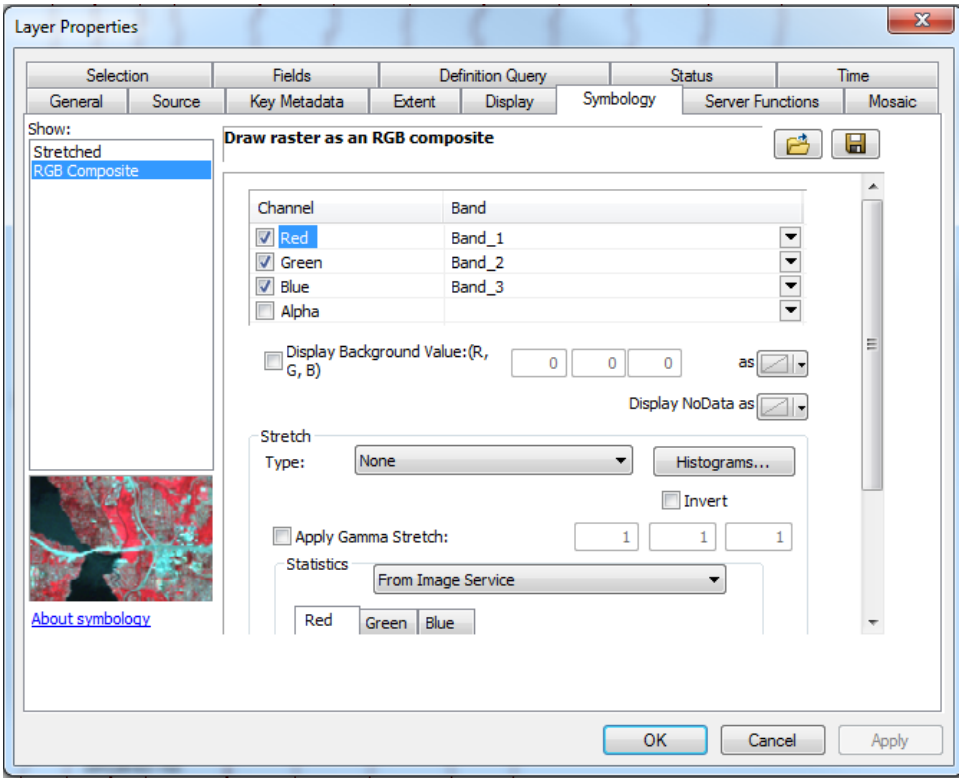


Beginning in 2014, the seamline files will also display the electromagnetic spectrum ranges for the four bands collected.

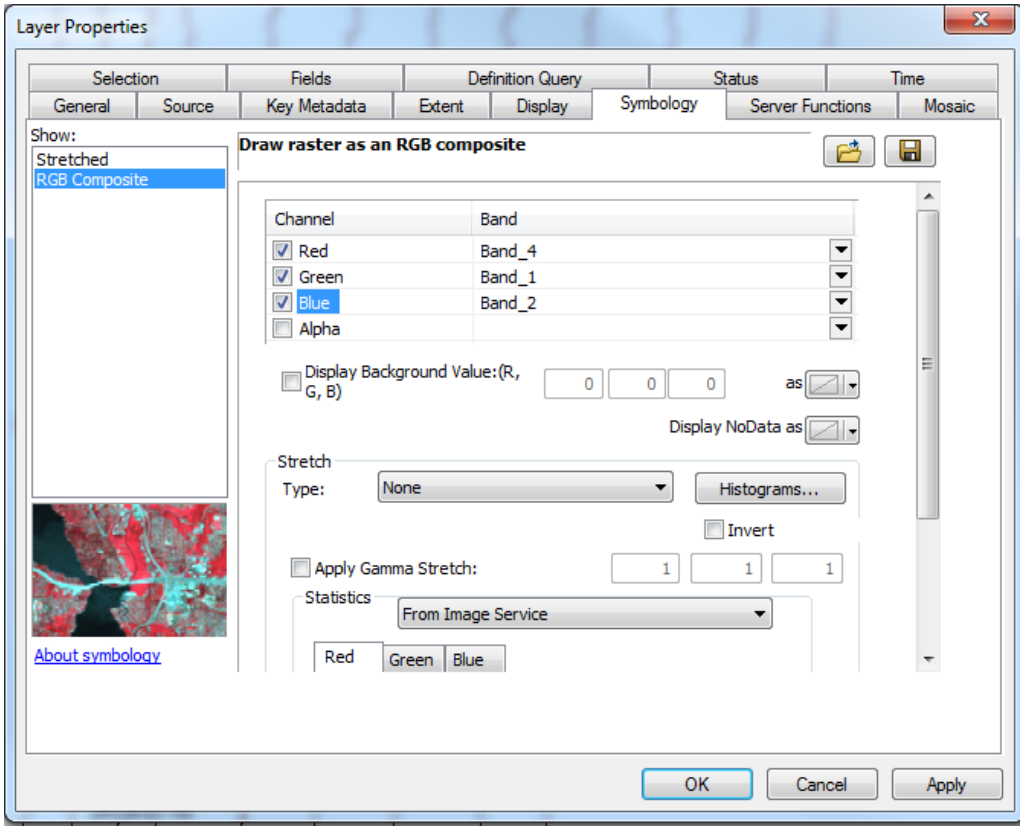
At present, the NAIP imagery in the public web service can displayed as either Natural Color (Red, Green and Blue bands) or Color Infrared. The user has the option of selecting the band combination to display.

Instructions for setting the bands:

1) Right click the name of the imagery to display. Select [Layer] *Properties* at the bottom of the drop down menu.
2) After the *Layer Properties* window opens, select the *Symbology* tab.
3) Select the bands by clicking on the small arrows to the right of the Channel and Band columns. For Natural Color, Red should be set as Band_1, Green as Band_2, and Blue and Band_3.
4) For Color Infrared, Red should be set as Band 4, Green as Band_1, and Blue as Band_2. Band_3 will not be used.



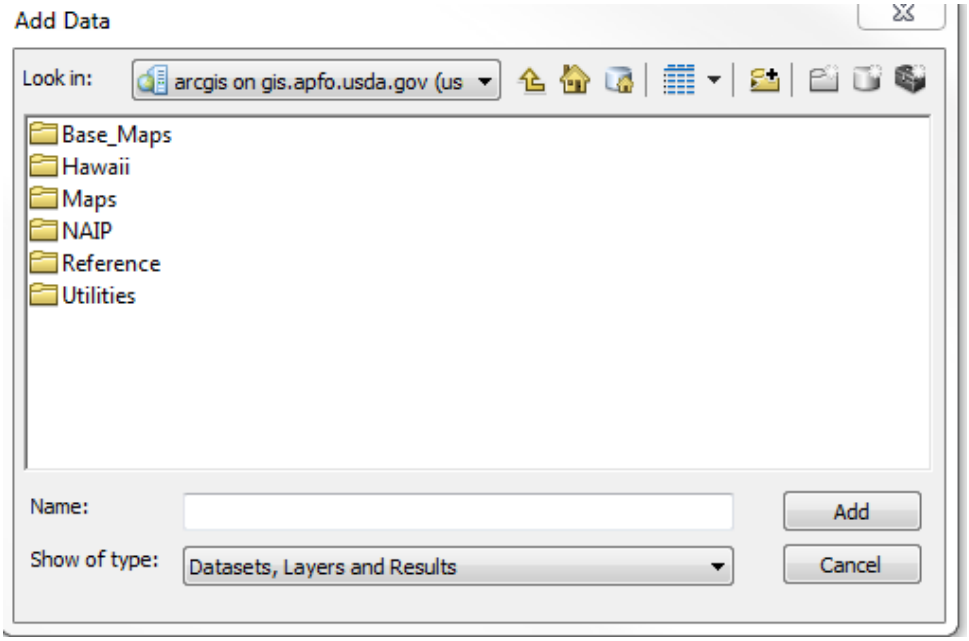
Band settings for a Natural Color display



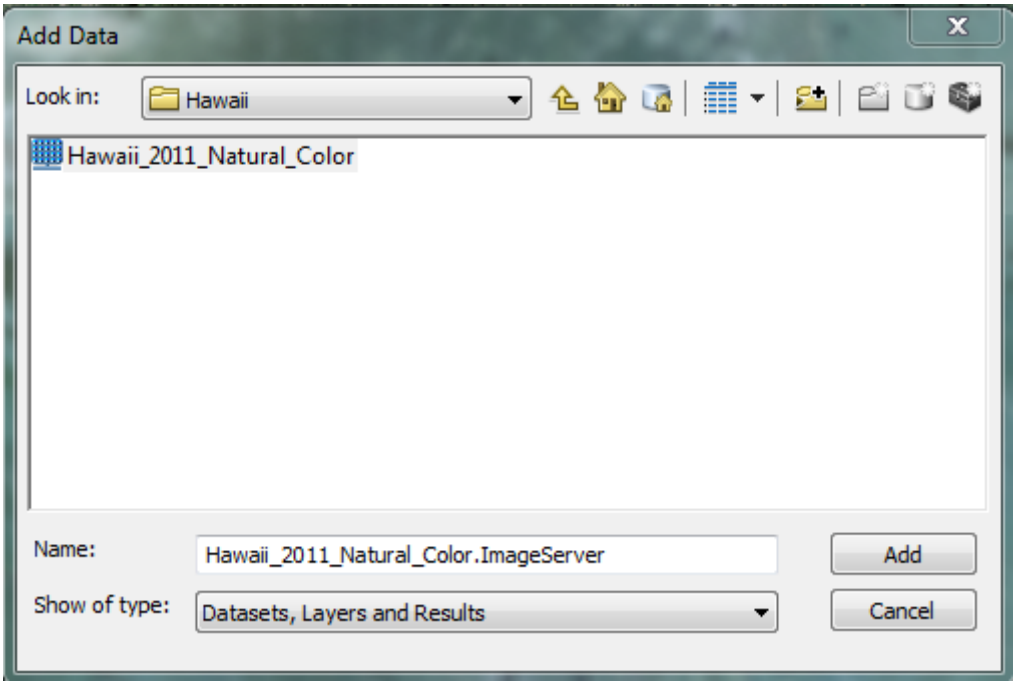
Band settings for a Color Infrared display

III. Imagery for the Hawaiian Islands

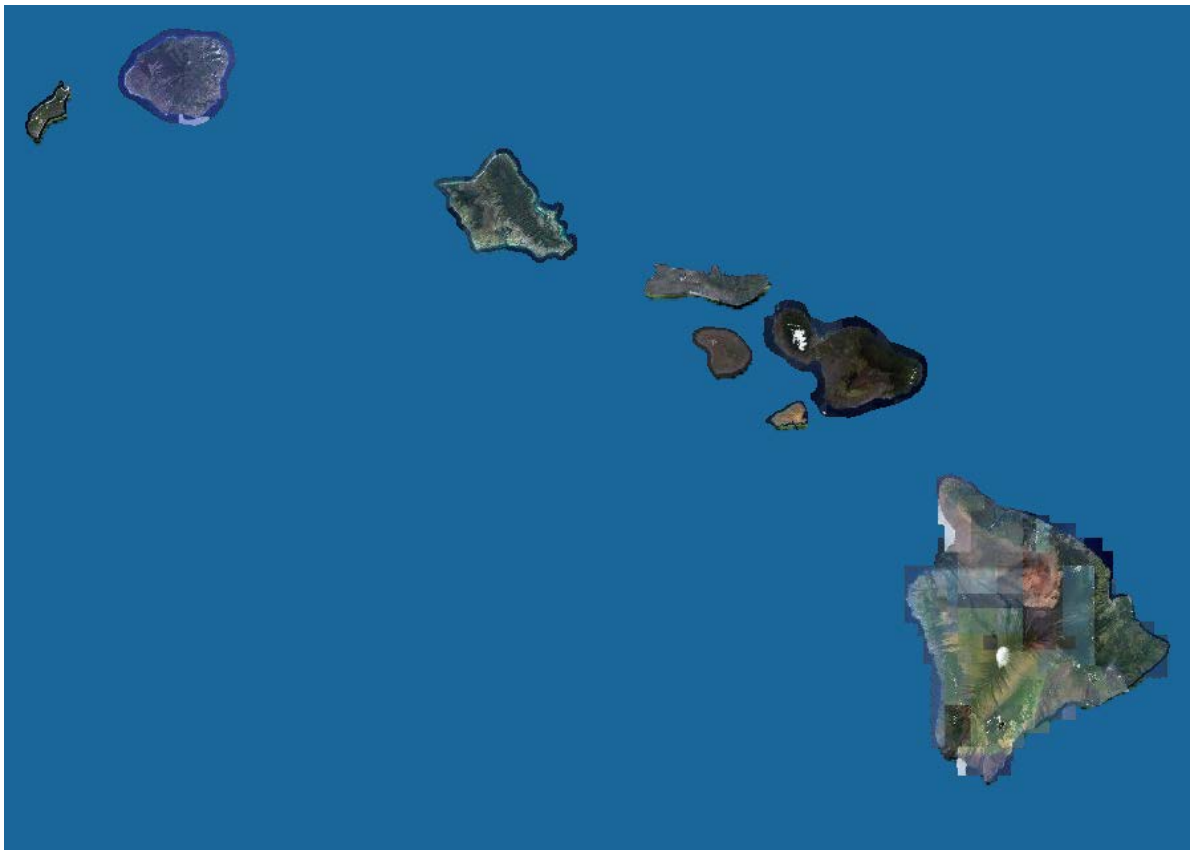
1) Double Click the Hawaii folder to see the Hawaiian imagery service.



2) There is only one option to select for Hawaii, from 2011.

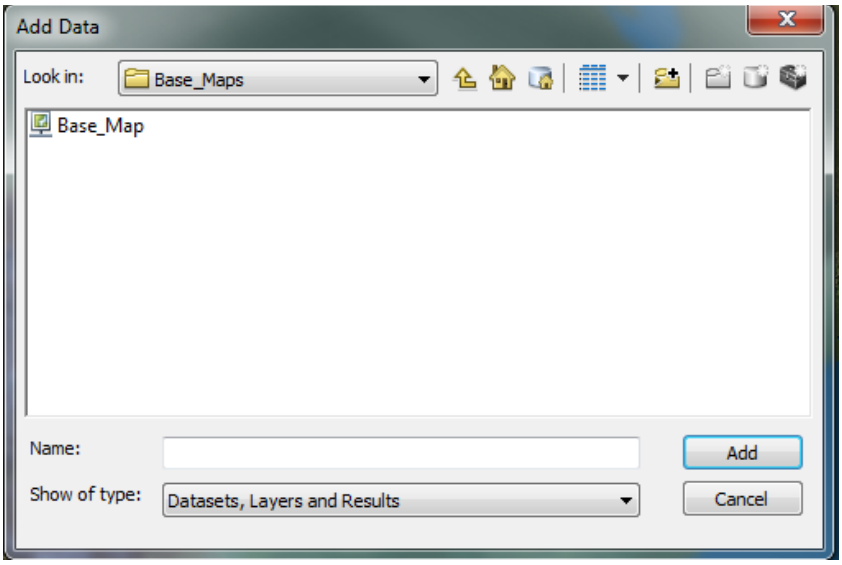


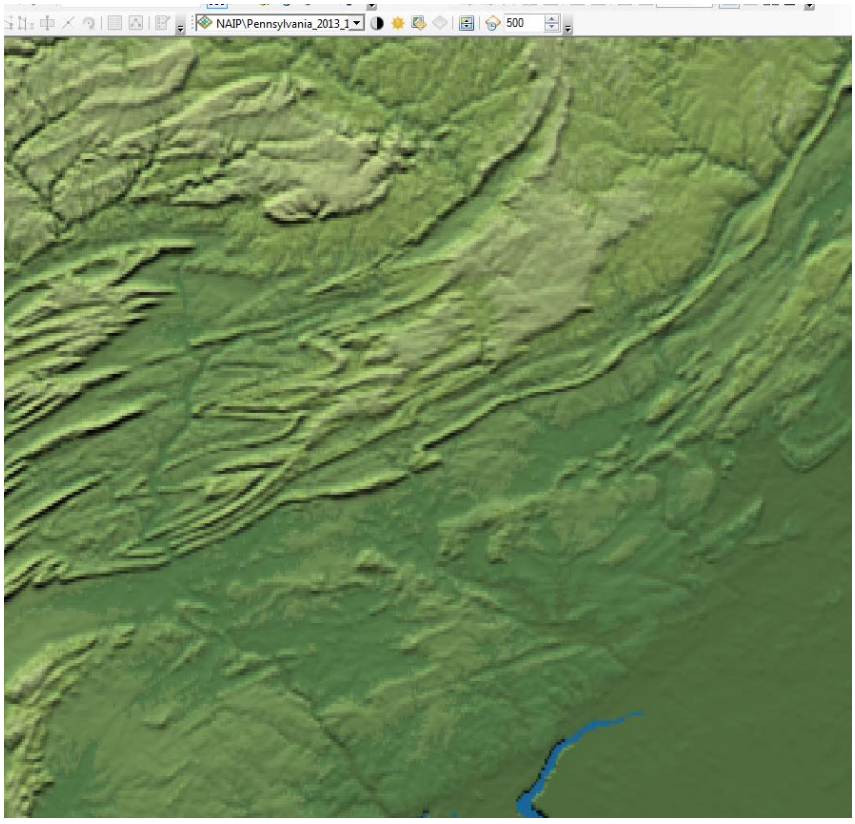
3) The imagery for Hawaii came from different sources. Some of it may be satellite imagery, and some of it may be aerial imagery from agencies such as NRCS. The imagery source is not listed.



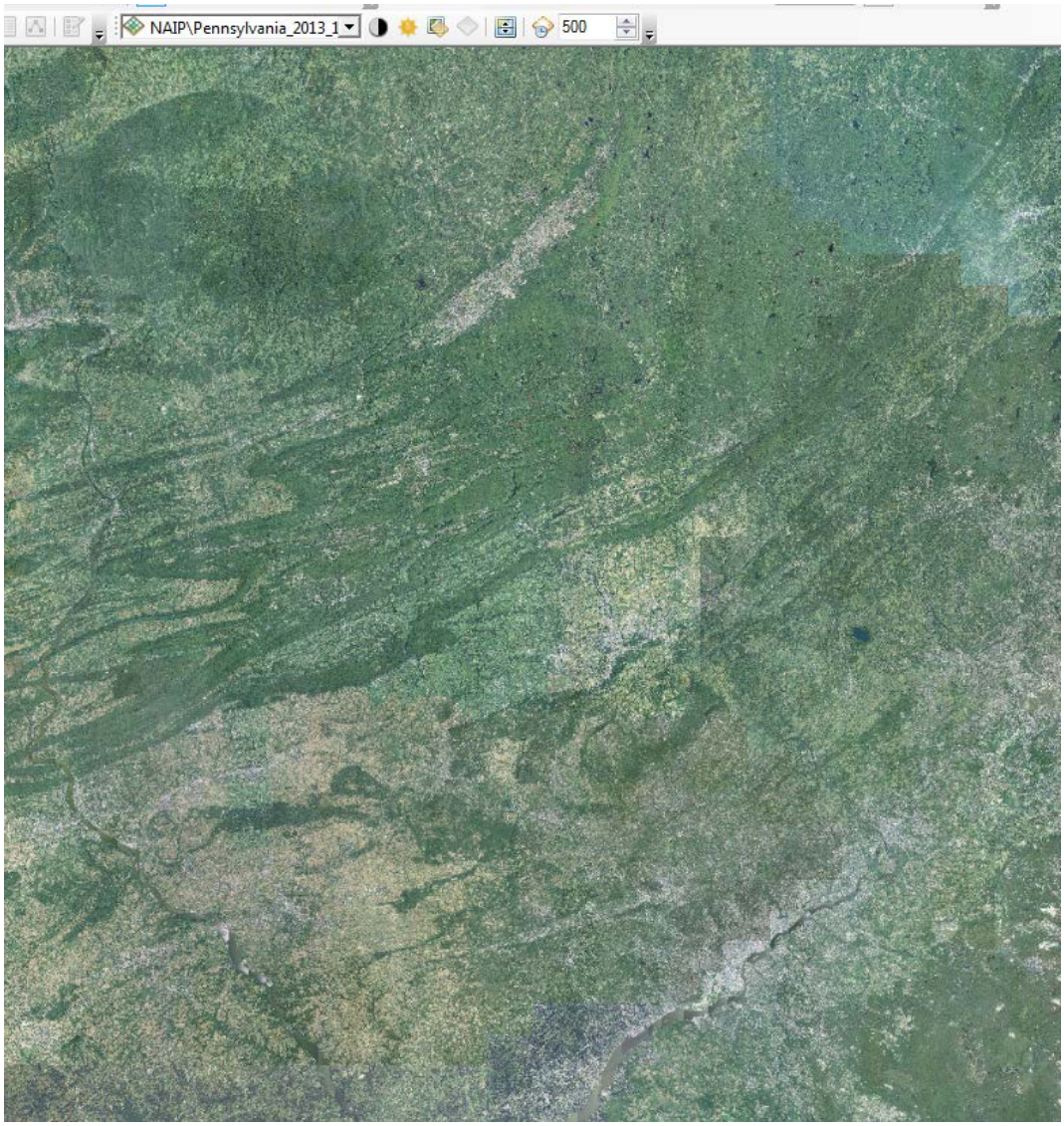
IV. The Base Map

The folder entitled Base Maps contains one map, also called Base Map. This is a color shaded relief map which displays at scales smaller than 1:1,500,000. At scales larger than 1:1,500,000, NAIP Imagery is displayed.





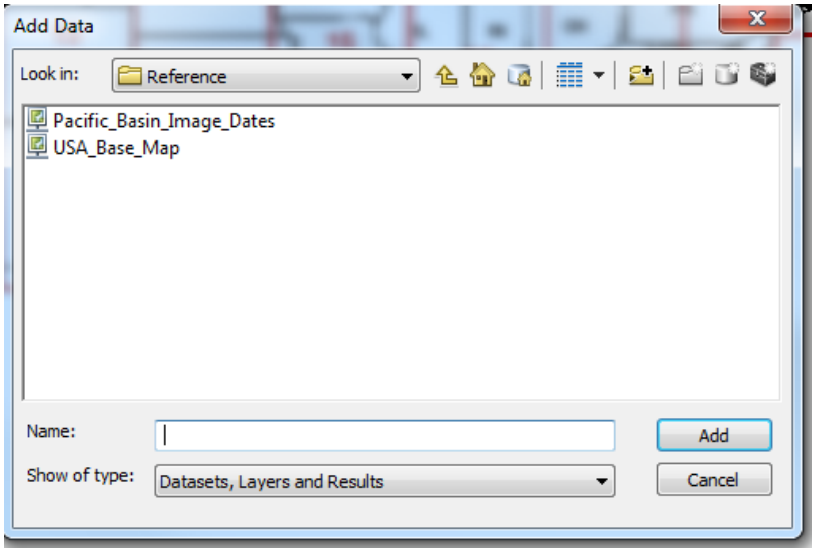
Shaded Relief Map (scale smaller than 1:1,500,000)



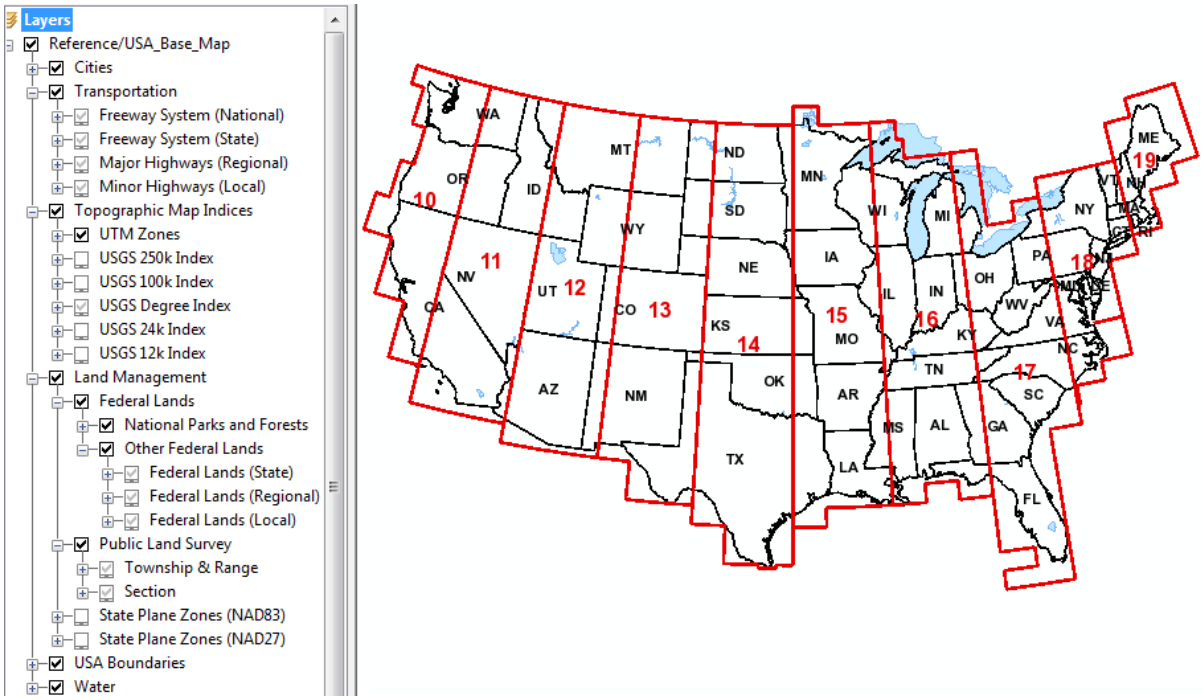
NAIP imagery (scale larger than 1:1,500,000)

V. The Reference Folder

The most useful layer in this folder is the USA Base Map.

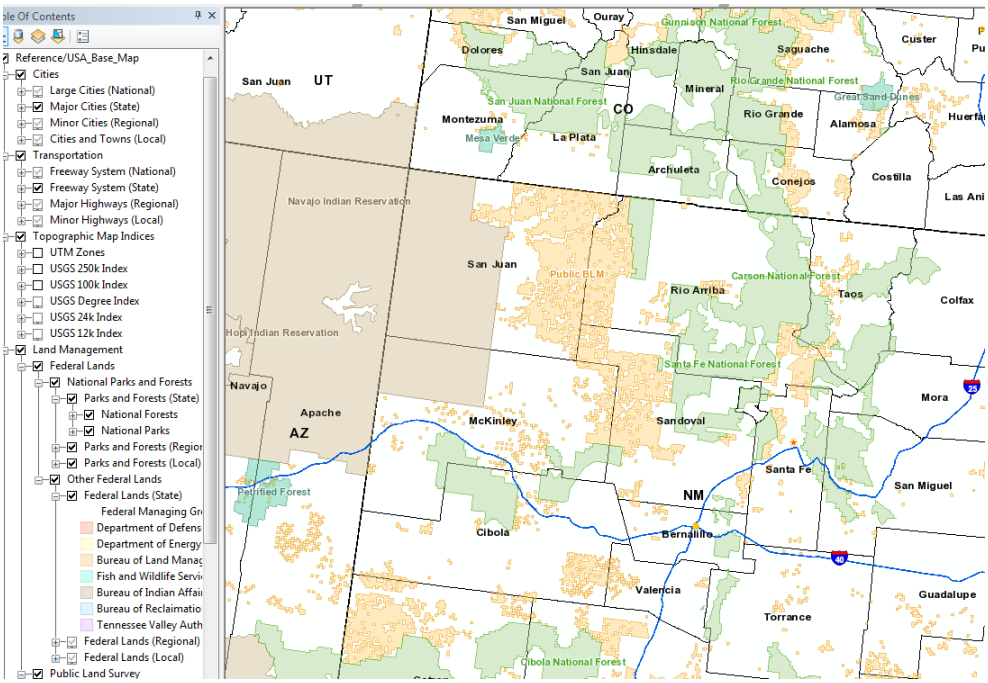


It contains a good deal of useful vector data which can be turned on or off through the Table of Contents. Some data only displays at certain Zoom levels.
At 1:29,112,464, the map displays the state boundaries, the UTM Zones, and some of the major water bodies.

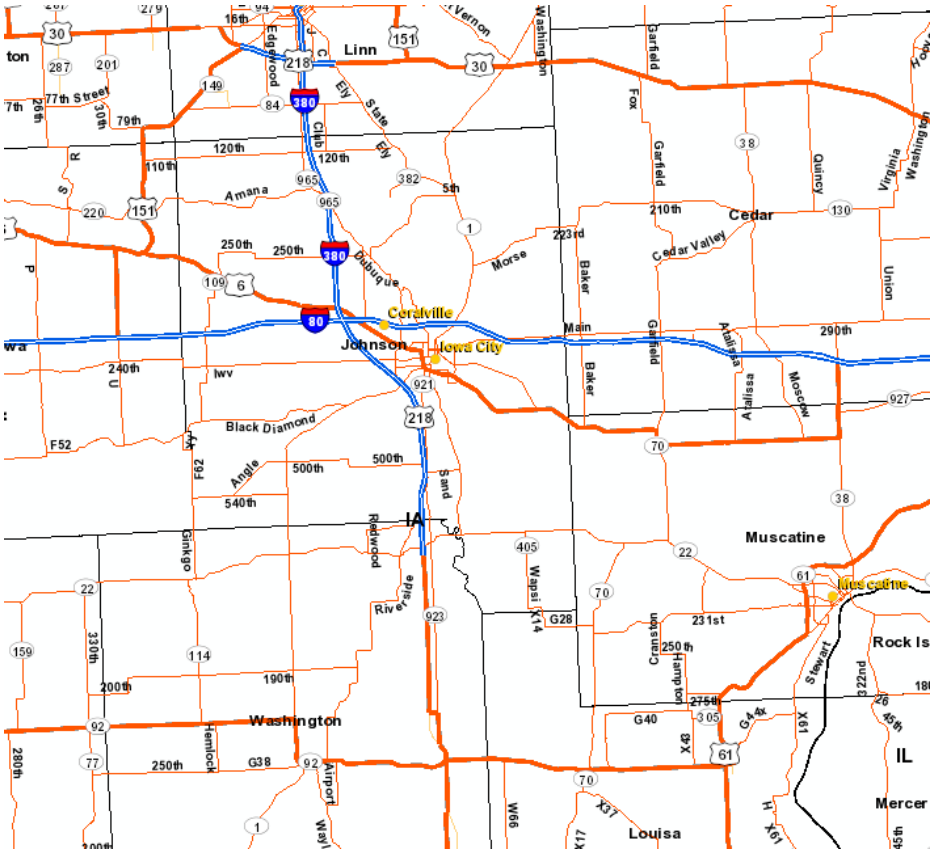


At 1:2,250,000, different layers have turned on automatically, or allowed the user to turn them

on. County boundaries with labels, Interstate highways, major cities, and public lands are now visible.

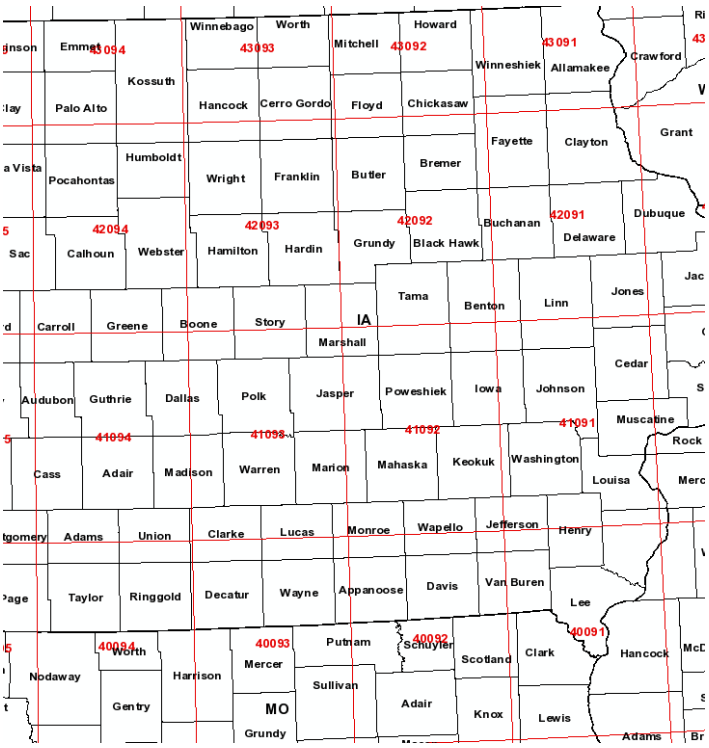


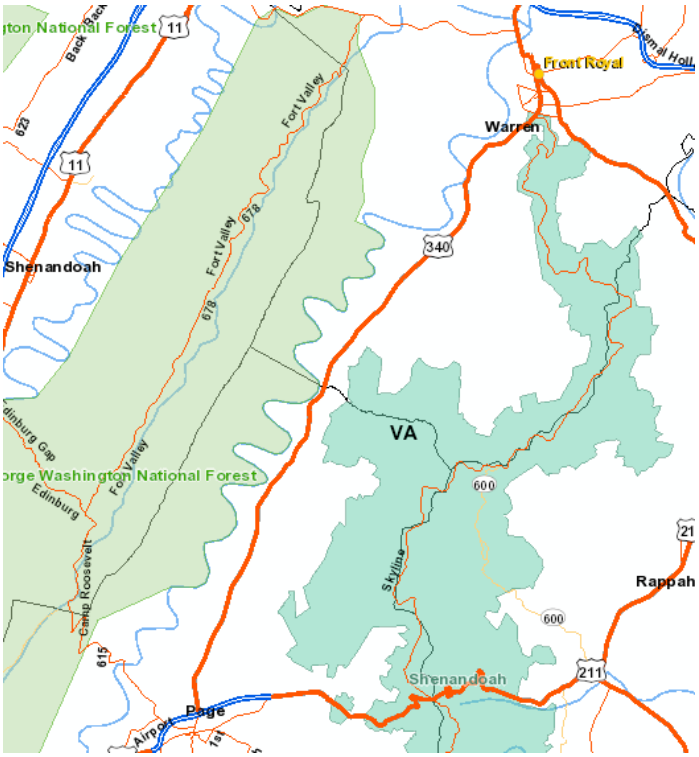
At 1:500,000, smaller municipalities and roads are displayed.



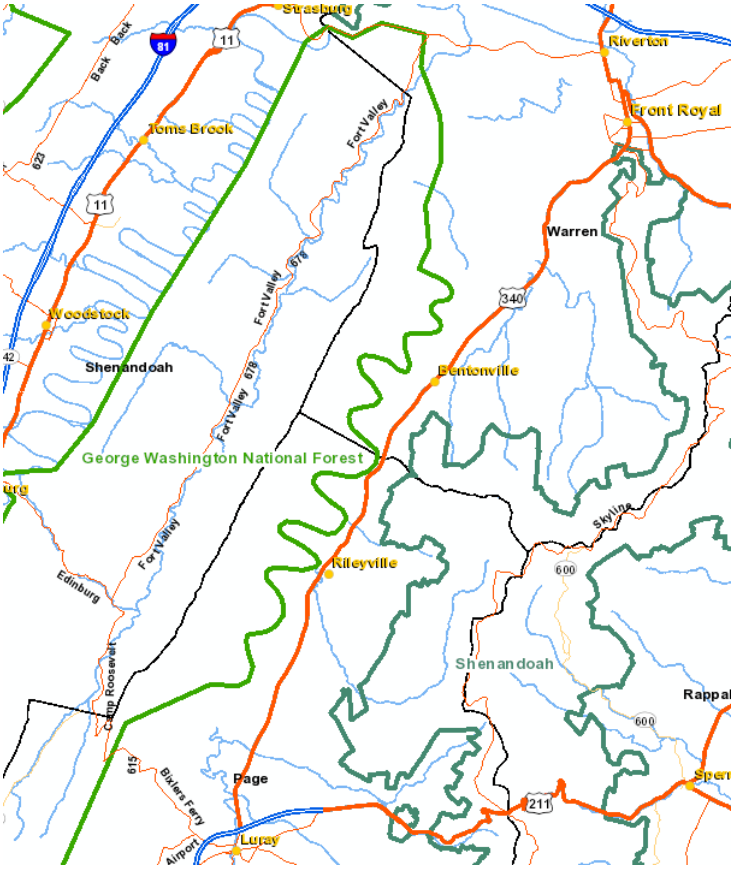
At 1:250,000, the Township and Range areas of the Public Land Survey System can be displayed.

The USGS grid for degrees (latitude and longitude) is visible between 1:500,000 and 1:2,000,000.



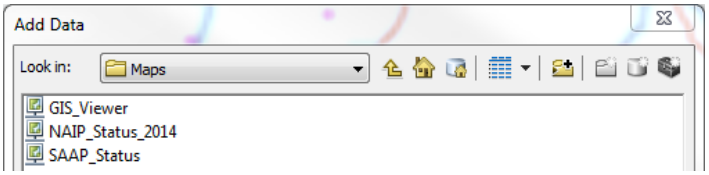


Federal lands can be displayed. When zoomed in, federal lands become a boundary line rather than a filled in polygon.



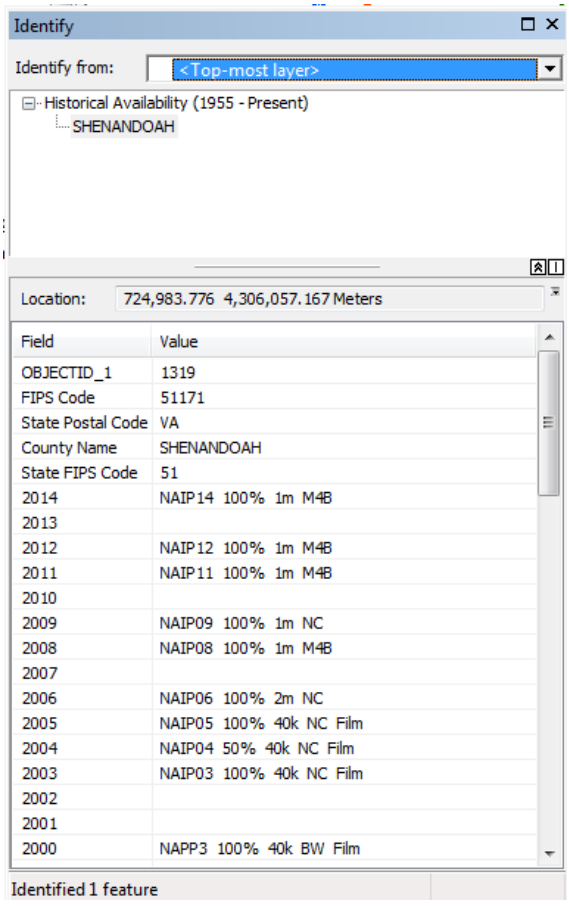
VI. The Maps Folder

The Maps folder contains maps which are also available on the APFO website. The NAIP Status 2014 viewer displays the status of imagery acquisition and inspection. When all 2014 NAIP imagery has been accepted, the map will go away. The 2015 status map will be available on the APFO website and on ArcGIS Online, but not from this service.

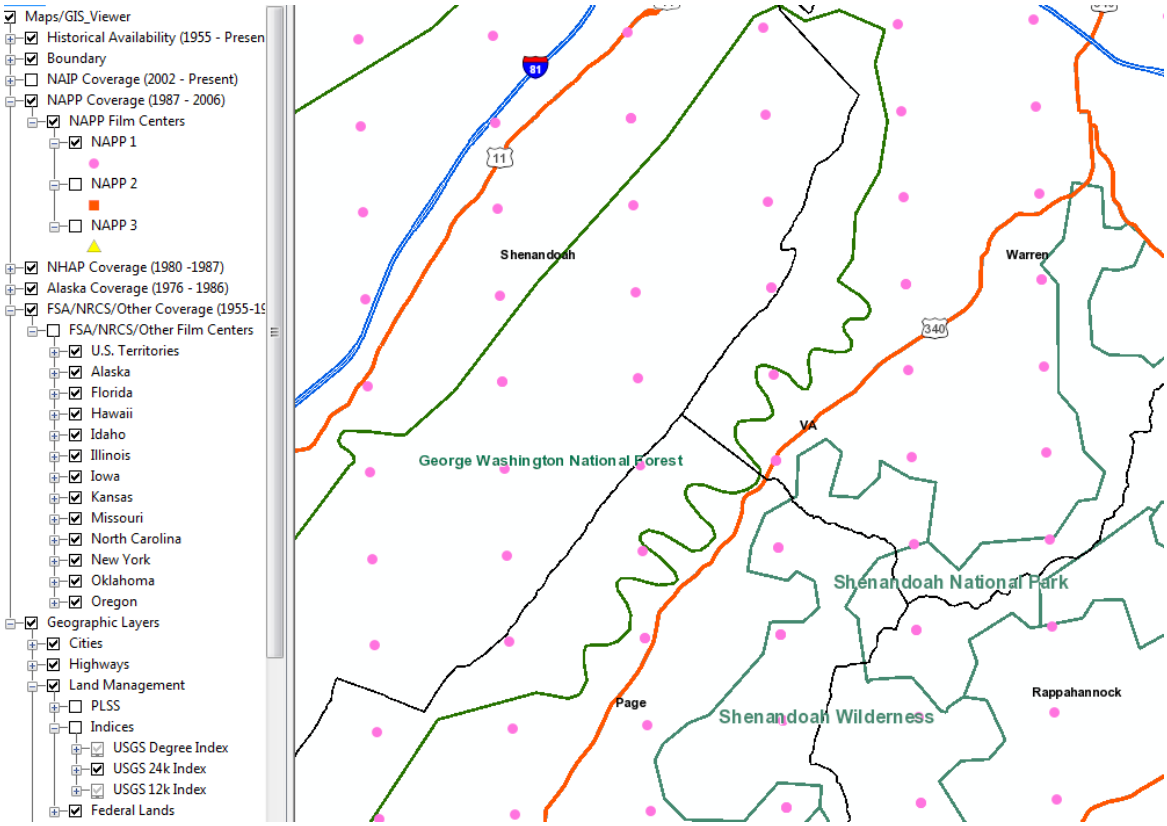


The GIS Viewer displays information available originally in shapefile or feature class format, and used by the APFO Customer Service Section in researching sales orders. The GIS Viewer is on the APFO website, and the Historical Availability layer is on ArcGIS Online.

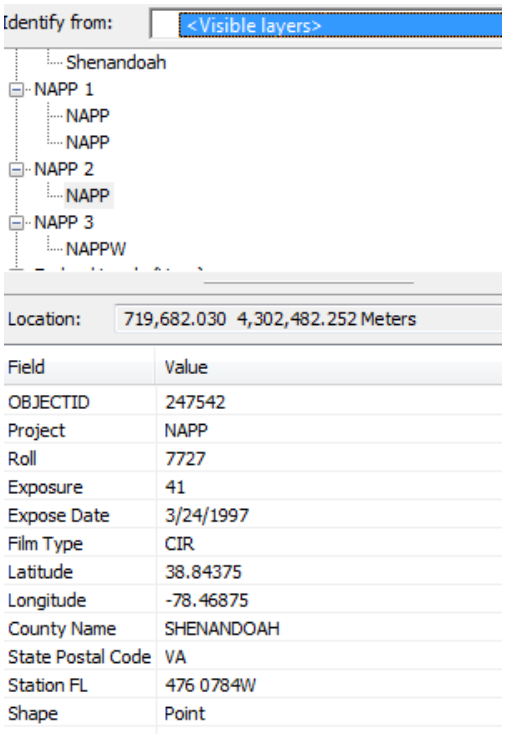
There are a number of different layers, which give different information. The Historical Availability layer arranges the information by county, and will show all available imagery, from 1955 (ASCS film projects) to the present. It is generally faster to obtain information from this layer than from some of the other sources, and it could be brought into an existing project to research the possibility of obtaining additional imagery coverage.



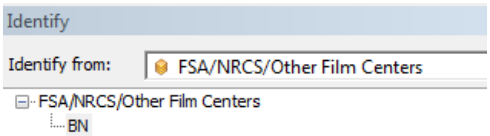
APFO has photo center files for film acquired through the National High Altitude Program (NHAP), National Aerial Photography Program (NAPP) and National Agriculture Imagery Program (NAIP). Pictured below are NAPP1 points.

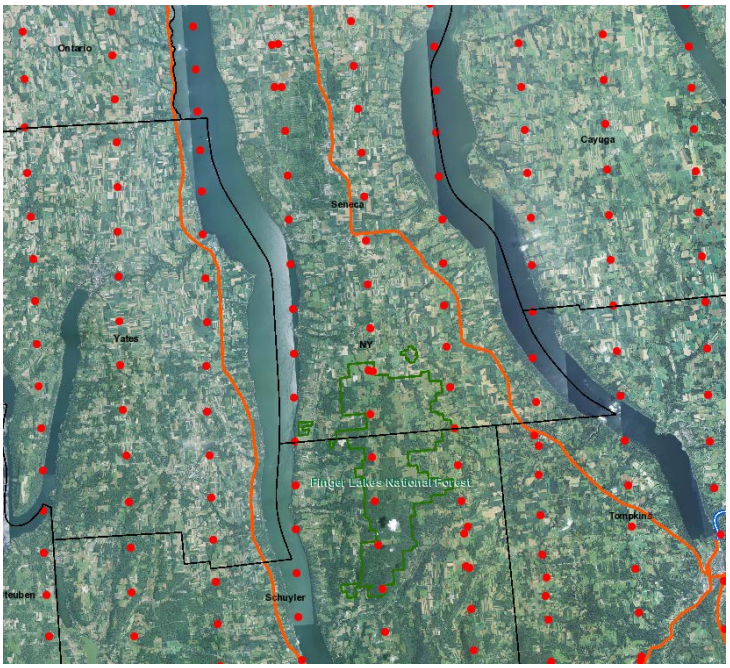


The center points for NAPP 2 and 3 are in the same position, and the point symbols will be on top of each other. A zoomed in view displays the roll and exposure for each of the available exposures at that site, and the labels are color coded to match the symbol for each NAPP photo program. The points will not appear at scales smaller than 1:250,000.



The layer for FSA/NRCS in New York is displayed below. The points are from ASCS, which has been changed to FSA in other tables used at APFO. The exposure date was in 1991, but the layer name was the Contract Year of 1990, and 1990 is the year listed in the Historical Availability layer.

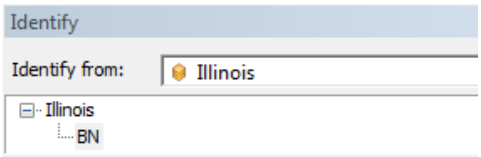




Location: 837,751.354 4,734,945.698 Meters

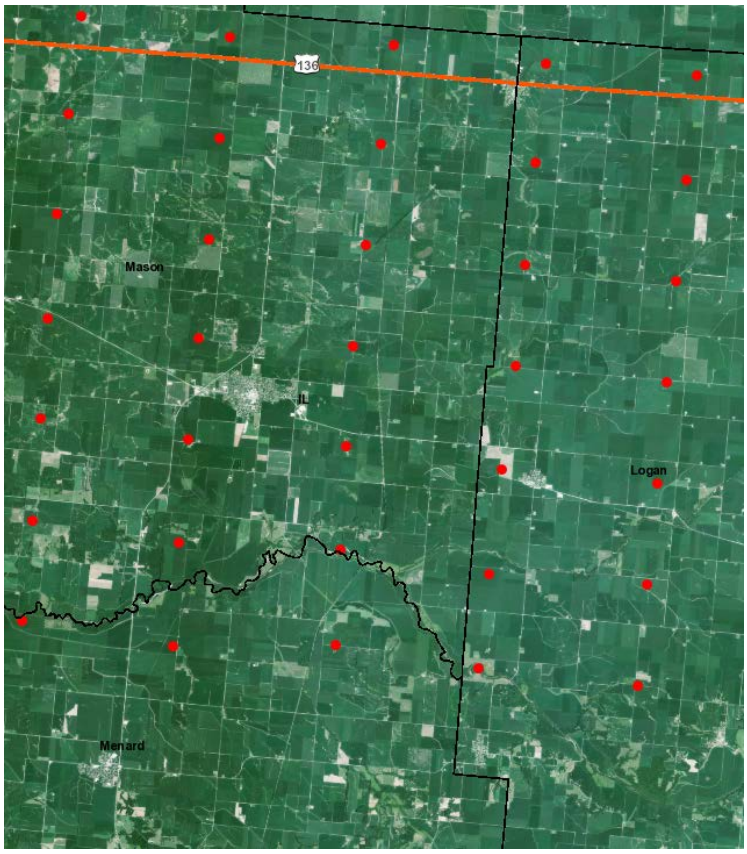
Field	Value
OBJECTID	3792
Spot	58153
Exposure	23
Roll	2390
Film	BN
Symbol	36000
Date	9/22/1991
Program	ASCS
Deg Lat	42
Min Lat	41
Sec Lat	34.566
Deg Long	76
Min Long	52
Sec Long	36.945
Latitude	42.692935
Longitude	-76.876929
Shape	Point

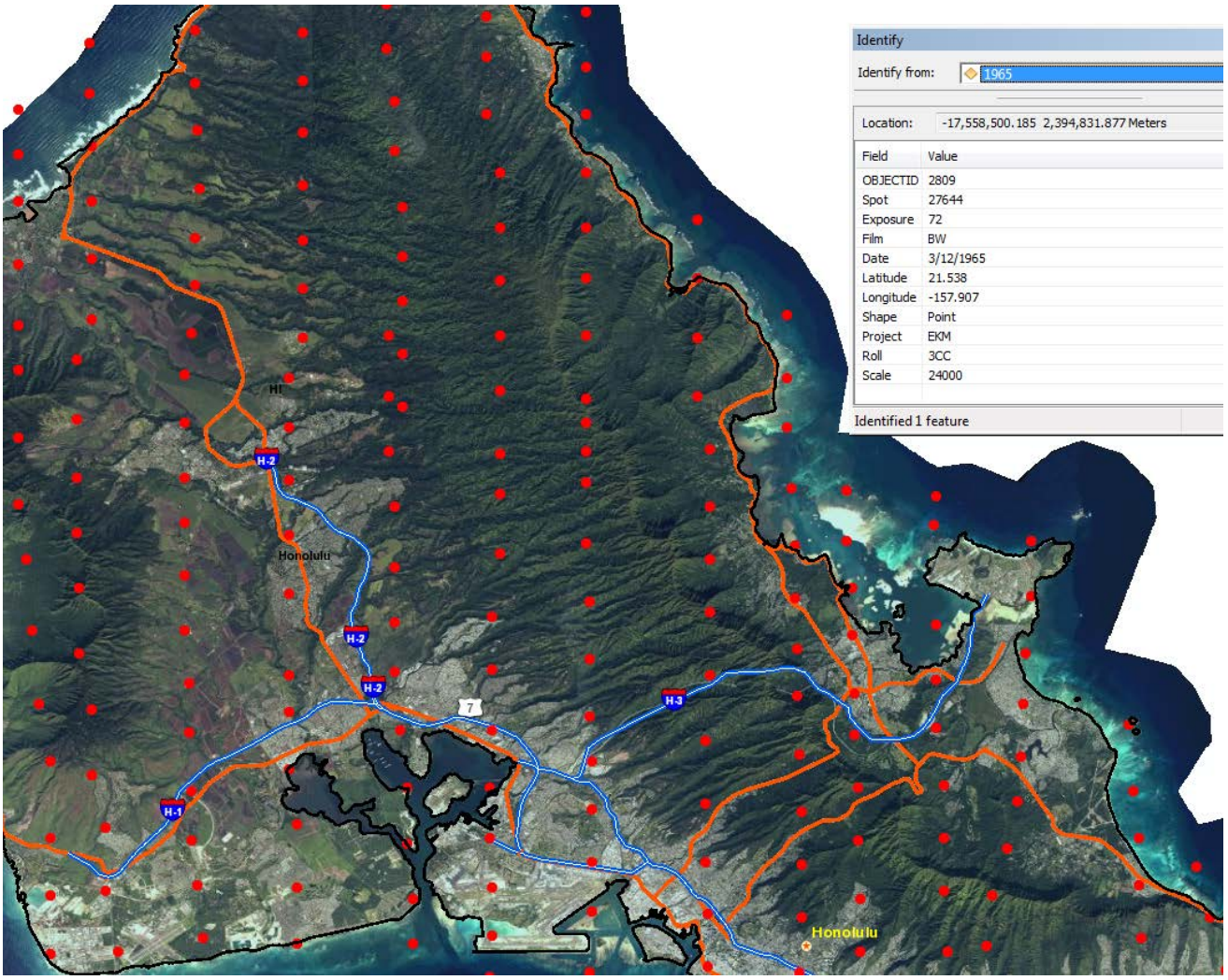
A similar layer from Illinois displays points from the Soil Conservation Service (SCS; now National Resources Conservation Service -NRCS)



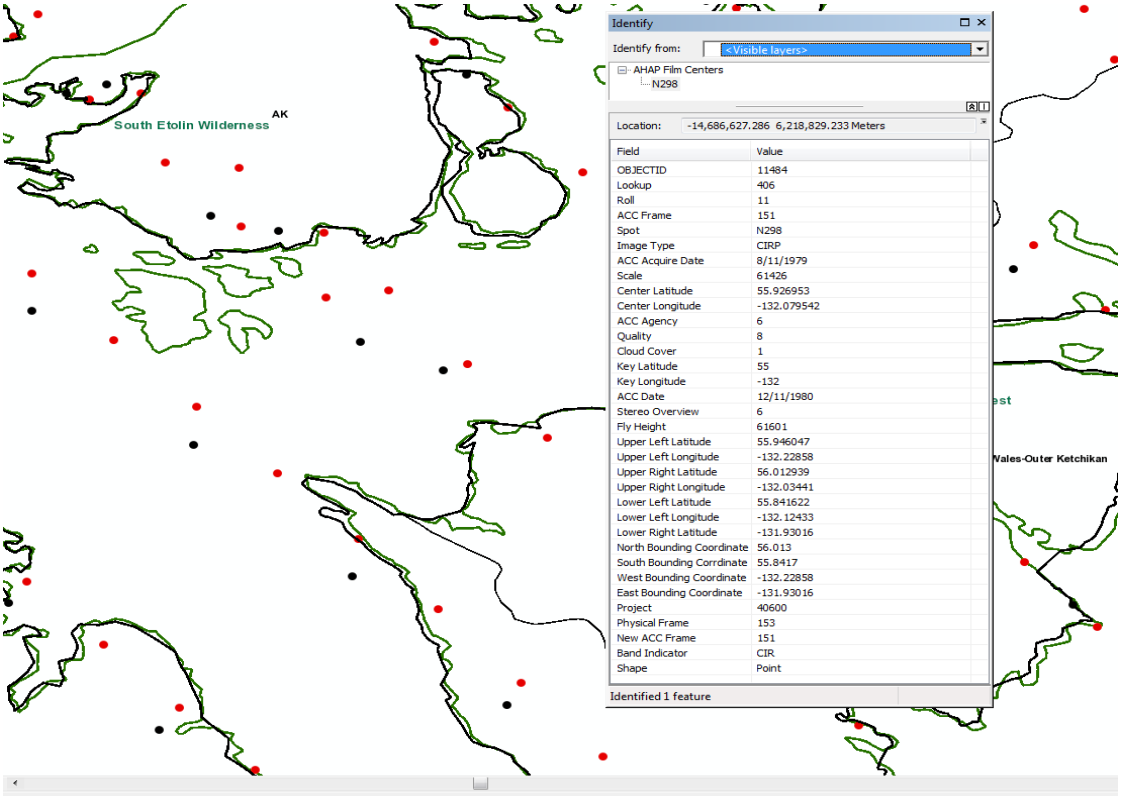
Location: -257,246.735 4,500,538.364 Meters

Field	Value
OBJECTID	816
Spot	60862
Exposure	185
Roll	1594
Type	BN
Symbol	17000D
Date	10/24/1993
Program	SCS
Deg Lat	40
Min Lat	18
Sec Lat	41.67
Deg Long	89
Min Long	54
Sec Long	19.507
Latitude	40.311575
Longitude	-89.905419
Shape	Point


136
Mason
Logan
Menard



There is film from Hawaii in 1965, as shown by the control point file. The background imagery is from 2011. Users will have to remember that the imagery corresponding to the control point files is not available for viewing. Even if the film has been scanned, in most cases it has not been used to create orthophotos; it usually has not even been geo-referenced.



Black and White and CIR film from Alaska is available from APFO. Since the points will only display at 1:250,000 or smaller, searching can be cumbersome and time consuming.

The data in the two vector layer folders could be used for GIS projects. Much of this type of data can be found in other locations and in other formats, but the basic vector data could be convenient for someone making a basic map including the NAIP imagery.

The restrictions on visibility at different zoom levels cannot be changed, and the result is that sometimes two desired layers cannot be displayed at the same time. The data has some limitations, but it can be useful in many circumstances.

For more information, contact GIS Specialists Brian Vanderbilt, 801-844-2930, or Louise Mathews, 801-844-2934