



The Nation's Forest Census

STREAMLINING NATIONAL FOREST INVENTORY WORKFLOWS THROUGH ARCGIS ADD-INS

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Agenda

- ž Introduction
 - What is FIA?
 - What is Pre-field?
- ž Need for workflow refinement
- ž Development of ArcGIS add-ins
 - Plot Editor Add-in
 - Canopy Cover Add-in
- ž Overall workflow benefits
- ž Questions

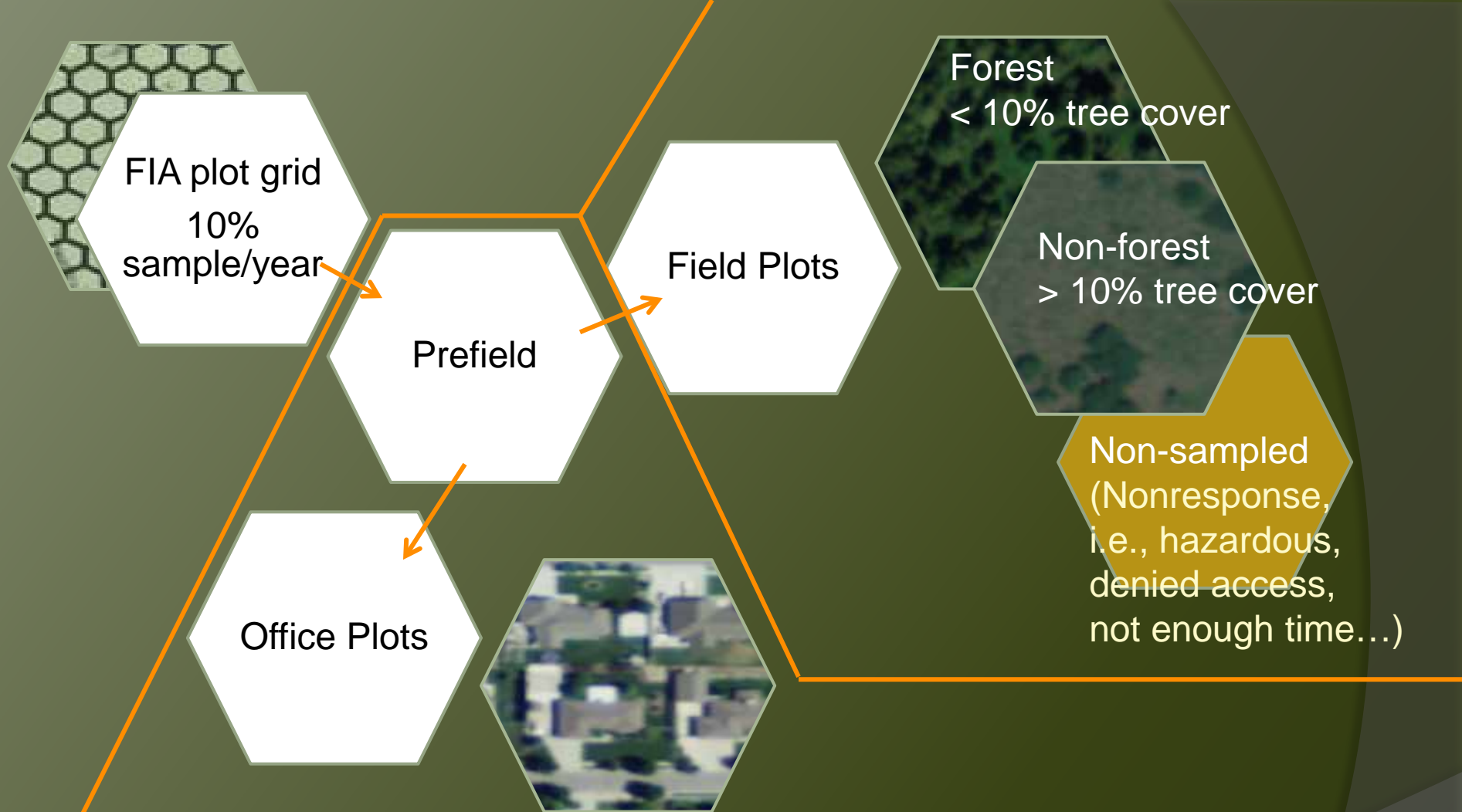
Introduction



¿ What is *FIA*?

- *Forest Inventory and Analysis* is a National Program
 - A “Census” on the Nation’s Forest
 - What/Where is all forest land?
 - Public and private lands where permitted
 - 1 plot every 6000 acres
 - 10% sampled/year, distributed throughout the sample area.





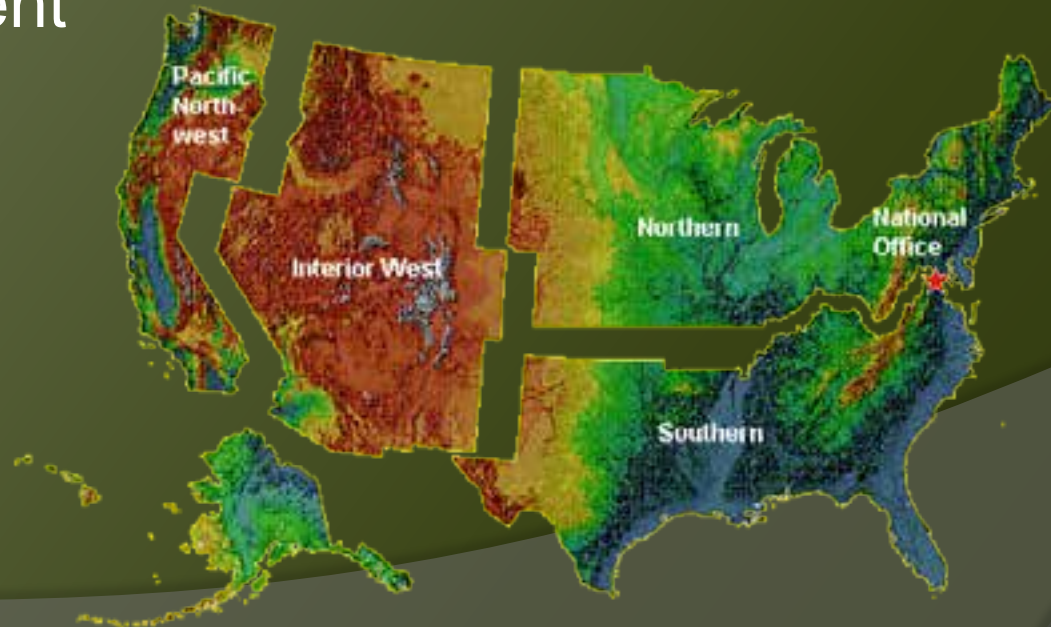
ž What is *Pre-field*?

- *Pre-field* is the work that occurs prior to field data collection

Pre-field workflow needed refinement nation-wide

ž Each region:

- Housed the data separately in regional databases
- Data collection methods were separate and inconsistent



Pre-field workflow needed refinement nation-wide

- ž We needed the ability to:
 - Actively query and write to our nationally centralized and secure Oracle database
 - Collect data on non-visit plots
- ž ArcGIS Desktop 10.x and it's add-in capability helped make this possible

Change in Pre-field workflow led to a need for refinement nation-wide

- ž We needed the ability to:
 - Actively query and write to our nationally centralized and secure Oracle database
 - Collect data on non-visit plots
- ž ArcGIS Desktop 10.x and it's add-in capability helped make this possible

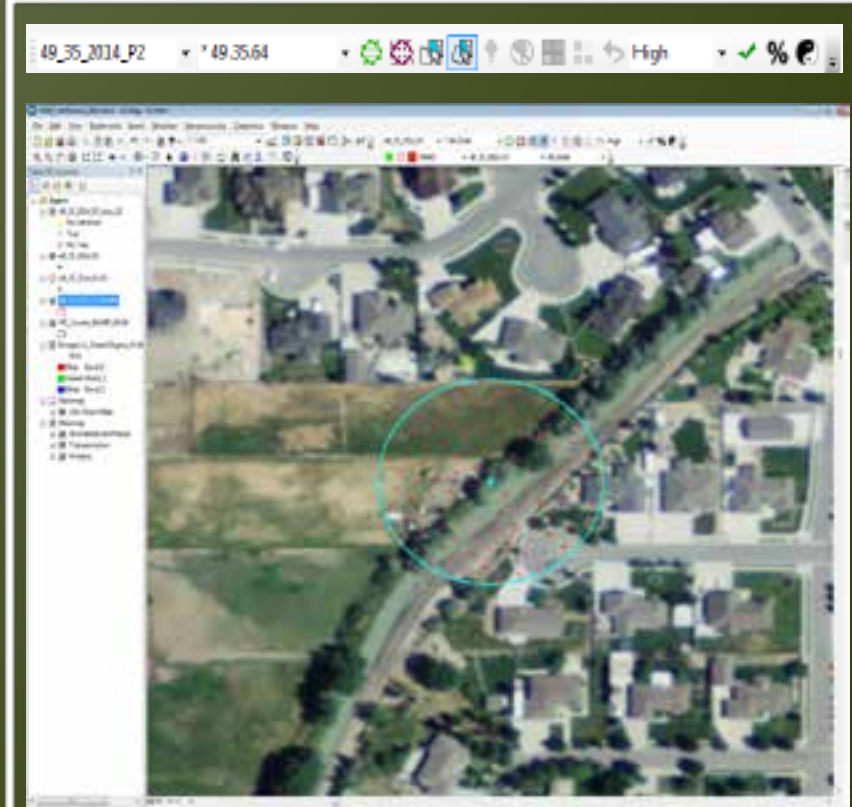
Development of 2 Add-ins



The screenshot shows the Plot Editor Add-in interface. At the top, there are window titles: "RMRS" and "49_35_2014_P2". The main window is titled "Plot Editor RMRS" and contains several sections:

- Plot Data:** Fields for State (43), County (25), Plot (58), and various other identifiers. Buttons for "Get Data", "Next Plot", "Get Plot", and "Done Plot" are visible.
- Plot Info:** Fields for "Parcel ID", "Parcel Name", "Parcel Class", "Parcel Area", "Parcel Date", and "Parcel Status".
- Parcel Data:** Fields for "Parcel ID", "Parcel Name", "Parcel Class", "Parcel Area", "Parcel Date", and "Parcel Status".
- Comments:** A text area for entering notes.
- Parcel List:** A table with columns: "Parcel ID", "Area", "Parcel Name", "Parcel Class", "Parcel Area", "Parcel Date", "Parcel Status".

Plot Editor Add-in



The screenshot shows the Canopy Cover Add-in interface. At the top, there are window titles: "49_35_2014_P2" and "49_35_64". The main window is titled "Canopy Cover Add-in" and displays an aerial photograph of a residential area. A red circle highlights a specific area of the image. The interface includes a toolbar at the top with various icons for navigation and analysis. On the left side, there is a "Layers" panel with a list of layers and their corresponding colors. The main area shows the aerial image with a red circle highlighting a specific area.

Canopy Cover Add-in

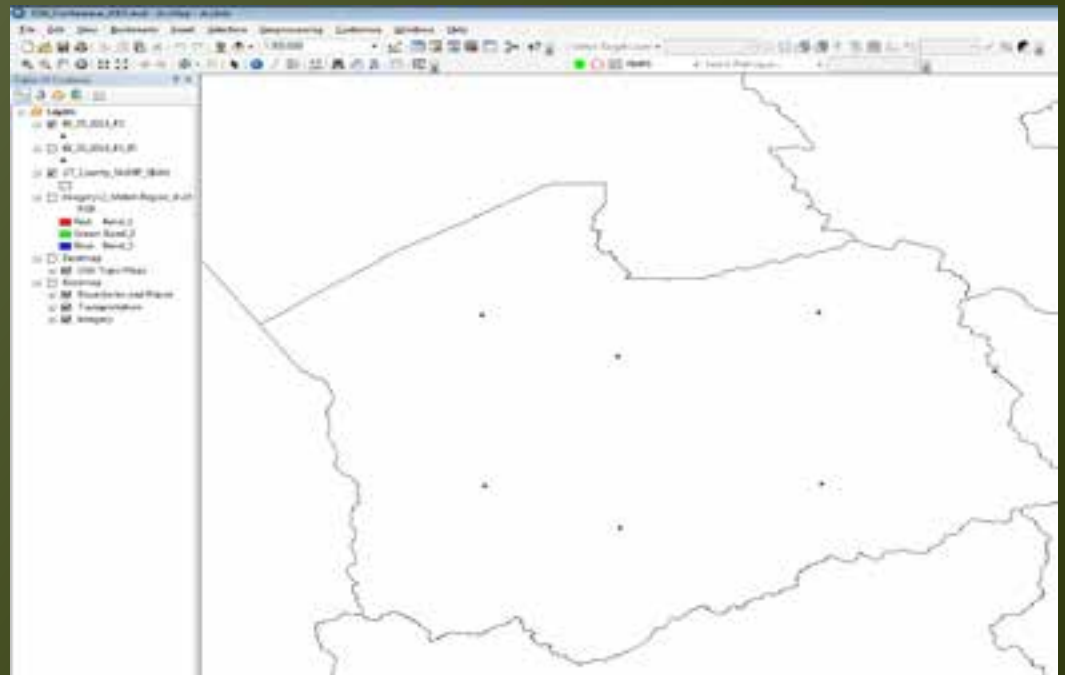
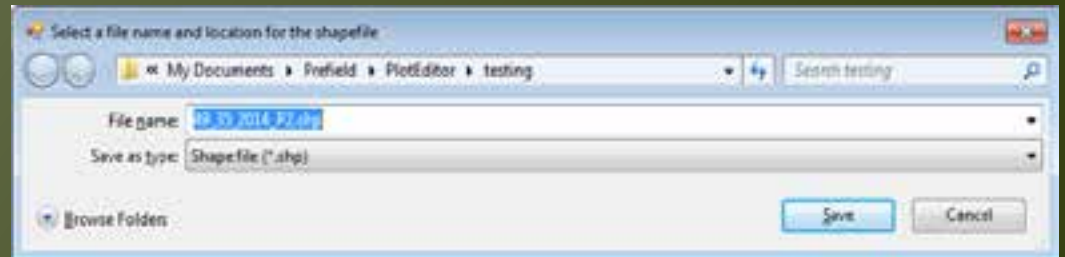
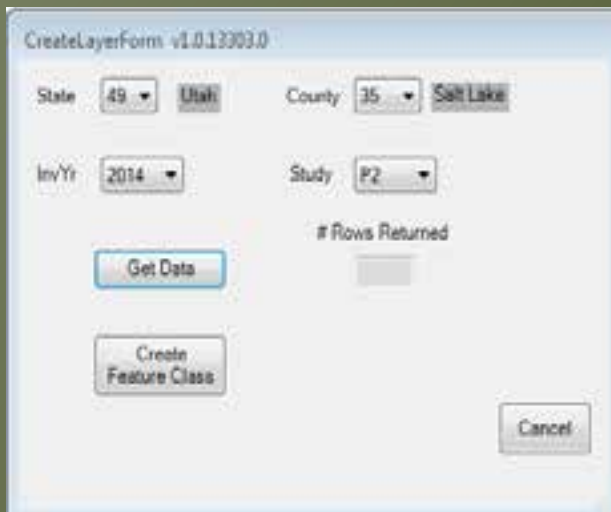


Plot Editor Add-in



∅ Query national database

∅ Create and Save dot layer



Plot Editor Data Collection Form

RMRS 49_35_2014_P2 49.35.64

Prefield Plot Editor RMRS v1.0.13303.0 10/30/2013

Plot Data

State: 49 Utah Ad For Cd: NULL # Plots Remaining: 7
County: 35 Salt Lake CN: 40424547010690 # In State Not Pl Complete: 917
Plot: 64 Owner Class: 45 Individual
Inv Year: 2014 Sample Kind: 2
QA Status: 1 Elev: 4496
Latitude: ██████████ Longitude: ██████████

Get Data
Next Plot
Get Plot
Zoom 2 Plot

Plot view options:
 Call Made?
 Call Required?
 All Plots

Prefield Call

Forested? Field Plot? PC Cond Status
Visit Type
Future Forest
Truck Distance
Land Use
Land Cover

Canopy Cover
Samp Method
% Cover
Confidence
Conf Reason

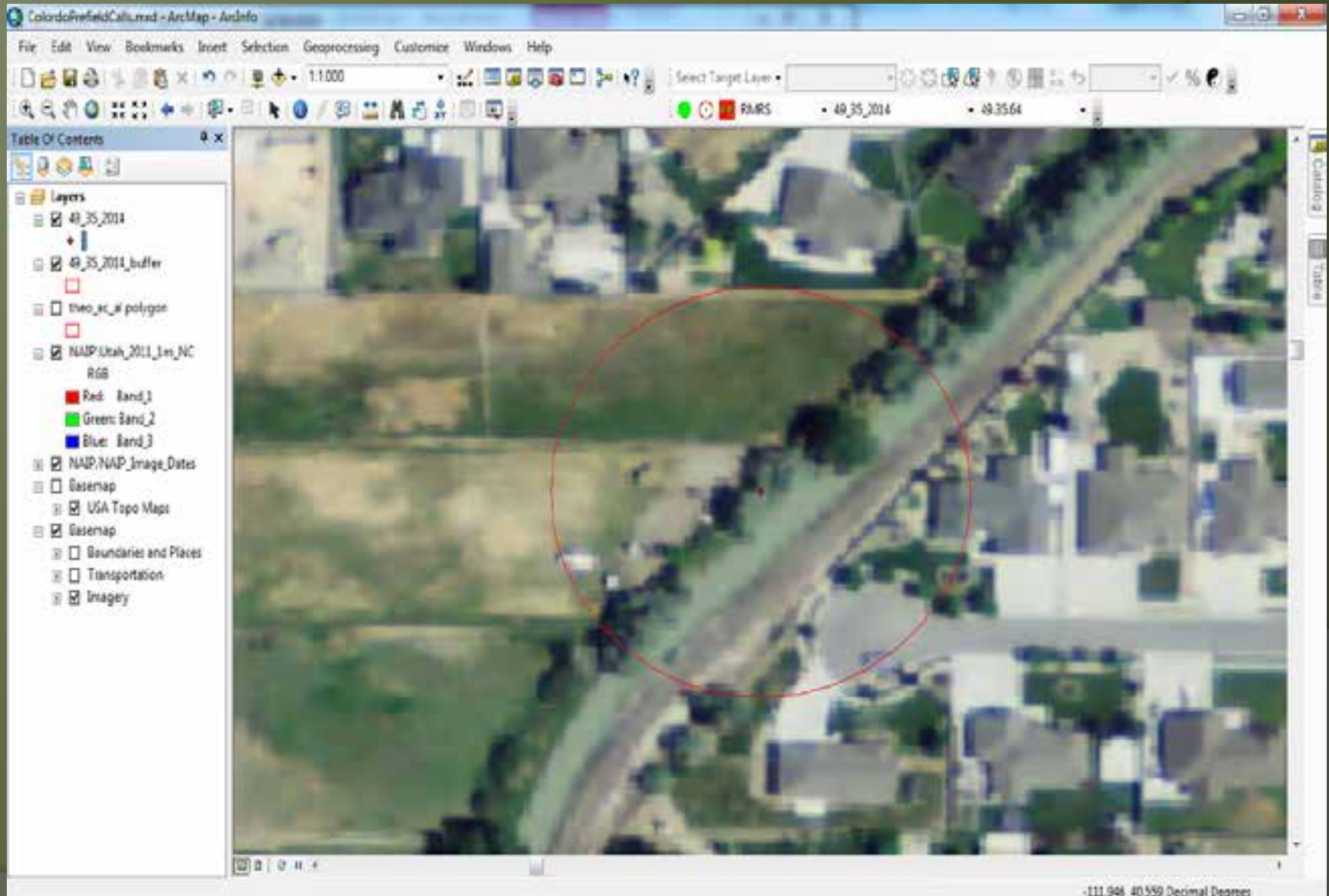
Submit
More Info
Fetch % Cover
Fill Image Date/Source
Image Source
Image Date

Comments

Previous Visit / Office Calls

	MeasDate	Inv yr	Plt Stat	FutFor	Plt no. Rtn	Note
▶	//					

Assess the plot area (144 FT radius)



Enter non-visit data into form

Prefield Plot Editor RMRS v1.0.13303.0 10/30/2013

Plot Data

State: 45 Utah Ad For Cd: NULL # Plots Remaining: 7
County: 35 Salt Lake CN: 40424547010690 # In State Not Pl Complete: 517
Plot: 64 Owner Class: 45 Individual
Inv Year: 2014 Sample Kind: 2
QA Status: 1 Elev: 4496
Latitude: [REDACTED] Longitude: [REDACTED]

Get Data
Next Plot
Get Plot
Zoom 2 Plot

Plot view options

Call Made?
 Call Required?
 All Plots

Prefield Call

Forested? N Field Plot? N PC Cond Status: 2 Nonforest land

Visit Type: [REDACTED]
Future Forest: 0 No forest possible
Truck Distance: [REDACTED]
Land Use: [REDACTED]
Land Cover: NULL

Canopy Cover
Samp Method: [REDACTED]
% Cover: [REDACTED]
Confidence: [REDACTED]
Conf Reason: [REDACTED]

Submit
More Info
Fetch % Cover
Fill Image Date/Source

Image Source: [REDACTED]
Image Date: [REDACTED]

Comments: [REDACTED]

Previous Visit / O

MeasDt	FutFor	Plots Ran	Note
▶			

Land Cover Legend:

- 10 - Agricultural
- 11 - Cropland
- 12 - Pasture (improved)
- 13 - Idle farmland
- 14 - Orchard
- 15 - Christmas tree plantation
- 16 - Maintained wildlife opening
- 17 - Windbreak/Shelterbelt
- 20 - Rangeland
- 30 - Developed
- 31 - Cultural (business, residential, etc.)
- 32 - Rights-of-way
- 33 - Recreation
- 34 - Mining and wasteland
- 40 - Other
- 41 - Nonvegetated
- 42 - Wetland
- 43 - Beach
- 45 - Nonforest-Chaparral

Enter non-visit data into form

Prefield Plot Editor RMRS v1.0.13303.0 10/30/2013

Plot Data

State: 45 Utah Ad For Cd: NULL # Plots Remaining: Get Data

County: 35 Salt Lake CN: 40424547010690 # In State Not PI Complete: 917 Next Plot

Plot: 64 Owner Class: 45 Individual Get Plot

Inv Year: 2014 Sample Kind: 2 Zoom 2 Plot

QA Status: 1 Elev: 4496

Latitude: Longitude:

Prefield Call

Forested?: N Field Plot?: N PC Cond Status: 2 Nonforest land Submit

Visit Type: Canopy Cover: More Info

Future Forest: 0 No forest possible Samp Method: Fetch % Cover

Truck Distance: % Cover: Conf Reason: Fill Image Date/Source

Land Use: 32 Rights-of-way Image Source:

Land Cover: Image Date:

Comments: NULL

Previous Visit / C

MeasD	Note
▶	

- 1 - Treeland
- 2 - Shrubland
- 3 - Grassland
- 4 - Non-vascular Vegetation
- 5 - Mixed Vegetation
- 6 - Agricultural Vegetation
- 7 - Developed, Vegetated
- 8 - Barren/Sparsely Vegetated
- 9 - Developed, Sparsely Vegetated
- 10 - Water
- 11 - PREFIELD ONLY; unable to differentiate Shrub and Grassland classes
- 12 - PREFIELD ONLY; No Available Photo Coverage

Enter non-visit data into form

Prefield Plot Editor RMRS v1.0.13303.0 10/30/2013

Plot Data

State: 49 Utah Ad For Cd: NULL # Plots Remaining:
County: 35 Salt Lake CN: 40424547010690 # In State Not Pt Complete: 917
Plot: 64 Owner Class: 45 Individual
Inv Year: 2014 Sample Kind: 2
QA Status: 1 Elev: 4496
Latitude: Longitude:


Get Data
Next Plot
Get Plot
Zoom 2 Plot

Plot view options
 Call Made?
 Call Required?
 All Plots

Prefield Call

Forested? N Field Plot? N PC Cond Status: 2 Nonforest land

Canopy Cover
Samp Method:
% Cover:
Confidence:
Conf Reason:

Submit
More Info
Fetch % Cover
Fill In  Date/Source

Visit Type:
Future Forest: 0 No forest possible
Truck Distance:
Land Use: 32 Rights-of-way
Land Cover: 7 Developed, Vegetated

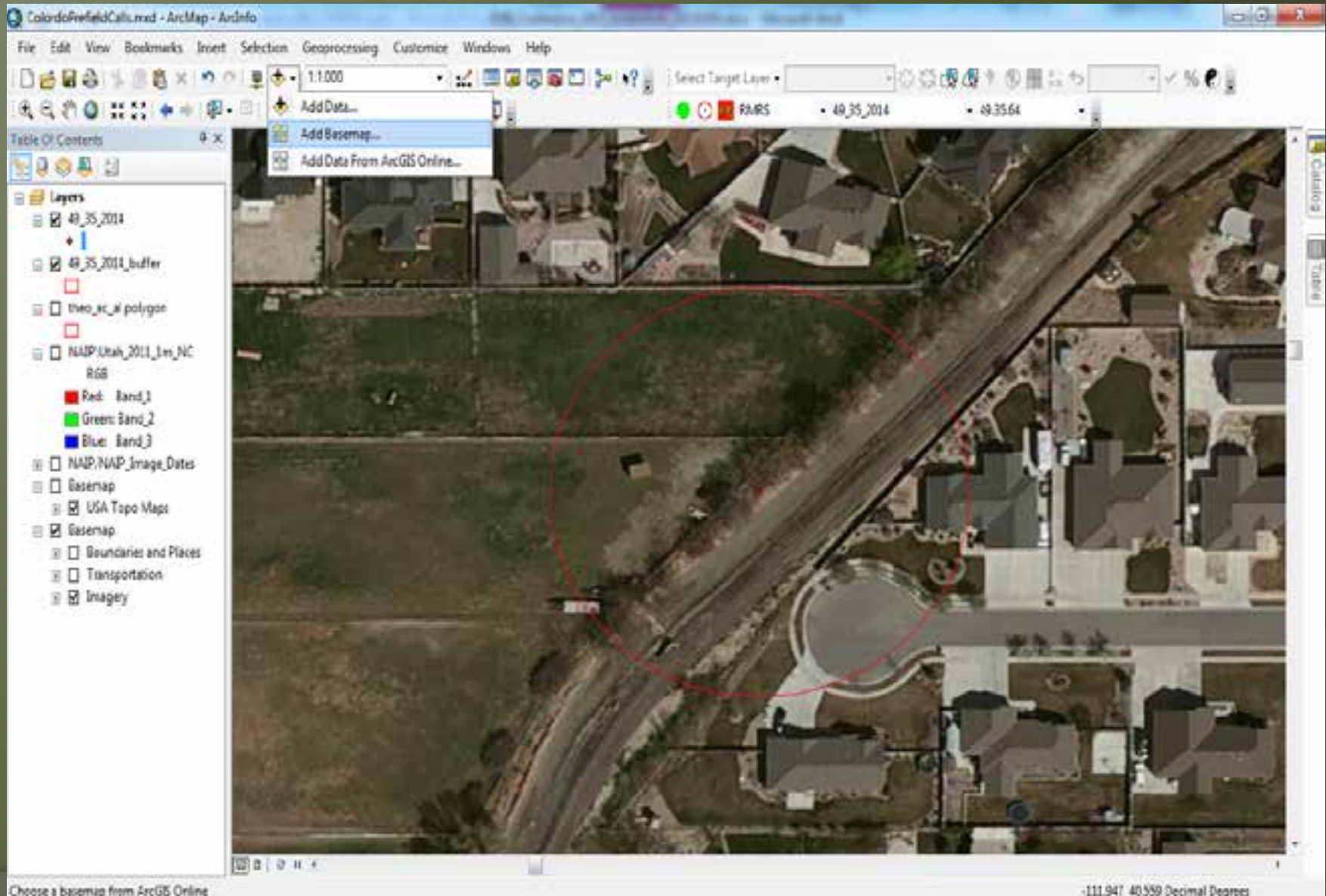
Image Source: NAIP
Image Date: 07-Aug-11 10:27

Comments: Right-of-way includes treed area along canal, canal and adjacent road

Previous Visit / Office Calls

	MeasDate	Inv yr	PtStat	FutFor	Pt ns Ran	Note
▶	//					

Assess the plot area (144 FT radius)



Enter non-visit data into form

Prefield Plot Editor RMRS v1.0.13303.0 10/30/2013

Plot Data

State: 49 Utah Ad For Cd: NULL # Plots Remaining:
County: 35 Salt Lake CN: 40424547010690 # In State Not Pt Complete: 917
Plot: 64 Owner Class: 45 Individual
Inv Year: 2014 Sample Kind: 2
QA Status: 1 Elev: 4496
Latitude: Longitude:

Get Data
Next Plot
Get Plot
Zoom 2 Plot

Plot view options

Call Made?
 Call Required?
 All Plots

Prefield Call

Forested? N Field Plot? N PC Cond Status: 2 Nonforest land

Visit Type:
Future Forest: 0 No forest possible
Truck Distance:
Land Use: 32 Rights-of-way
Land Cover: 7 Developed, Vegetated

Canopy Cover
Samp Method:
% Cover:
Confidence:
Conf Reason:


Submit
More Info
Fetch % Cover
Fill In  Date/Source

Image Source: Microsoft
Image Date: 31-Mar-12 00:00

Comments: Right-of-way includes treed area along canal, canal and adjacent road

Previous Visit / Office Calls

	MeasDate	Inv yr	PtStat	FutFor	Pt ns Ran	Note
▶	//					



Canopy Cover Add-in

- ž Developed in conjunction with Remote Sensing Application Center (RSAC)
 - Original Development 2010
 - Updated in 2012
- ž Aids photo interpreters in assessing the tree canopy cover of FIA non-visit plots

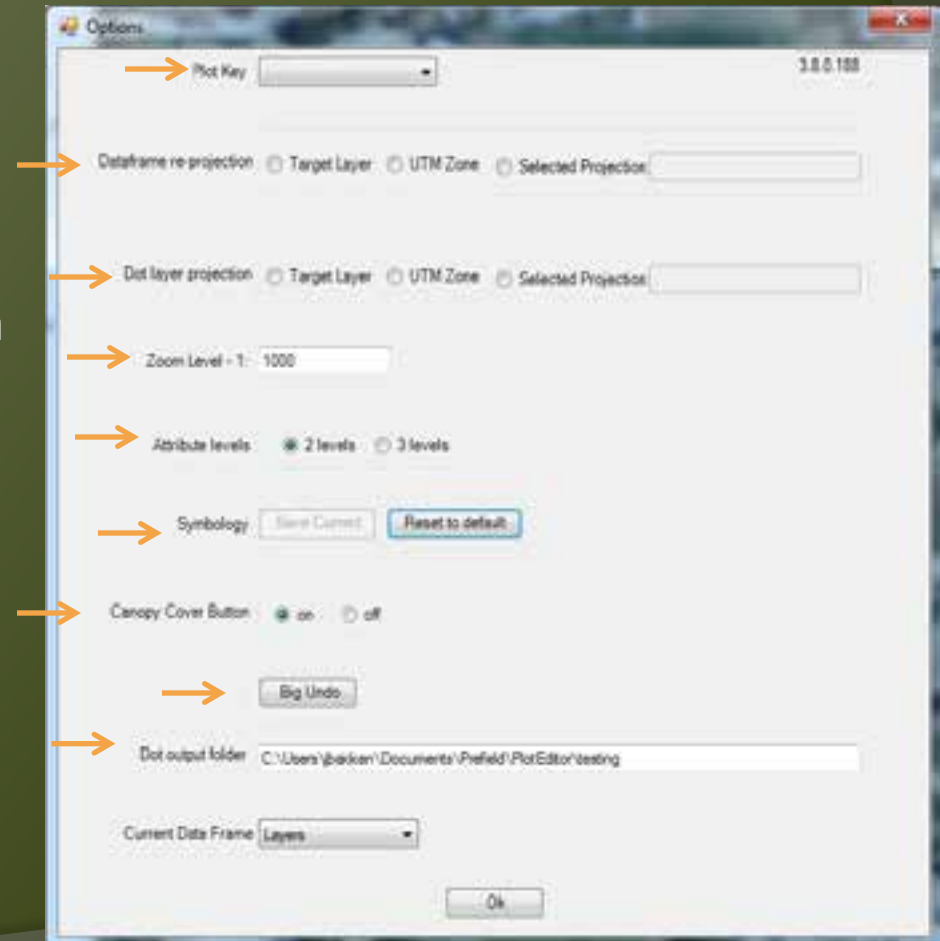
Canopy Cover Add-in



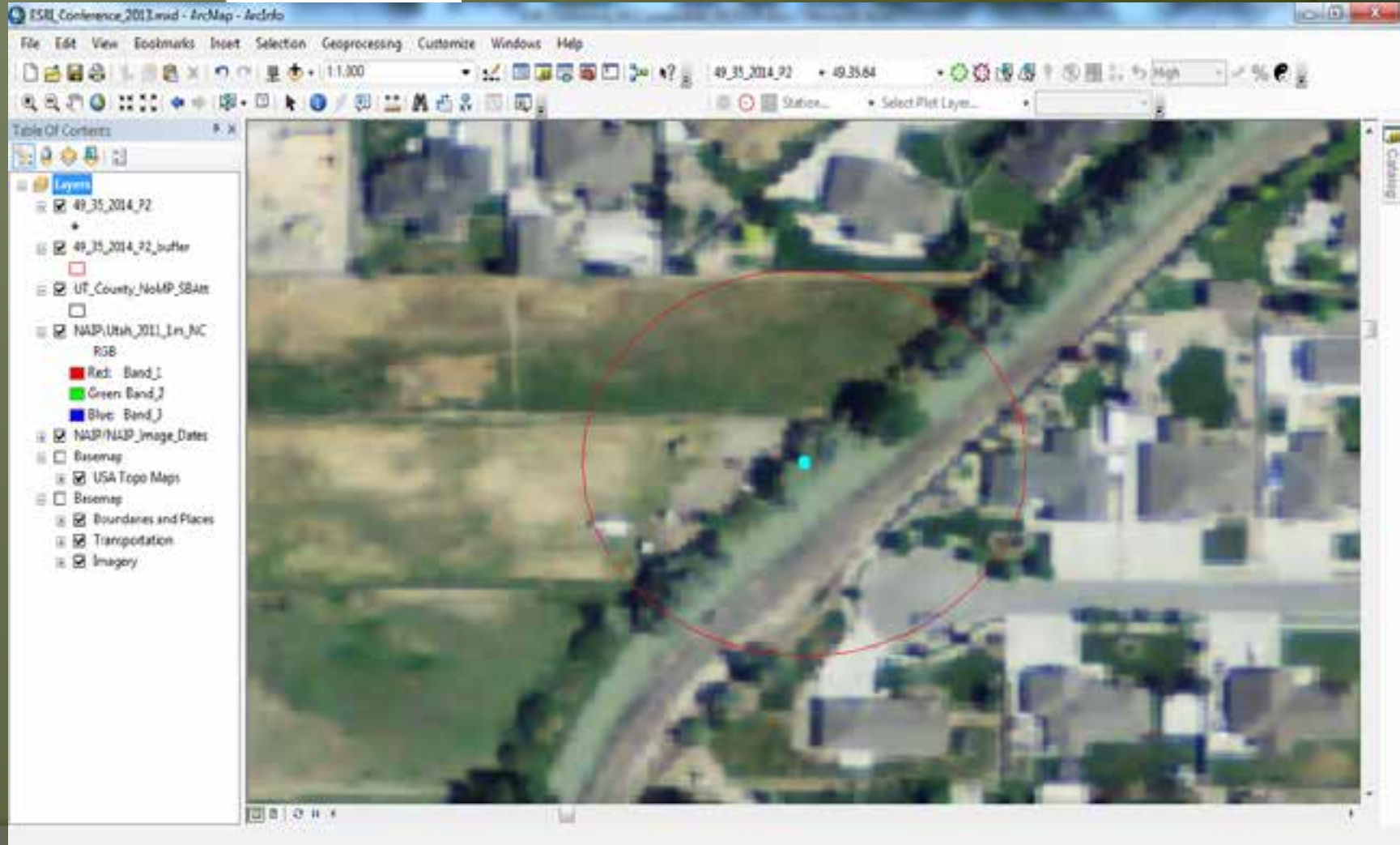
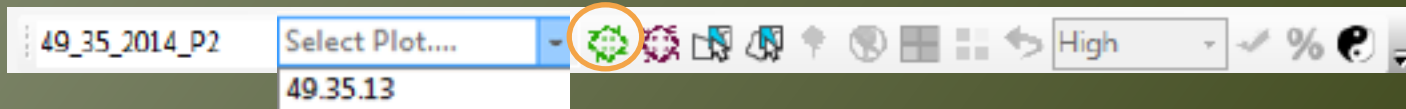
☞ Select Target Layer

– Select Options

- Plot Key
- Dataframe re-projection
- Dot Layer projection
- Zoom Level
- Attribute levels
- Symbology
- Canopy Cover Button
- Big Undo
- Dot output folder



Canopy Cover Add-in



Canopy Cover Add-in



49_35_2014_P2 49.35.64 High

ESRI_Conference_2011.mxd - ArcMap - ArcInfo

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

1:1,000 49_35_2014_P2 49.35.64 High

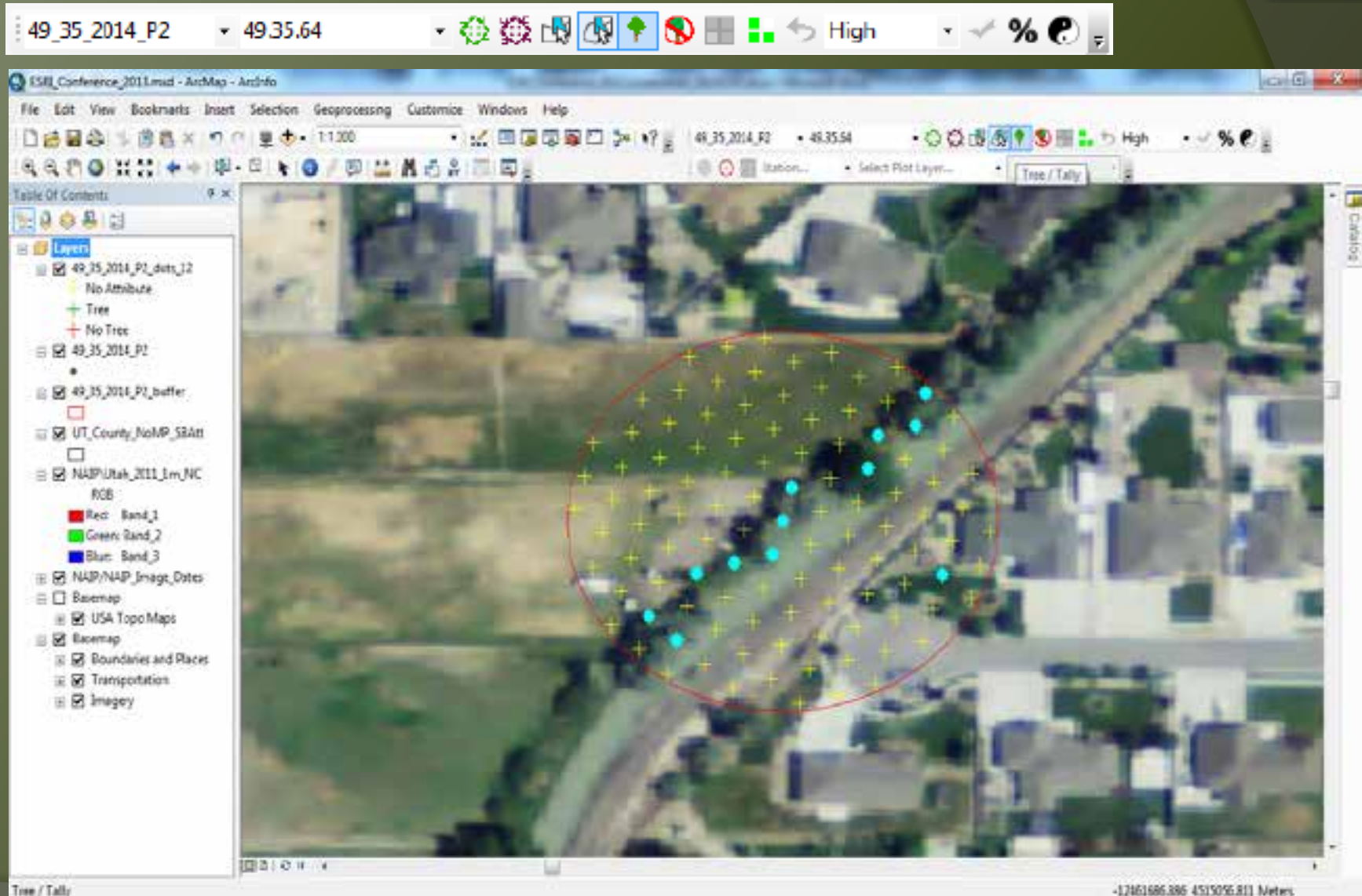
Station... Select Plot Layer...

Table Of Contents

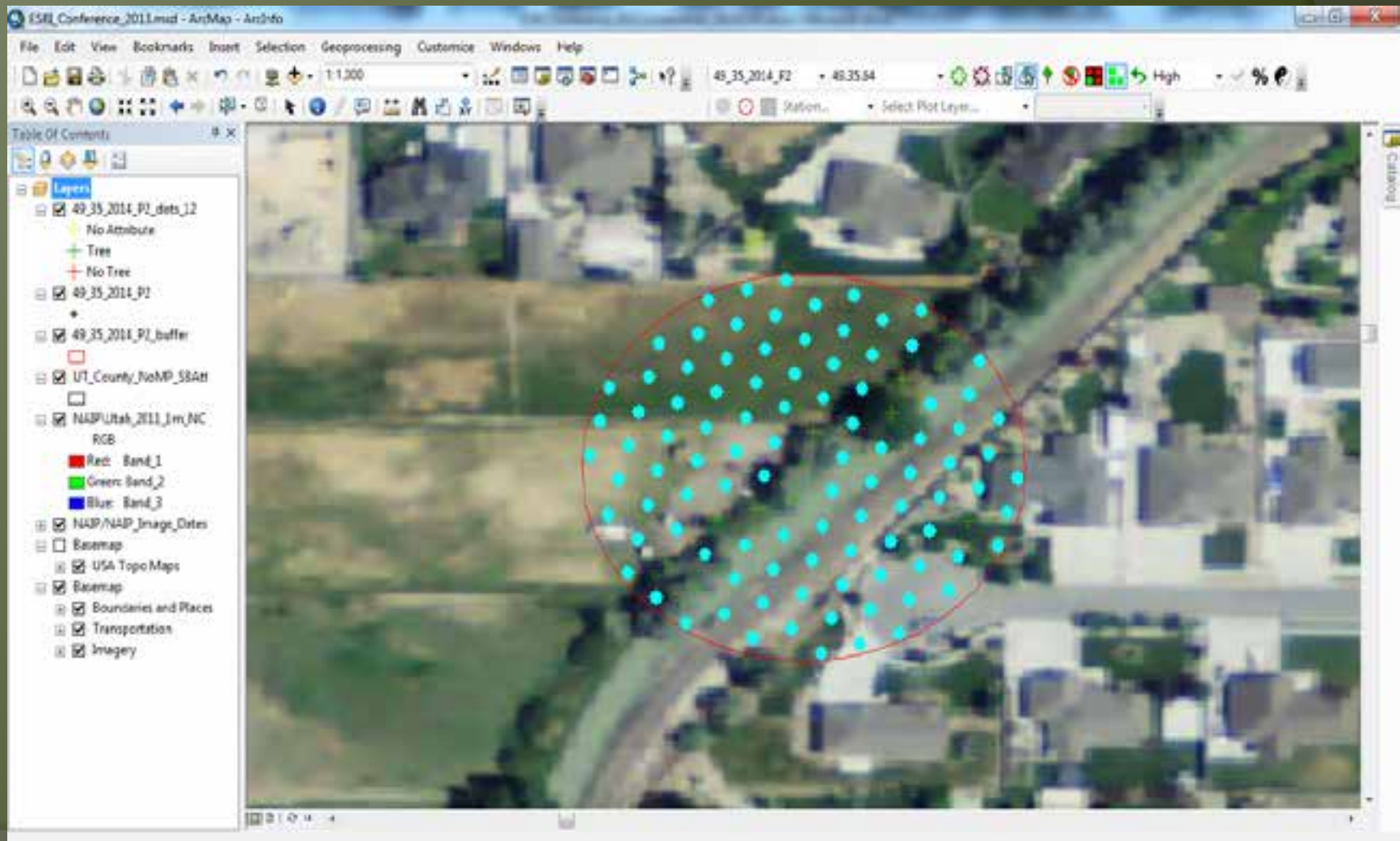
- Layers
 - 49_35_2014_P2_dets_12
 - No Attribute
 - Tree
 - No Tree
 - 49_35_2014_P2
 -
 - 49_35_2014_P2_buffer
 - VT_County_NoMP_SlAtt
 - NADP\Utah_2011_1m_NC
 - RGB
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3
 - NADP/NAD_Image_Dates
 - Backmap
 - USA Topo Maps
 - Backmap
 - Boundaries and Places
 - Transportation
 - Imagery

An aerial photograph of a residential area with a road intersection. A red circle is drawn over a portion of the road and surrounding greenery. Inside this circle, numerous yellow crosses are scattered, representing the 'Tree' layer in the map's legend. The background shows houses, lawns, and other vegetation.

Canopy Cover Add-in



Canopy Cover Add-in



Canopy Cover Add-in



49_35_2014_P2 * 49.35.64

Low Confidence Reason Dialog

Please select the reason for low confidence.

- Photo Quality
- Clouds
- Shadows
- Disturbance
- Phenology (leaf on/leaf off)
- Shrub / Tree Question
- Tally Tree Question
- Other

Done

Done

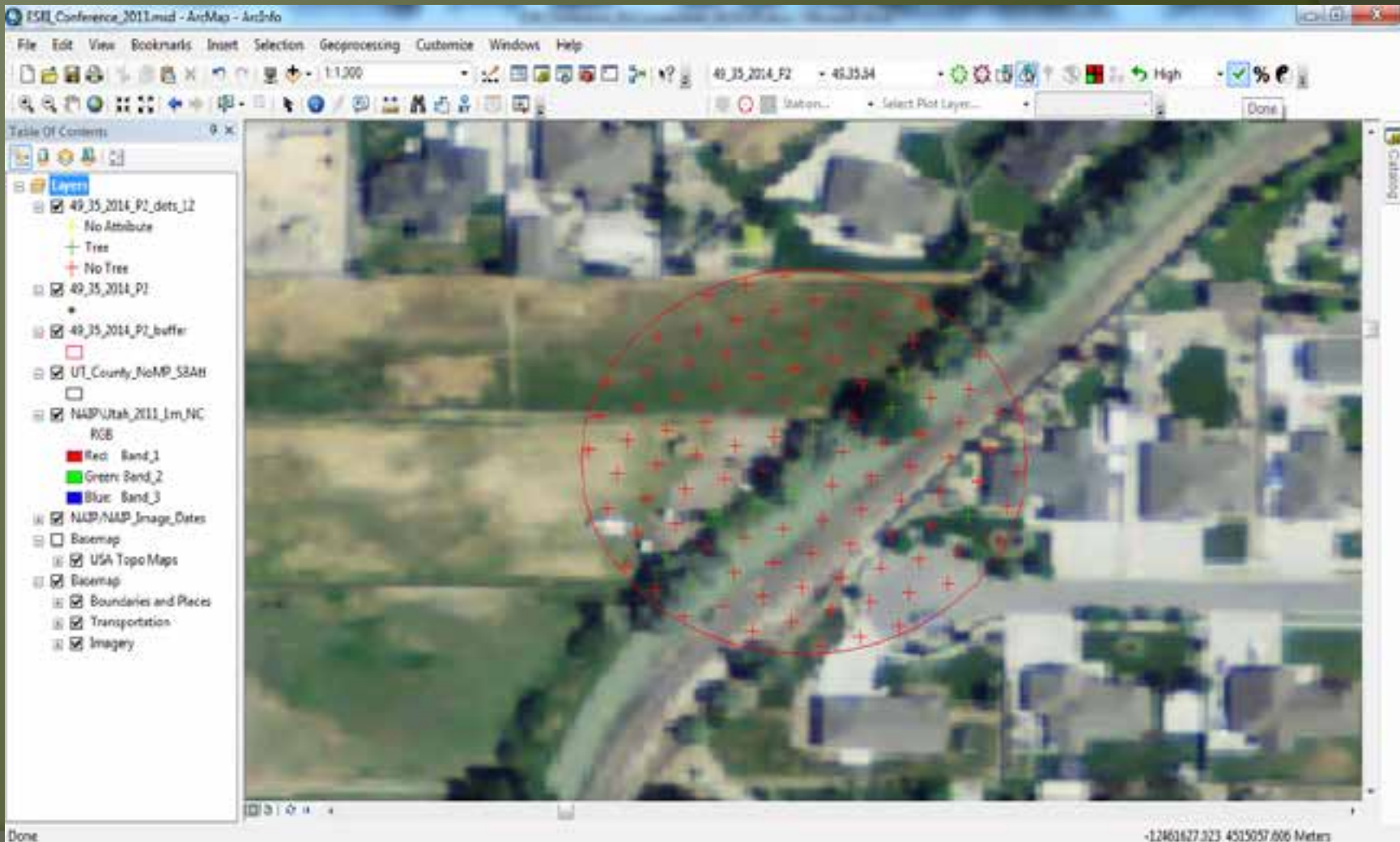
Layers

- 49_35_2014_P1_dets_12
 - No Attribute
 - Tree
 - No Tree
- 49_35_2014_P1
- 49_35_2014_P1_buffer
- UT_County_NoMP_S8Att
- NADP/Utah_2011_1m_NC RGB
 - Red: Band_1
 - Green: Band_2
 - Blue: Band_3
- NADP/NADP_Image_Dates
- Basemap
- USA Topo Maps
- Basemap
- Boundaries and Places
- Transportation
- Imagery

Done

-12461627.023 4515057.606 Meters



Canopy Cover Add-in



Enter non-visit data into form

Prefield Plot Editor RMRS v1.0.13303.0 10/30/2013

Plot Data

State: 49 Utah Ad For Cd: NULL # Plots Remaining:
County: 35 Salt Lake CN: 40424547010690 # In State Not Pl Complete: 917
Plot: 64 Owner Class: 45 Individual
Inv Year: 2014 Sample Kind: 2
QA Status: 1 Elev: 4496
Latitude:  Longitude: 

Get Data
Next Plot
Get Plot
Zoom 2 Plot

Plot view options

Call Made?
 Call Required?
 All Plots

Prefield Call

Forested? N Field Plot? N PC Cond Status: 2 Nonforest land

Visit Type:
Future Forest: 0 No forest possible
Truck Distance:
Land Use: 32 Rights-of-way
Land Cover: 7 Developed, Vegetated

Canopy Cover:
Samp Method: 11
% Cover: 11
Confidence: HIGH
Conf Reason:

Submit
More Info
Print
Fill Image Date/Source

Image Source: NAIP
Image Date: 07-Aug-11 10:27

Comments: Right-of-way includes treed area along canal, canal and adjacent road

Previous Visit / Office Calls

	MeasDate	Inv yr	PtStat	FutFor	Pt na Ran	Note
▶	//					

Enter non-visit data into form

Prefield Plot Editor RMRS v1.0.13303.0 10/30/2013

Plot Data

State: 49 Utah Ad For Cd: NULL # Plots Remaining:
County: 35 Salt Lake CN: 40424547010650 # In State Not Pl Complete: 917
Plot: 64 Owner Class: 45 Individual
Inv Year: 2014 Sample Kind: 2
QA Status: 1 Elev: 4496
Latitude: Longitude:

Prefield Call

Forested?: N Field: N
Visit Type:
Future Forest: 0 No forest:
Truck Distance:
Land Use: 32 Right-of-way:
Land Cover: 7 Development:
Comments: Right-of-way include

Buttons: Get Data, Next Plot, Get Plot, Zoom 2 Plot, Plot view options (Call Made?, Call Required?, All Plots), Submit (★), More Info, Fetch % Change, Fill Image Date/Source

Message Box: Prefield Call successfully updated. Press OK to move to next plot. [OK]

Previous Visit / Office Calls

	MeasDate	Inv yr	Plt Stat	Fut For	Plt ns Ran	Note
▶	//					

Overall workflow benefits

- ž Centralized national network - Data is collected and written directly to a secure database
- ž Consistent data collection and workflow from region to region
- ž Flexible ability to update and/or adapt to regional variations
- ž Increased opportunity for data quality assessments

Questions:



Contact Info:

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801-625-5422 or jbakken@fs.fed.us