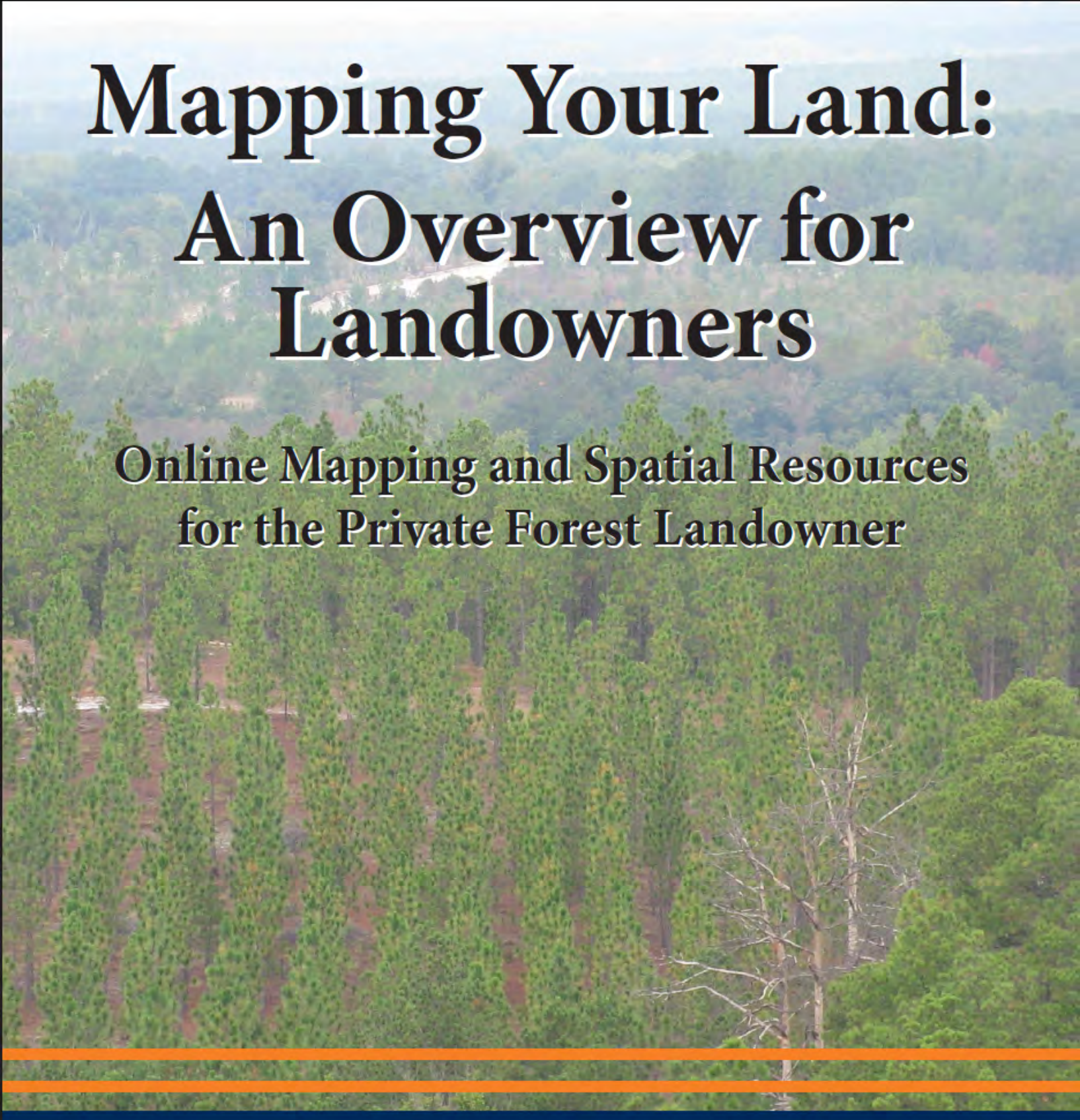
Mapping Your Land: An Overview for Landowners

Online Mapping and Spatial Resources for the Private Forest Landowner



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Online Mapping and Spatial Resources for the Private Forest Landowner

There is growing interest among private landowners to diversify the benefits of their property through multiple use management. Often, landowners desire the ability to receive regular income from their property, in addition to traditional timber production. Multiple use management has the potential for increased productivity, additional and more regular income, and improved environmental conditions on private forestland by promoting uses like pine straw production, wildlife habitat, livestock forage, watershed management, aesthetics, and recreation in addition to timber production. However, small-scale private landowners often have limited information regarding how to plan for management of these benefits. Effective management begins with a good plan. A map is one of the most important tools a rural or urban forest landowner needs for planning and management especially when planning for multiple uses. The goal of this project is to compile outreach information and examples of online mapping and spatial resources that can be used by landowners and forest land managers, such as consulting foresters and wildlife biologists, to help them maximize benefits of planning and evaluation of multiple use management on small-scale forests with limited or no capital outlay.

Mapping and spatial resources like Geographical Information Systems (GIS) and Global Position System (GPS) units continue to be unfamiliar or considered too complicated to use. Online mapping and spatial resources can provide landowners with the information necessary to make more informed, economical, and ecological decisions about how to manage their property and market it for a variety of uses. These resources are available online, often free, easy to use, and require no or very little training to be used effectively. They can also be used with or without the use of traditional and/or complicated GIS software.

A timely, readily available, source of information and examples of online spatial resources like topographic maps, aerial photography, soils maps and associated information, working with various types of GPS units, and even visual simulations can be effective tools that will benefit landowners as they make decisions regarding the management of their property. Conservation professionals such as forestry consultants and wildlife biologists can also benefit from this book as they assist landowners in their decision making. This book focuses on utilizing online mapping and spatial resources to promote appropriate multiple use management for small-scale, private forest landowners in Alabama by highlighting these resources and tools with examples that can be utilized to create effective maps, acquire data, and store spatial information about areas of interest. Potential uses for these resources include making maps and creating databases for identifying timber stands, sensitive areas like streamside management zones (SMZs), stream crossings, logging hazards, logging decks, wildlife food plots, burn plans, roads, agroforestry or silvopasture

continued on inside back cover

Auburn University
Longleaf Pine Stand Dynamics Laboratory
3301 Forestry & Wildlife Sciences Building
Auburn, Alabama 36849-5418

Tel: 334.329.0236

LPSDL
Longleaf Pine Stand Dynamics Laboratory

Mapping Your Land: An Overview for Landowners

Online Mapping and Spatial Resources for the Private Forest Landowner

Tutorials
by

John C. Gilbert[1] and John S. Kush[1]

Design and Layout
by

Elizabeth P. Bowersock[2]

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[1]Longleaf Pine Stand Dynamics Laboratory, School of Forestry and Wildlife Sciences, Auburn University, Alabama
[2] School of Forestry and Wildlife Sciences, Auburn University, Alabama

How to Use This Book

The purpose of this book is to introduce private forest landowners and conservation professionals to online mapping and spatial resources that can be used to accomplish a variety of objectives. The tutorials provide instructions and examples to help users get started using these applications and programs to make maps, acquire data, and store information about areas of interest. All examples were created using Microsoft Windows XP and Internet Explorer 8. Users can choose to duplicate the examples or focus on other areas of interest. To help users choose which applications best fit the desired objectives, this book is divided into 5 sections highlighting websites and programs with examples and tutorials. Each section contains keywords, homepage links, tutorial information, examples, and screenshots. Screenshots are highlighted with "red ovals and lines" to help the users find the buttons, tools, etc. described in the tutorials. Each section can be used individually or in combination to achieve the desired objectives. Since websites are constantly changing and being updated, links and screenshots may not match exactly as these updates are completed. Keywords lists were added to help users find online applications and programs using a search engine (e.g. Google, Bing, Yahoo, etc.) if links change. Below is an outline with titles and key points for each section.

1. **USDA/NRCS Web Soil Survey 3**
   - Online application
   - Locate a piece of property or an area of interest
   - Create a boundary for the area of interest
   - Display soil information with aerial photographs and/or topographic layers as backgrounds
   - Create maps
   - Create basic or detailed soil reports

2. **Google Earth 7**
   - Requires downloading a program
   - Locate a piece of property or area of interest
   - Store location and description information
   - Create placemarks or points (gates, deer stands, start of a path, etc.)
   - Create paths or lines for roads, streams, etc.
   - Create boundaries for timber stands, fields, etc.
   - Create maps
   - Get directions

3. **Alabama Historic Aerial Photo Archive 12**
   - Online application
   - View historical aerial photographs
   - Order digital copies

4. **USDA Natural Resources Conservation Service (NRCS) Geospatial Data Gateway 13**
   - Online application to search for data
   - Requires a GIS viewer
   - For more advanced users
   - Search for data (examples include aerial imagery, topographic maps, elevation information, soils, land use land cover, geology, climate data, etc.

5. **USDA National Agroforestry Center (NAC) CanVis 14**
   - Requires downloading a program or requesting a CD or DVD
   - Create visual simulations of potential management options using digital photographs

1. USDA/NRCS Web Soil Survey

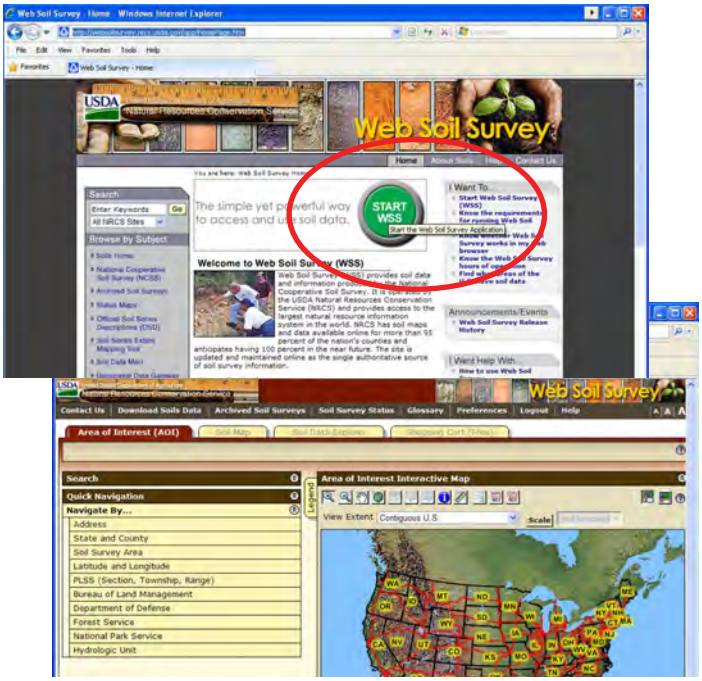
The USDA/NRCS Web Soil Survey (WSS) can be used to create a soils map as well as explore other online soil surveys. To get started with your own soil survey, follow the directions outlined below.

Keywords: web soil survey, NRCS

Starting the USDA/NRCS WSS:
In your web browser, go to: http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

To Create a Soils Map:

1. Click the green button to "START WSS." (See right.)
2. A screen with a map of the United States will appear. (See right.)
    - The default tab is "Area of Interest (AOI)."
3. Under "Quick Navigation,"
    a. Choose an option that best represents how you would like to navigate to the area of interest (i.e. where you want to create a soils map).
        - You can also use the tool bar above the map to navigate or in conjunction with one of the other navigation options. (See sample toolbar at the bottom of this page.)

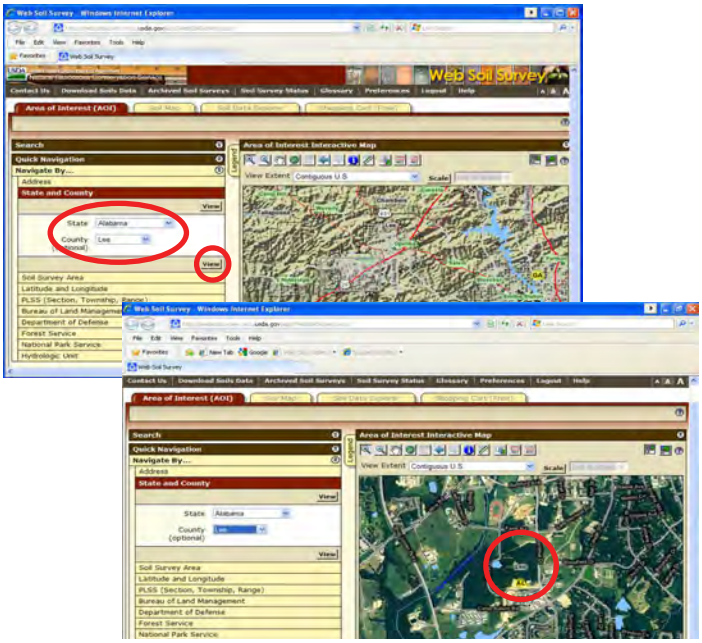


Toolbar Buttons, From Left to Right (See Below):

1. **Zoom In** – used to zoom in toward a specific point by clicking a specific place on the map or by clicking and dragging to create a box for an area of interest
2. **Zoom Out** – used to zoom out from a specific point by clicking a specific place on the map or by clicking and dragging to create a box for an area of interest
3. **Pan** – used to move the map in any direction by clicking and dragging a point on the map
4. **Zoom to Extent** – used to zoom the map out to show the entire United States
5. **Zoom to AOI (Area of Interest)** – used to zoom the map to the AOI that has been identified
6. **Zoom History Back** – used to zoom the map back to the previous view
7. **Zoom History Forward** – used to zoom the map forward after using the Zoom History Back tool
8. **Identify** – provides information about selected features on the maps. Follow directions that appear when selected.
9. **Measure Distance** – used to measure line segments. Click and drag a point on the map and move the pointer to another point and click. Double-click to end the measurement, and it provides total segment length. Note that the units feet/miles change as you zoom in. The units can also be changed to meters/kilometers by clicking the "Use Meters/Kilometers" button.
10. **Data Available** – used to show the available data with the date by clicking on an area
11. **Define AOI by Rectangle** – used to identify the area for the soils maps by clicking and dragging to create a box around the area
12. **Define AOI by Polygon** – used to identify the area for the soils maps by clicking points around the area
13. **Normal Map Layout (L) & Full Width Map Layout (R)** – used to change the way the map layout looks
14. **Help** – provides a help menu for the WSS

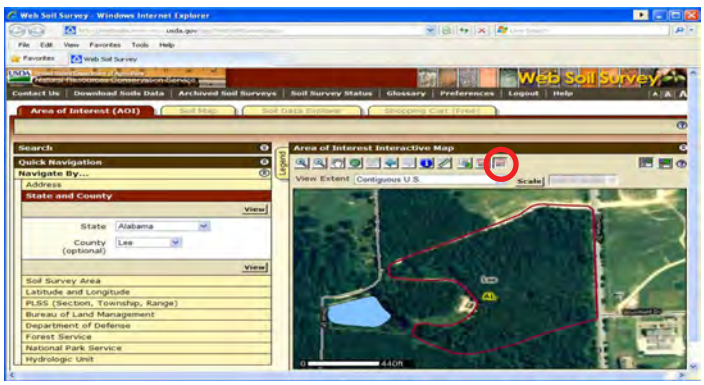
The example tract that will be used for the purpose of this tutorial is called the Donahue Tract. The Donahue Tract is located west of the intersection of Donahue Drive and Woodfield Drive on the Auburn University campus.

1. Under "State and County," choose "Alabama" and "Lee County."
2. Click "View" when the selection is made.
3. Use the "Zoom In" and "Pan" tools to find the location.



Set the Area of Interest (AOI):
To create a soils map, the AOI needs to be defined.

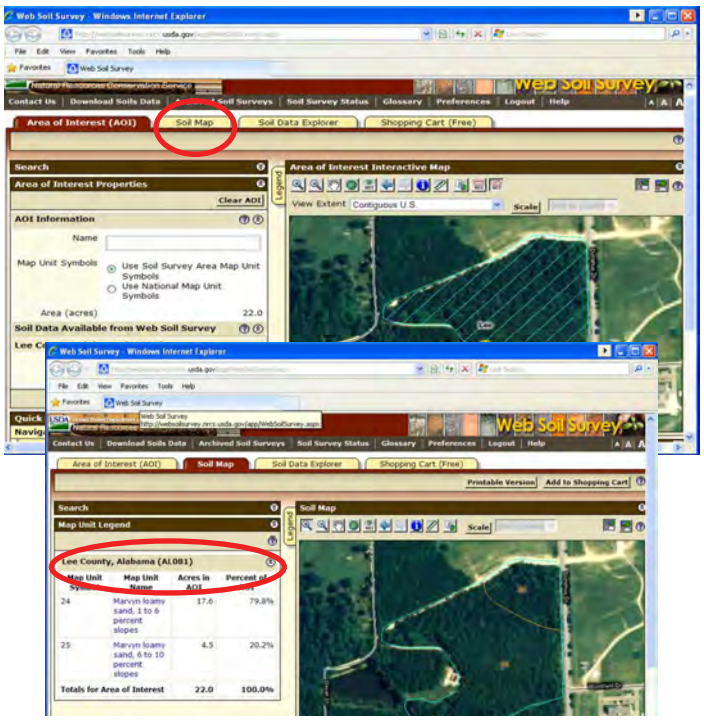
1. Click the "Define AOI by Polygon" tool.
2. Using this tool, click points to trace around the boundary of the tract. (See screen shot below for guidance.)
    - If you make a mistake, click "Clear AOI" or "Esc" and start over.
3. Double-click to complete the polygon.



The newly defined area will be highlighted with a diagonal hatching pattern. "Clipping soil layer to AOI extent" will appear. (If it doesn't, double-click the tract again.) See image below.

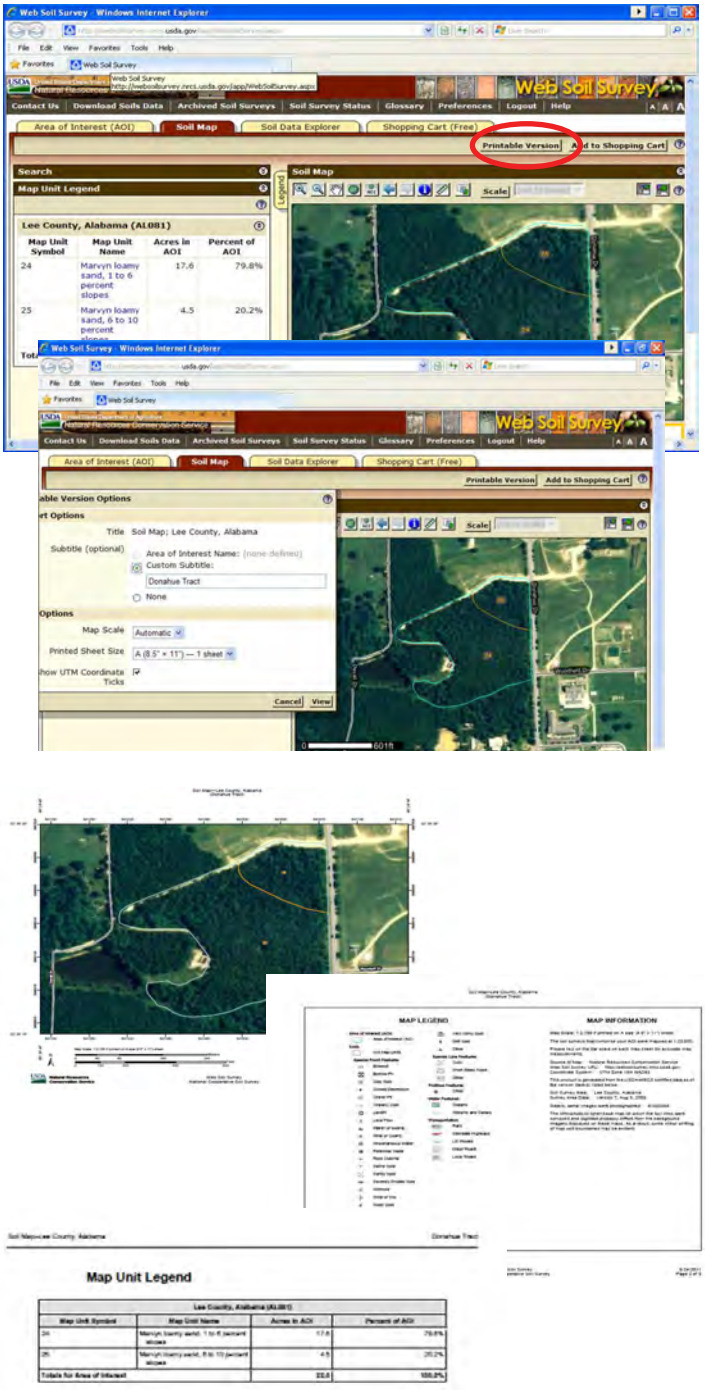
Creating the Soils Map:

1. Click the "Soil Map" tab to create the soils map for the tract. **If the message "Warning: Soil Map may not be valid at this scale" appears, zoom out.
    - A "Map Unit Legend" box appears and the soil divisions are shown on the tract.
    - Notice the "Map Unit Name," "Acres in AOI," and the "Percent AOI."



Create a Printable Version of the Map(s):
**There might be a need to alter your browser's pop-up settings before completeing these steps.

1. Click "Printable Version."
2. At subtitle, add "Donahue Tract."
3. Under "Options," make the desired selections then click "View."
    - The WSS will then generate a printable version.
    - A soils map, map legend, and map unit legend page (one of each) are created in a new window. (See page 5.)
4. Click "File," then "Print" to open the printer options window and to print the document.



Save the Map as a .pdf:

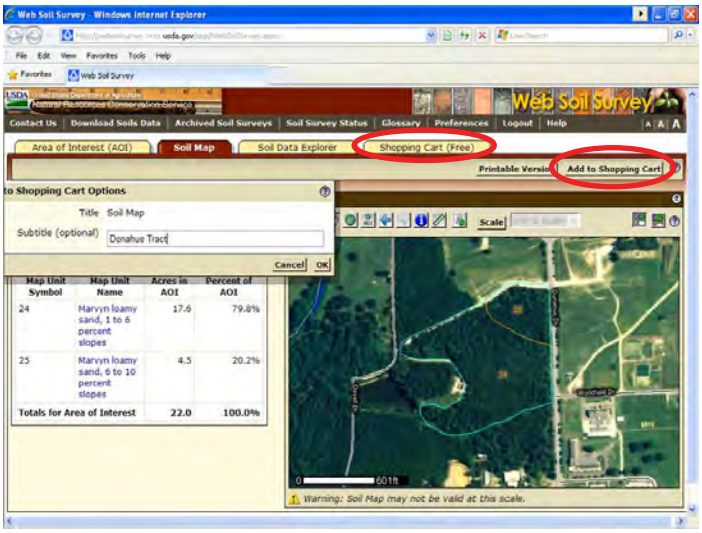
1. Click "File," then "Save As."
   - Make sure the "Save as type:" is Adobe PDF Files (.pdf). **If Adobe Reader is not loaded on your machine, visit http://get.adobe.com/reader/ to download a free version of the program.
2. In the "Save As" window, navigate to the file directory where you want to save the document.
3. Type in the name for the document under "File name:"
4. Click "Save."

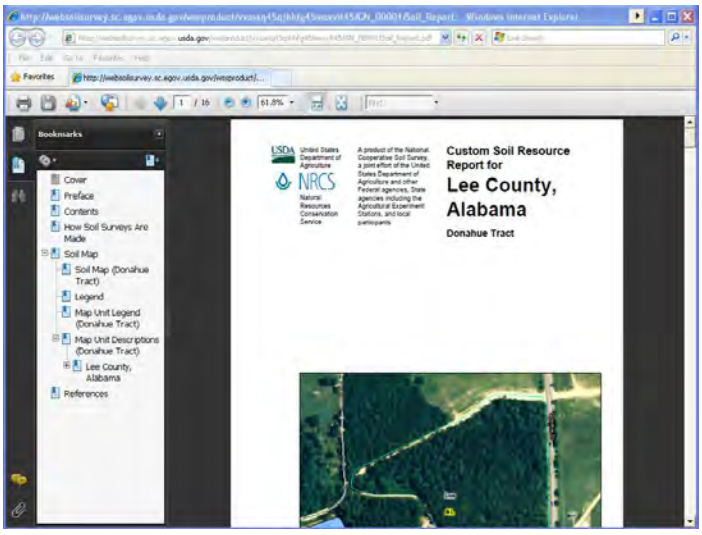
Creating a Custom Report:
The Custom Report provides more detailed information about the soil survey, map unit descriptions, and soil descriptions.

A custom report can be created for **free** by following these steps:

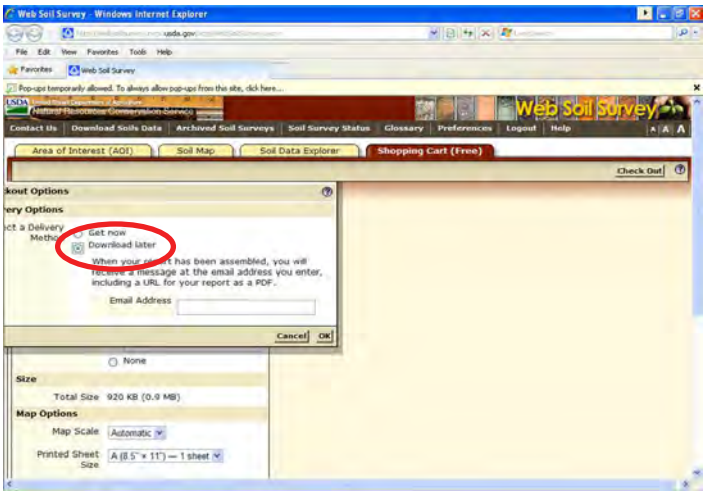
1. Click "Add to Shopping Cart."
2. Type in the subtitle "Donahue Tract" and click "OK."
3. Click the "Shopping Cart (Free)" tab to choose options for the report.
4. Choose any of the options. (For this example, the "Default Settings" were used.)
5. Click "Check Out."
6. Click "OK" to choose the default "Get Now" delivery method.

The custom report can be printed, saved, or emailed by following the same directions as outlined in "Create a Printable Version."

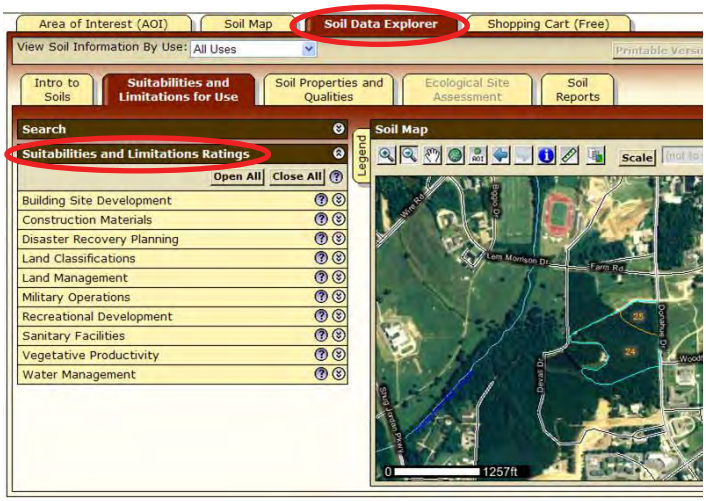




**Note that you can "Download Later," which requires an email address where a link will be sent to download the report within 10 days.

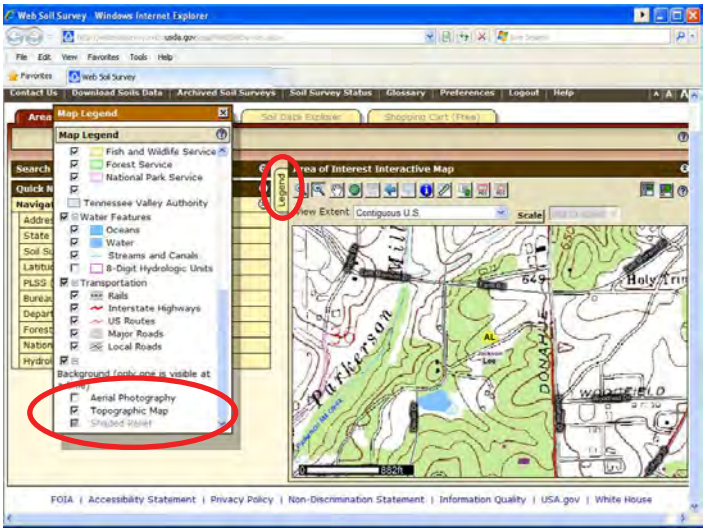


Exploring Soils Information:
To explore more soil data associated with the Soil Survey for the area, click "Soil Data Explorer." This tab allows you to explore a wide variety of soil properties under the "Suitabilities and Limitation Ratings" menu.



Adjusting Map Legend:
The map legend can be adjusted to change display options for the AOI, political features, federal land, water features, transportation, and background.

1. Click the "Legend" tab on the side of the map to access the options.
2. Change the background to "Topographic Map."



Tips and Troubleshooting:

1. If WSS is not working, check the system requirements to run the program. See http://websoilsurvey.nrcs.usda.gov/app/Help/Requirements.htm.
2. "Want" and "Help" menus are located on the right side of the WSS homepage.
3. For more instructions see http://websoilsurvey.nrcs.usda.gov/app/Help/WSS_HomePage_HowTo.pdf
4. It may be necessary to turn off the Pop-up blocker/ allow Pop-ups from the WSS website.
5. Some processes may take a little time to complete; be patient.
6. The session can also timeout if there is a long period of inactivity, which will require starting over.

Citation:
Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at http://websoilsurvey.nrcs.usda.gov/Accessed [05/24/2011].

2. Google Earth

Use and Tutorial Information

Google Earth provides aerial photography as a background for map making. It can be used to:

- Locate property or areas of interest
- Store location and description information
- Create placemarks or points for areas of interest
- Create paths or lines for roads, streams, etc.
- Create boundaries for timber stands
- Get directions

The software is free, but must be downloaded and installed; it also requires an internet connection.

Main Website:
http://www.google.com/earth/index.html
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Keywords: Google Earth

System Requirements:
Google Earth can be used on PCs, Macs, and Linux systems. Basic system needs are as follows:

- 512 MB of RAM
- 400 MB of free space on hard drive
- DirectX9 and 3D capable with 64/256MB of VRAM

For more detailed information and recommended system requirements by operating system, see
http://earth.google.com/support/bin/answer.py?answer=20701

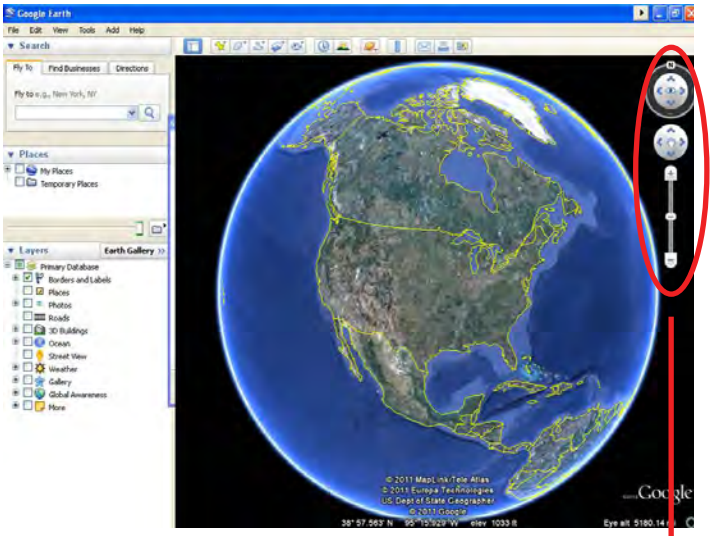
Google Earth Help and Tutorials:

1. Help: http://earth.google.com/support/?hl=en
2. Tutorials: http://www.google.com/earth/learn/

The example tract that will be used for the purpose of this tutorial is called the Donahue Tract. The Donahue Tract is located west of the intersection of Donahue Drive and Woodfield Drive on the Auburn University campus.

Opening Google Earth:

1. After downloading and installing Google Earth, open the program using the Desktop Icon or by locating the program in your Programs menu.
2. Click "Start" and then "All Programs" to find the list.
    - Below is the default view for Google Earth.



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Navigation:
Use the toolbar (see right) to:

- Turn the map different directions
- Move the view
- Zoom in and out

Other options include:

- Using the mouse, click (left mouse button) the screen and drag
- Using the scroll button on the mouse (if applicable)
- Using the arrow keys and "Ctrl" on the keyboard

Explore the toolbar and practice clicking the various tools.

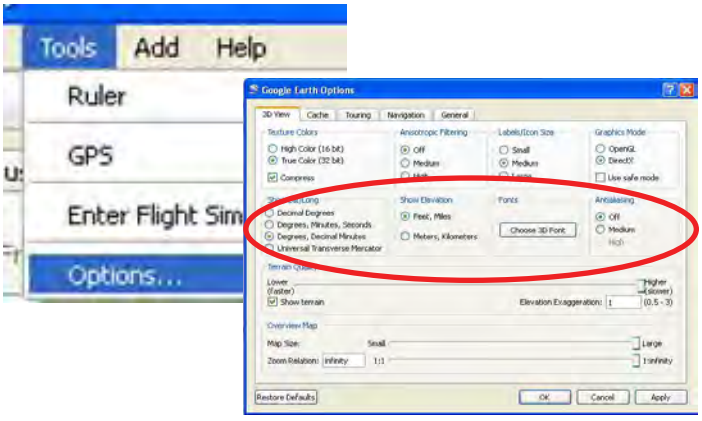
Layers:
Turn on basic layers for navigation by clicking the box next to the layer.

1. Borders and Labels
   - Shows state and county boundaries
   - Cities
2. Roads

Explore other layers for additional information.

To Change Coordinates and Units:

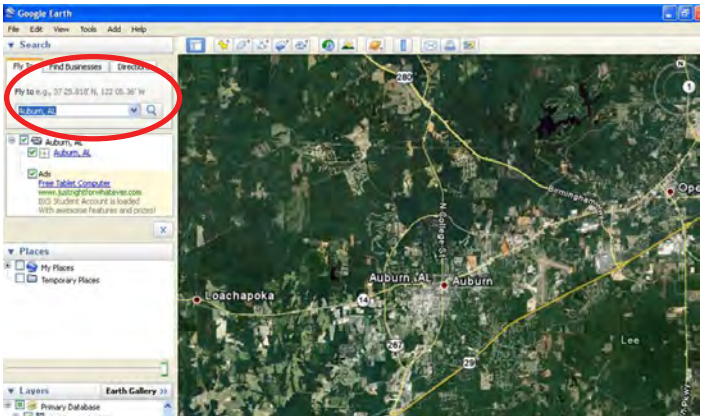
1. Click "Tools," then "Options." Make changes and click "Apply," then "OK."



Search and Locate:
When searching for an area of interest (e.g. a piece of property or a timber stand), use the navigation toolbar (see page 7); it may be faster to use the "Search" tool and the "Fly To" tab.

1. Type the name of a place or location using search options:
   - City
   - Address
   - Coordinates (default is latitude and longitude; can get from GPS unit)
2. Click the magnifying glass to zoom to the location.
   - Navigation tools can also be used with searches.

Additional options can be found under the "Find Businesses" tab as well as the "Directions" tab.



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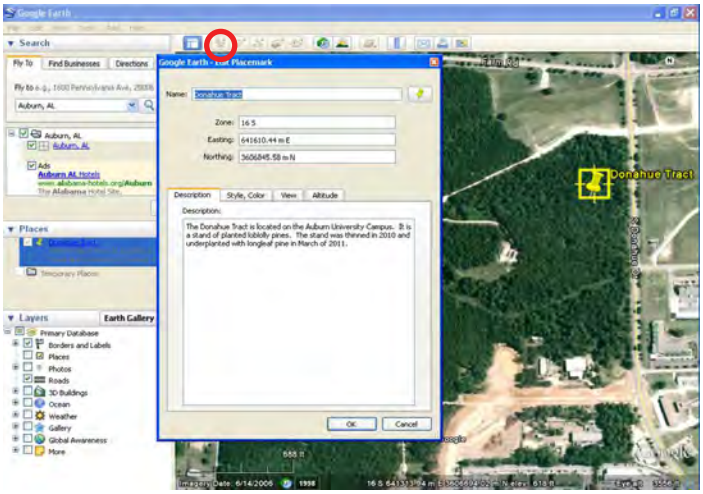
After locating an area of interest, use the tools from the toolbar to complete a variety of tasks.

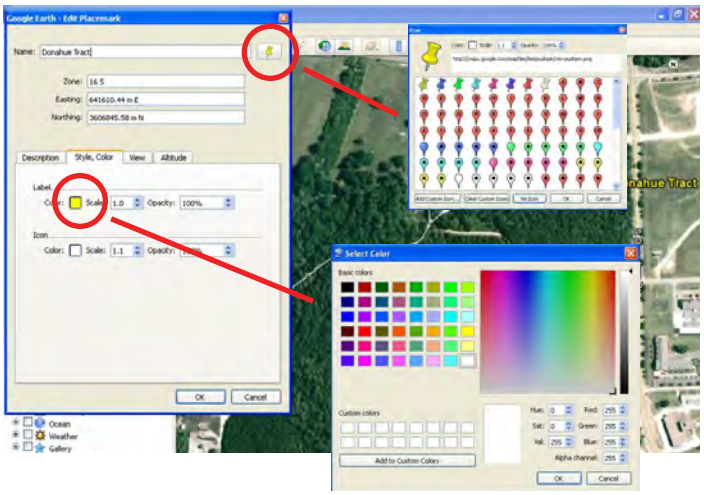
Tools (From Left to Right):

- Hide sidebar
- Add placemark
- Add polygon
- Add path
- Add overlay image
- Record a tour
- Show historical imagery
- Show sunlight across the landscape
- Switch between Earth, Sky, and other planets
- Show a ruler
- Email
- Print
- View in Google Maps

To Add a Placemark or Point (e.g. gate, deer stand, trailhead, etc.):

1. Locate the area of interest.
2. Click the "Add Placemark" button.
3. Click the Icon (a flashing yellow pushpin) and drag it to the area of interest.
4. Type a "Name" for the placemark in the blank provided.
5. Add a "Description" to store more information about the location.
6. Click the "Style, Color" tab to change the label, icon style, and color.
7. Write down the coordinates for future use.
8. Click "OK."





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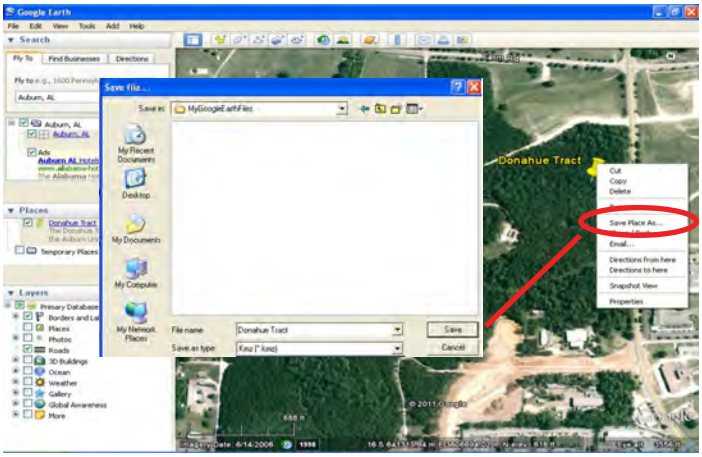
To Edit and Save a Placemark:

1. Right click the Icon or name under "Places" and click "Properties".
2. Under the same menu, click "Save Place As" to save the placemark in a convenient location.



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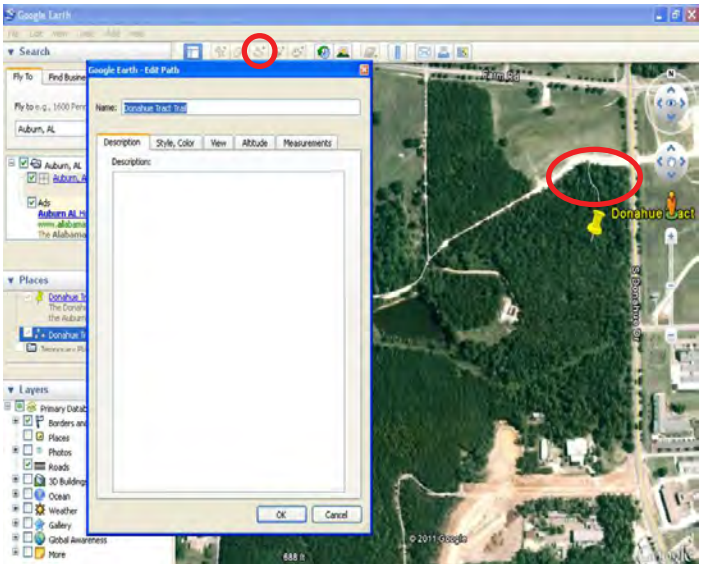
3. A ".kmz" extension is the default, but you can also choose ".kml" (user preference).

To Create a Path or Line:

1. Locate the area of interest.
2. Click the "Add Path" button.
    - The pointer will turn into a white square.
3. Move the pointer over the area of interest and trace the line (a trail or stream) by clicking points to create a line.
4. Right click to delete points.
5. Hover over points and the pointer will turn into a hand so you can click points and move them.
6. Use the same procedures from creating a placemark to:
    - Add a Description
    - Change Style, Color, and Icon
    - Edit the Path
    - Save and email the path file



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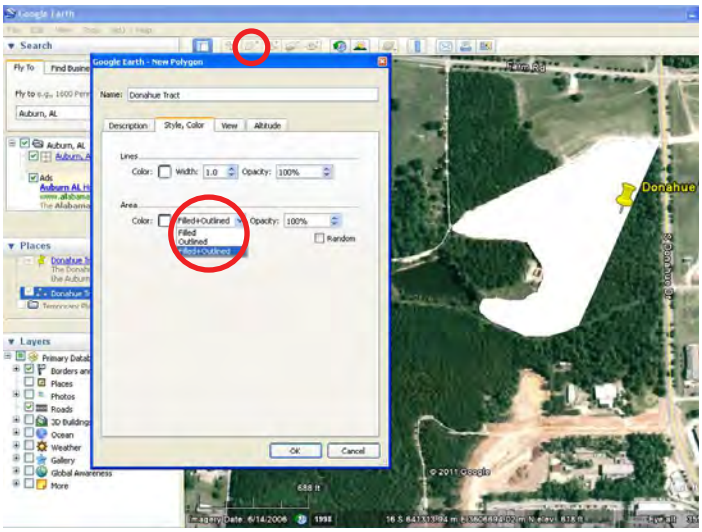
To Create a Polygon:

1. Locate the area of interest.
2. Click the "Add Polygon" button. The pointer will turn into a white square.
3. Move pointer over the area of interest and trace around the area (timber stand, field, etc.) by clicking points to create a polygon.
4. Use the aerial photo, roads, trails, and known boundaries to help you trace the area.
5. Right click to delete points.
6. Hover over points; the pointer will turn into a hand so you can click points and move them.
7. It may be helpful to change the "Area" to "Outlined." (See below.) This can be useful when tracing complex shapes. "Filled and Outlined" was used for the example below.
8. Click "OK" when the polygon is completed.
9. Use the same procedures from creating a placemark or a path to complete the polygon.



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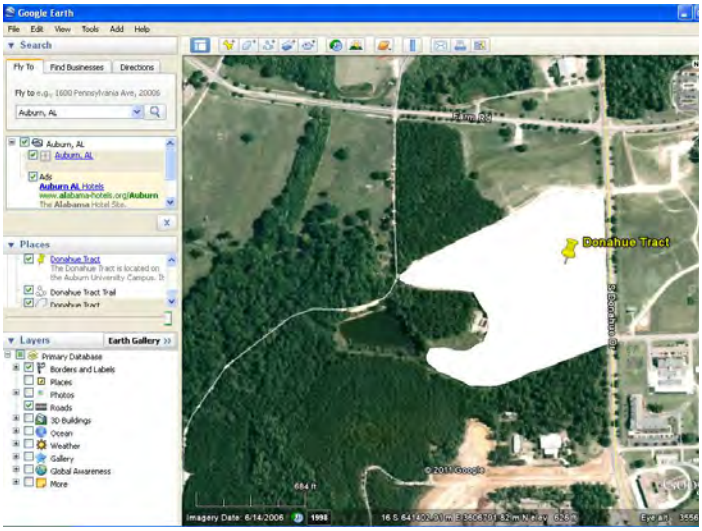

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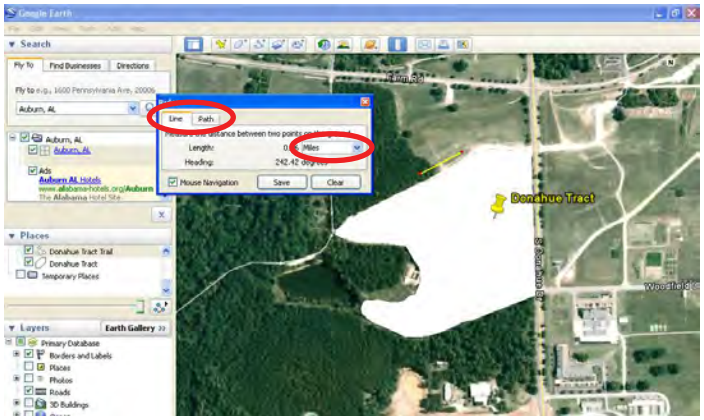
Measuring a Distance:

1. Click "Show Ruler."
2. Choose a "Line" or a "Path."
3. Choose the desired units.
4. Click 2 or more places on the map to measure a distance.



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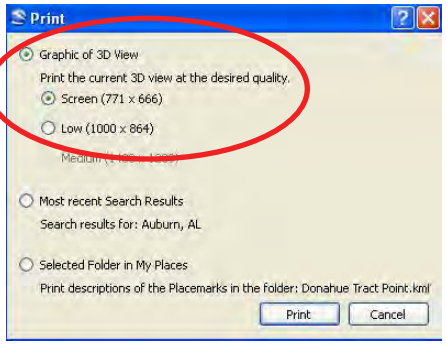
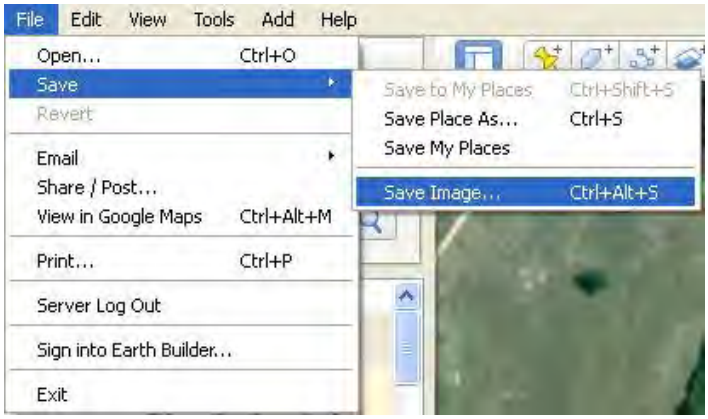
To Print a Map:

1. Click "File" and "Print."
2. Choose "Graphic of 3D View" and the desired quality.



To Save an Image of a Map:

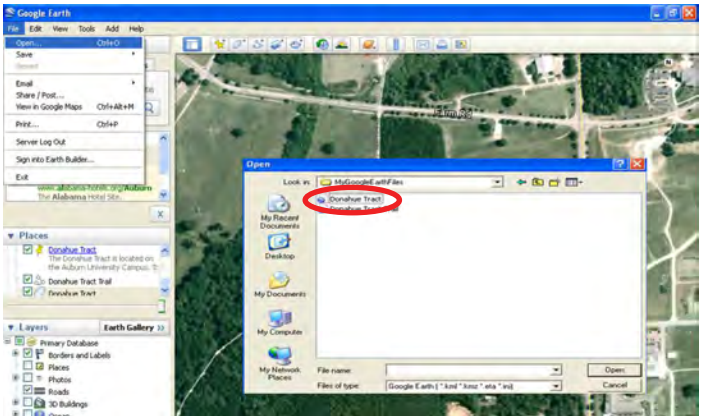
1. Click "File," "Save," and choose "Save Image."
2. Name the file.
3. The default file type is a Jpeg image (.jpg). This will allow the file to be opened and used like a picture.



© 2011 Google

Opening a Saved File:

1. Click "File" and "Open," then double-click on the file name.



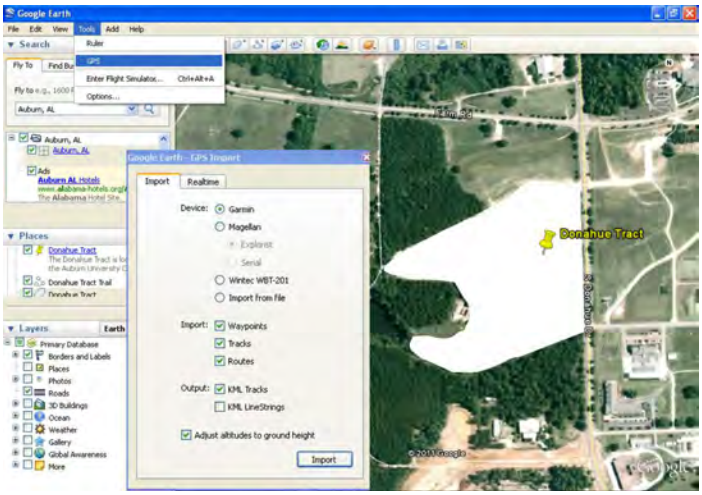
© 2011 Google

Calculating Areas:

- Areas can be calculated in Google Earth using the ruler if the area of interest is square or rectangular.
- Google Earth Pro has an area feature tool, but it requires purchasing a license.
  - Website: http://www.google.com/enterprise/earthmaps/earth_pro.html
- GE-Path (Freeware)
  - To see the full list of features, download from http://www.sgrillo.net/googleearth/gepath.htm
  - Save files with the ".klm" extension.

Adding GPS Data:

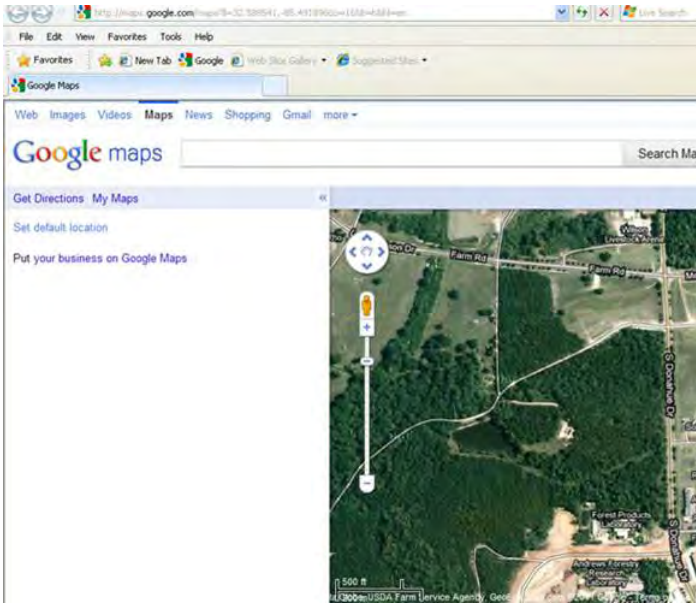
1. Click "Tools" then "GPS" to insert or add real-time data.



© 2011 Google

View in Google Maps:

1. Click "File" and "View in Google Maps."



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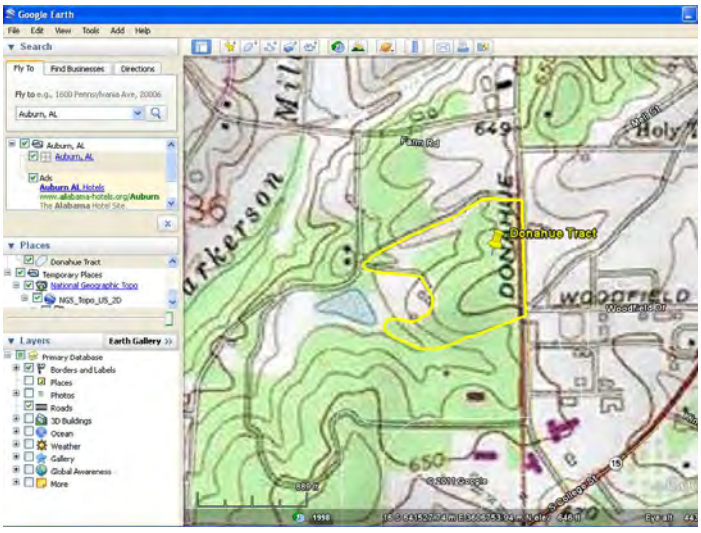
Topographic Map:

1. Visit http://www.gelib.com/ng-topo.htm
2. Keywords: Google Earth, topographic map, overlay.
3. Click "Download with Google Earth."
4. Save the .kml file, and then open it in Google Earth.
5. Topographic maps can be viewed at difference scales as you zoom in.



© 2011 Google

Google Earth. Version 6.0.3.2197

3. Alabama Historic Aerial Photos

The Alabama Historic Aerial Photos Archive is an online application that allows you to view historical aerial photographs and order digital copies.

Keywords: Alabama, historic, aerial photographs

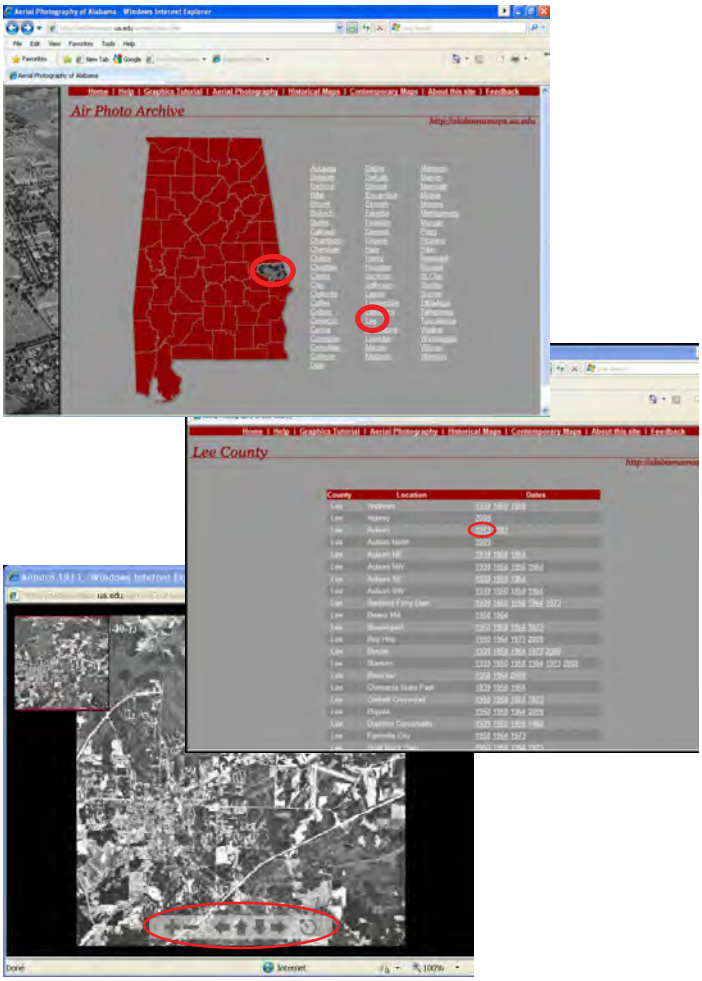
Aerial Photography Index (main website):
http://alabamamaps.ua.edu/

Aerial Photography Archive:
http://alabamamaps.ua.edu/aerials/index.html

Help is available at:
http://alabamamaps.ua.edu/help/historical.html

Choose the County and Location of Interest:

1. Scroll over the county with the mouse to see a historical mosaic for the county.
2. Either click the county on the map or the name in the list on the right to see the list of locations.



3. Find the location nearest to your area of interest and click the date of interest.

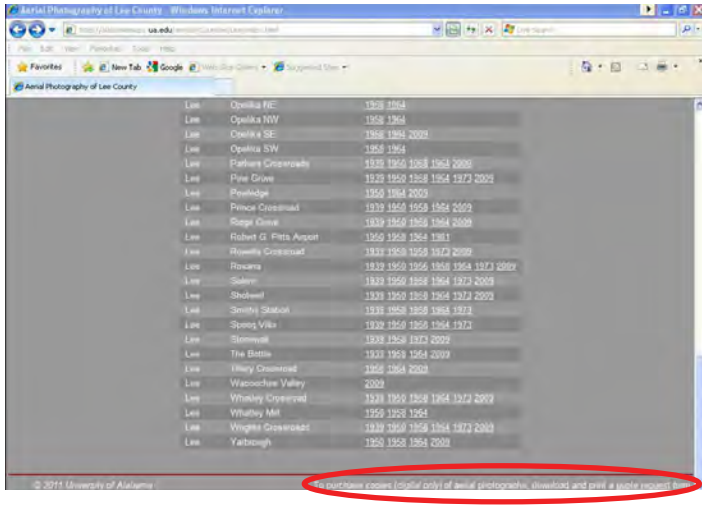
Tools (see bottom left):
Use the tools at the bottom of the aerial photograph window or click and drag to view a particular place in the photograph.

From left to right:

- Zoom in
- Zoom out
- Arrows to move each direction
- Recenter the photo

Digital Copies:
To purchase digital copies, download a quote request.

1. Fill out the required information on the "Alabama Maps Aerial Photo Order Form." (See below.)
2. Follow the directions for purchasing digital copies of the aerial photographs.
3. If you are unable to find an area of interest, send an email to alabama.maps@ua.edu with a location description and coordinates requesting if historical aerial photographs are available and what years are available.
    - You can get coordinates from your GPS unit or using the tutorial information from Google Earth.



4. USDA Natural Resources Conservation Service (NRCS) Geospatial Data Gateway

For more advanced users that have a GIS software package or viewer, the NRCS Geospatial Data Gateway provides a wide variety of data options.

Keywords: NRCS, Geospatial, Data, Gateway

Homepage: http://datagateway.nrcs.usda.gov/

Frequently Asked Questions: http://datagateway.nrcs.usda.gov/GDGHome_FAQ.aspx

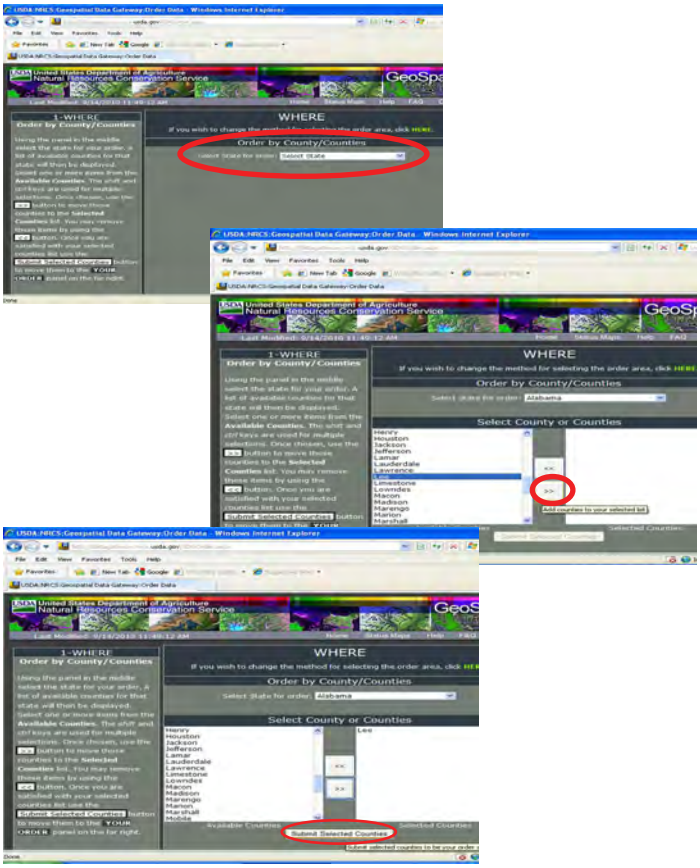
For more information and help: http://datagateway.nrcs.usda.gov/Gateway_5_tutorial_14MAY2010.pdf

NRCS Geospatial Data Gateway:

- Requires a GIS viewer.
- Data will vary by state and county.
- Example data types include:
  - Ortho Imagery or Aerial imagery
  - Topographic maps
  - Elevation maps
  - Land Use Land Cover
  - Geology
  - Soils
  - Climate Precipitation
  - Climate Temperature

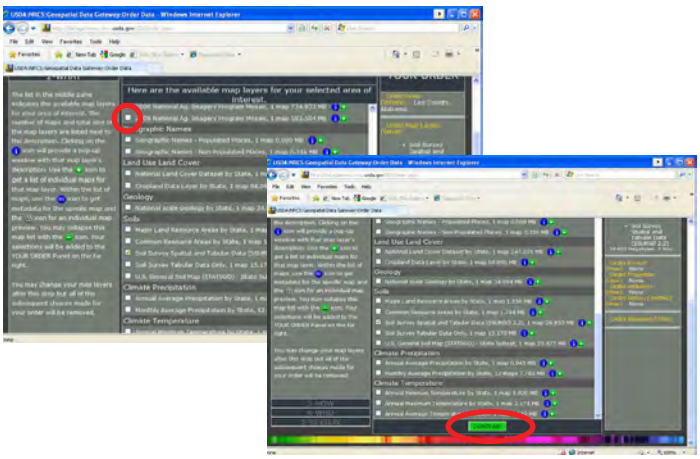
Get Data:

1. Click the green button labeled "Get Data."
2. Next, select the state and county of interest.
   - You *can* choose all of the counties in a state.
3. Click "Submit Selected Counties."



Data Options:

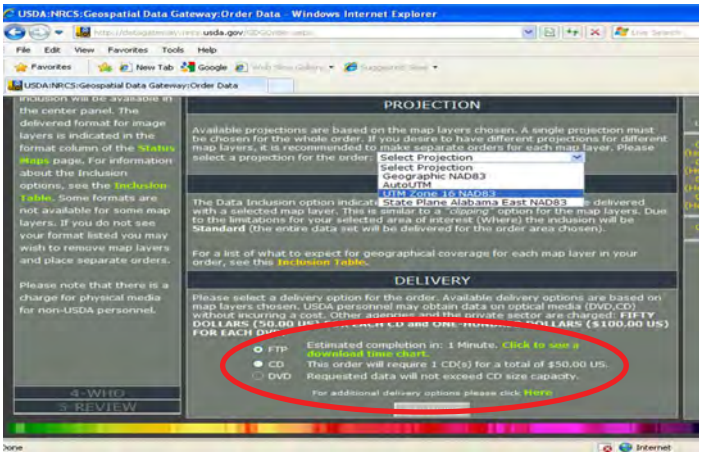
1. Scroll through the list of data options. If you selected numerous counties or the whole state, then some options may not be available. If this happens, try selecting individual counties.
2. Click the box to next to the data layers of interest. (See below.)
3. Click "Continue."



Projection and Delivery Method:

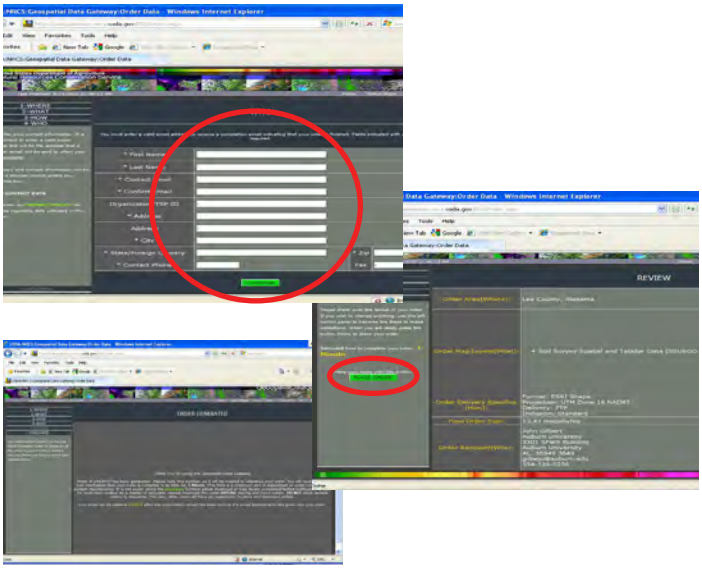
1. Choose a projection.
    - If you have other existing GIS or GPS data you want to overlay with your choice, choose a projection that matches your existing data.

2. Choose a delivery method.
    - The FTP option allows you to download the data online. (Depending on your connection speed and size of data request, this could take some time to download.)
    - CD and DVD options cost extra and will be mailed to you.



FTP Option:

1. Choosing the FTP option requires you to complete the form.
2. After the information is filled out, click "Continue" and "Place Order."
    - Information will be provided about the status of your order.



5. USDA National Agroforestry Center (NAC) CanVis

For users with an interest in creating visual simulations of potential management options using digital photographs, CanVis provides a variety of options. CanVis is a free program that requires either downloading the program or ordering a CD or DVD.

Keywords: National, Agroforestry, CanVis, visual simulation

CanVis (main website):
http://www.unl.edu/nac/simulation/index.htm

Download: http://www.unl.edu/nac/simulation/download.htm

Order: http://www.unl.edu/nac/simulation/order.htm

Other Help, Training, and Publications:
http://www.unl.edu/nac/simulation/products.htm#canvis
or
http://www.unl.edu/nac/publications.htm

A picture can really make a difference when making decisions and planning management options. With CanVis, users can:

- Edit digital photographs.
- Add or remove trees, shrubs, grasses and groundcover, etc.
- Use a series of photographs to show a simulation before and after a potential management option like planting trees, planting shrubs, thinning a stand, adding a fence, etc. (See example below.)

Example simulations can be found at
http://www.unl.edu/nac/simulation/examples.htm

Images created using CanVis 2.3

continued from inside front cover

areas, and recreation areas. The expectation is that this book will provide an opportunity for private landowners and conservation professionals to be able to create maps and aid management plans that will contribute to the economic and ecological development of multiple-use management on small, family farms and forests.

Book Design

This book is designed to take users through the steps needed to create maps, acquire, and store information for areas of interest by showing examples. The steps can be followed to duplicate the examples, or users can use the steps and focus on an area of interest.

Tips

Click:	moving the mouse pointer over an item of interest and clicking the left mouse button
Double-click:	quickly clicking the left mouse button twice
Right-click:	clicking the right mouse button
Click and drag:	moving the mouse pointer over an item of interest (e.g. a map) and clicking and holding the left mouse button while moving the object/items of interest or creating a box around the object

Disclaimer

These examples are for educational purposes only. There are no guarantees of any kind. The user assumes all risks with viewing, downloading, saving etc. online programs and products. The user is responsible for determining if the level of accuracy of the data meets the desired level for decision making. The authors are not liable or responsible for the use or incorrect use of these data. No guarantees, warranties, etc. are made, expressed, or implied for this book (including but not limited to accuracy, completeness, etc). Use this information at your own risk and liability. Please use the credit information when displaying, summarizing, or using all or any part of this information. Please note that websites are constantly changing and being updated, therefore links and screenshots may not match exactly as they appear in this book.

Contact

For more information or further help with mapping your land, please contact the Longleaf Pine Stand Dynamics Laboratory in the School of Forestry and Wildlife Sciences at Auburn University.

Longleaf Pine Stand Dynamics Laboratory
3301 Forestry and Wildlife Sciences Building
Auburn, Alabama 36849-5418

Tel: 334.329.0236/334.844.1065
Fax: 334.844.1084
Web: www.lpsdl.auburn.edu

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555 Alabama Street
Montgomery, Alabama 36104

Tel: 334.265.8733

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