

Using iTree VUE with GIS to Quantify the Carbon Storage by Urban Trees

“Results in about an hour for free”

Peggy Minnis
Pace University

Register a
username
&
password

Download
the free
tools

i-Tree - Tools for Assessing and Managing Community Forests - Windows Internet Explorer

http://www.itreetools.org/

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i-Tree - Tools for Assessing and Managing Community ...

i-Tree Tools for Assessing and Managing Community Forests

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Community Trees:
A Living Investment

**COMMUNITY TREES:
A LIVING INVESTMENT**

DVD

Featured i-Tree Project:
Corvallis, Oregon

What is i-Tree?

i-Tree is a state-of-the-art, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools. The i-Tree Tools help communities of all sizes to strengthen their urban forest management and advocacy efforts by quantifying the structure of community trees and the environmental services that trees provide.

Since the initial release of the i-Tree Tools in August 2006, numerous communities, non-profit organizations, consultants, volunteers and students have used i-Tree to report on individual trees, parcels, neighborhoods, cities, and even entire states. By understanding the local, tangible ecosystem services that trees provide, i-Tree users can link urban forest management activities with environmental quality and community livability. Whether your interest is a single tree or an entire

What's New?

Master Gardeners use i-Tree to calculate value of city trees
[Springfield News-Sun Article >>](#)

Tennessee's Urban Forest: A US Forest Service Report
[Tennessee UF Report >>](#)

Peel (Southern Ontario) Region's Urban Forest Strategy
[Peel Region UF Strategy>>](#)

London Tree Officers Association release Canopy findings



i-Tree

Vue

User's Manual

v. 4.0

Version 4.x
due in the
summer

i-Tree Vue offers the following advantages:

- It provides a broad estimate of tree canopy, carbon storage and annual carbon sequestration and air pollution removal, for the contiguous United States.
- It allows you to explore National Land Cover Data information and provides a broad estimate of land cover classes.
- No field data are required.
- Canopy cover and ecosystem services are presented in spatial terms, so you can visualize how they vary across your community.
- User friendly tools within the VUE application allow you to refine an area of interest for analysis.
- Integration of regional correction factors allow you to adjust and improve upon NLCD estimates based on recent research.

The land cover is being classified from satellite imagery captured by an orbiting platform 400+ miles up. Then the pixels are classified based on ground truthing in selected areas. The classification is automated. Each pixel represents 30 meters.

The current data available is from 2001 and 2006.

So, while VUE does have several limitations, for a quick and dirty estimate of carbon storage, annual sequestration, certain pollution removal and a monetary estimate of the value of the standing forest, it gets you going while you are waiting for the money for a more in-depth study.

http://gisdata.usgs.net/website/MRLC/

(allow pop ups)

Multi-Resolution Land Characteristics Consortium (MRLC) - Windows Internet Explorer

http://gisdata.usgs.net/website/MRLC/

File Edit View Favorites Tools Help

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Multi-Resolution Land Characteristics Consortium (MRLC)

Multi-Resolution Land Characteristics Consortium (MRLC)

Multi-Resolution Land Characteristics Consortium (MRLC)

MRLC Consortium provides a dynamic online map interface that can be used to view USGS datasets.

[Launch MRLC Consortium Viewer](#)

[View User Instructions](#)

The viewer uses extensive JavaScript and frames which means some browsers may not be able to support full interactive capabilities. Additionally, the viewer may be difficult for some users to interpret. These users may contact [EROS Customer Services](#), or the [maintainer](#) of these pages for assistance. The viewer will attempt to detect the version of browser in use and the window size and a warning will be given if your browser does not meet minimum or tested specifications. Browser compatibility information is available in the [User Instructions](#).

[Accessibility](#) [FOIA](#) [Privacy](#) [Policies and Notices](#)

[U.S. Department of the Interior](#) | [U.S. Geological Survey](#)
URL: <http://www.mrlc.gov/website/MRLC/index.php>
Page Contact Information: [Site Maintainer](#)
Page Last Modified: July 21, 2009

USA.gov
TAKE PRIDE IN AMERICA

Zoom



Query



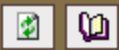
Tools



Downloads



Documents



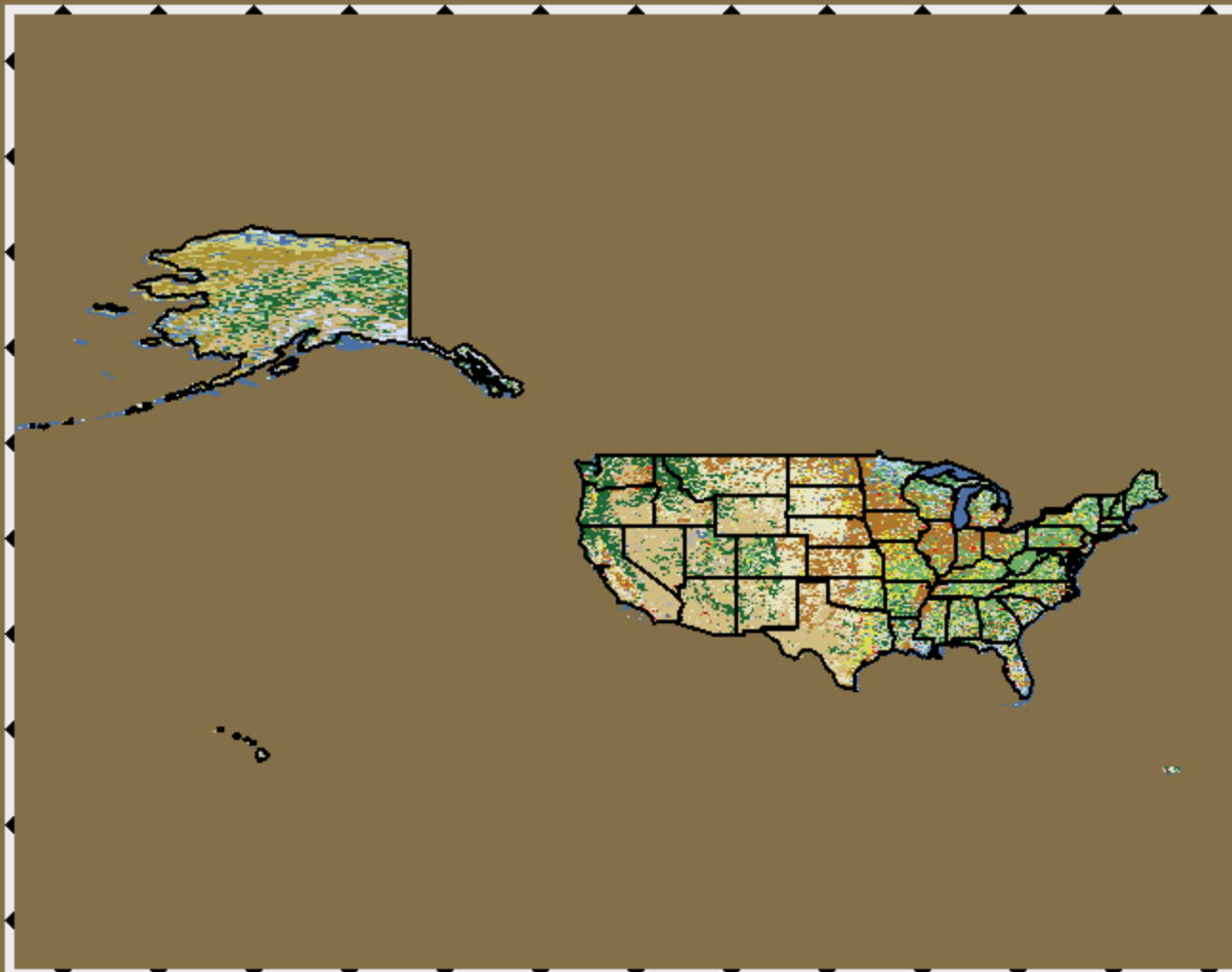
Scale Information



Display

Download

- Places (Names)
- Transportation
- Boundaries
- Layer Extent
- Hydrography
- Land Cover
- Elevation



NLCD Land Classes



A legend for the National Land Cover Database (NLCD) showing 18 land classes. Each class is represented by a colored square followed by its code and name. The classes are organized into groups: Developed (11-24), Barren (31), Forest (41-43), Shrub/Scrub (52), Grassland/Pasture (71-81), Crops (82), and Wetlands (90-95).

11	Open Water
21	Dev. Open
22	Dev. Low
23	Dev. Med
24	Dev. High
31	Barren
41	For. Deciduous
42	For. Evergreen
43	For. Mixed
52	Shrub / Scrub
71	Grassland
81	Pasture
82	Crops
90	Wet. Woody
95	Wet. Herbaceous

Download button

National Map Seamless Request Summary Page - Windows Internet Expl...

http://extract.cr.usgs.gov/Website/distreq/RequestSummary.jsp?AL=41.652271875000004,41.239134375,-75.48068

The National Map Seamless Server Request Summary Page

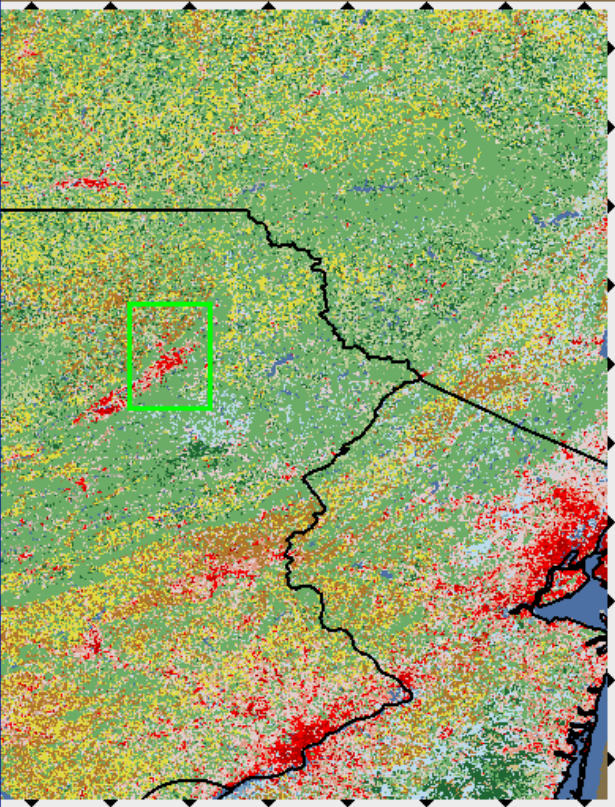
You are logged in as Default Seamless User.

[Modify Data Request](#) [Tutorial](#) [HELP!](#)

Data Extraction Request Pieces:			
Area	Output Parameters	Size (MB)	Download Links
National Land Cover Dataset 2001 - Land Cover V2			
(WGS 84) N: 41.65227 W: -75.80401  S: 41.23913 E: -75.48068	Output Format: GeoTIFF USA Contiguous Albers Equal Area Conic USGS version X cell Size: 30.00 Meters Y cell Size: 30.00 Meters	2	 EROS Data Center Download
National Land Cover Dataset 2001 - Canopy			
(WGS 84) N: 41.65227 W: -75.80401  S: 41.23913 E: -75.48068	Output Format: GeoTIFF USA Contiguous Albers Equal Area Conic USGS version X cell Size: 30.00 Meters Y cell Size: 30.00 Meters	2	 EROS Data Center Download
National Land Cover Dataset 2001 - Impervious Surface V2			
(WGS 84) N: 41.65227 W: -75.80401  S: 41.23913 E: -75.48068	Output Format: GeoTIFF USA Contiguous Albers Equal Area Conic USGS version X cell Size: 30.00 Meters Y cell Size: 30.00 Meters	2	 EROS Data Center Download

Click here...

page)



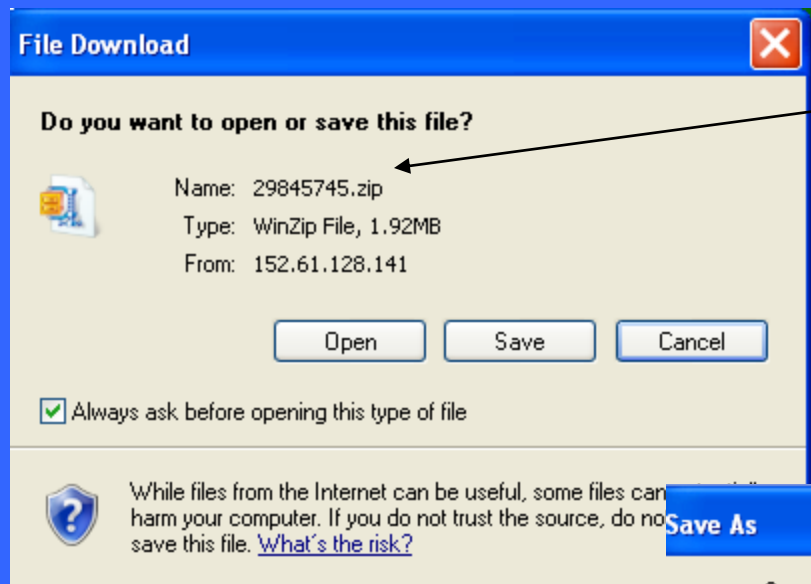
Scale Information
Out In
Scale ~ 1:1,563,559

[Display](#) [Download](#)

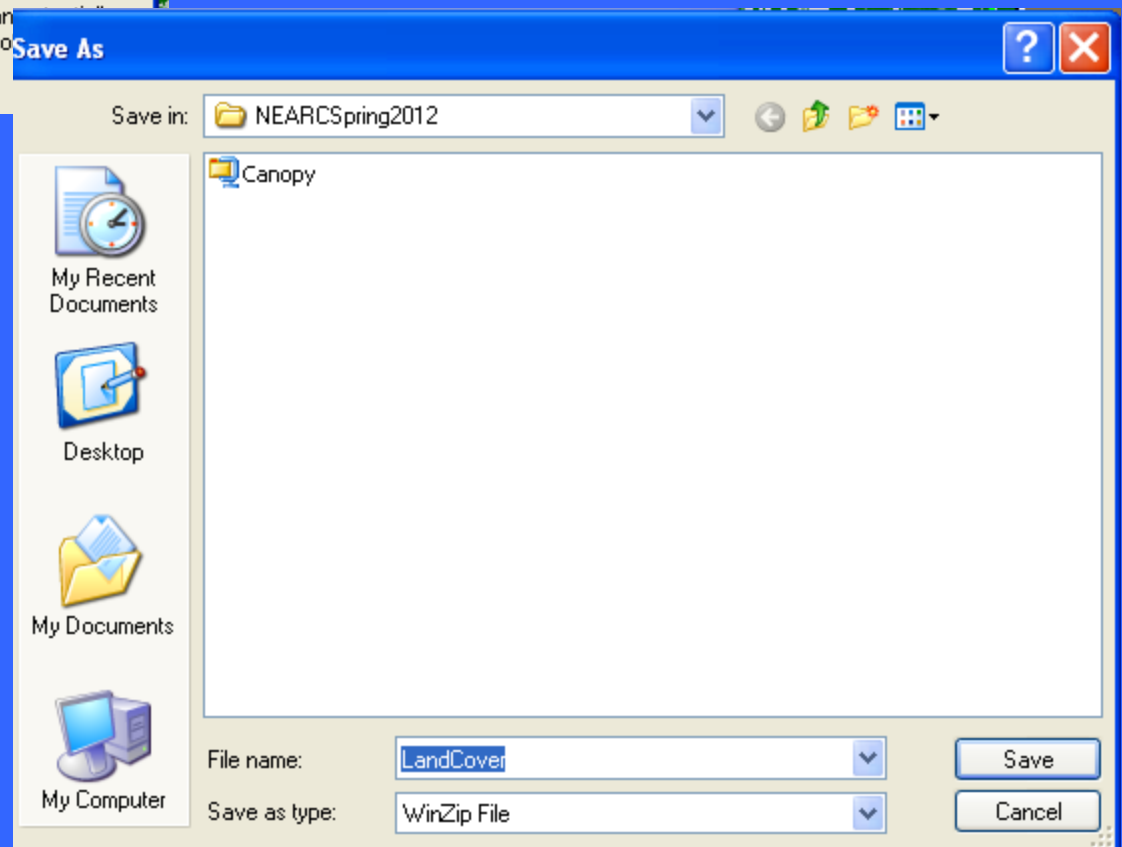
- Elevation
- Land Cover
 - ☐ NLCD 1992 (CONUS) Land Cover
 - ☒ NLCD 2001 (CONUS) Land Cover V2
 - ☒ NLCD 2001 (CONUS) Forest Canopy
 - ☒ NLCD 2001 (CONUS) Impervious Surface V2
 - ☐ NLCD 2006 (CONUS) Land Cover
 - ☐ NLCD 2006 (CONUS) Impervious Surface
- Orthoimagery
- Transportation

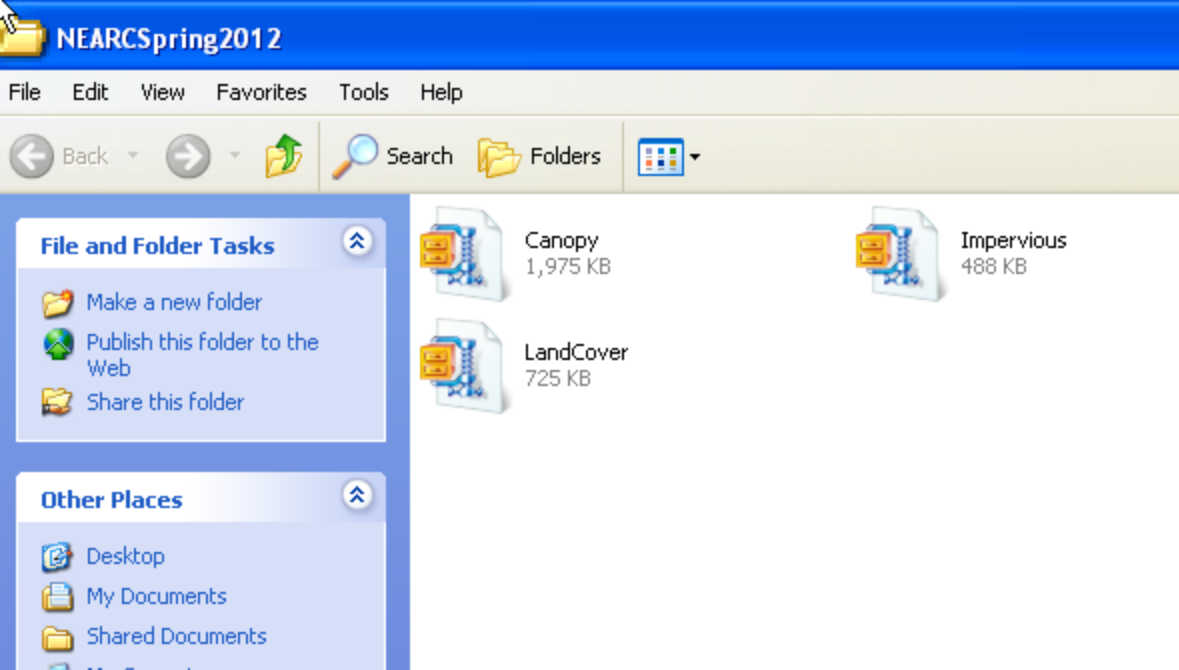
Download

Internet 100%

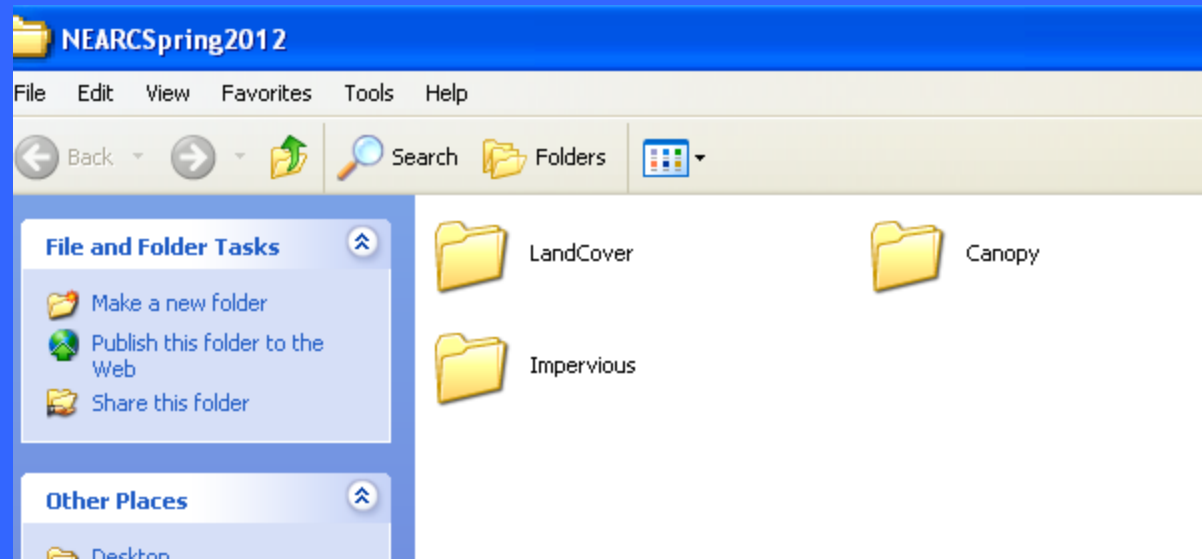


Keeping track of the individual data sets might be the hardest part, so writing down the numbers that correspond to the three maps is important.

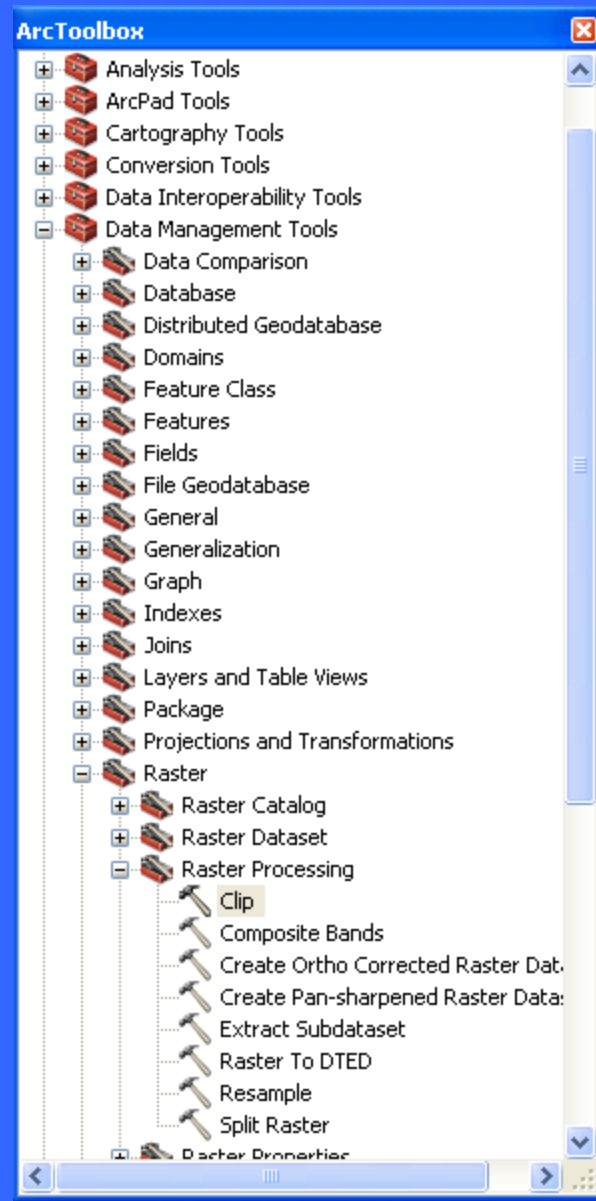




It helps to create a folder for each shapefile that is extracted.

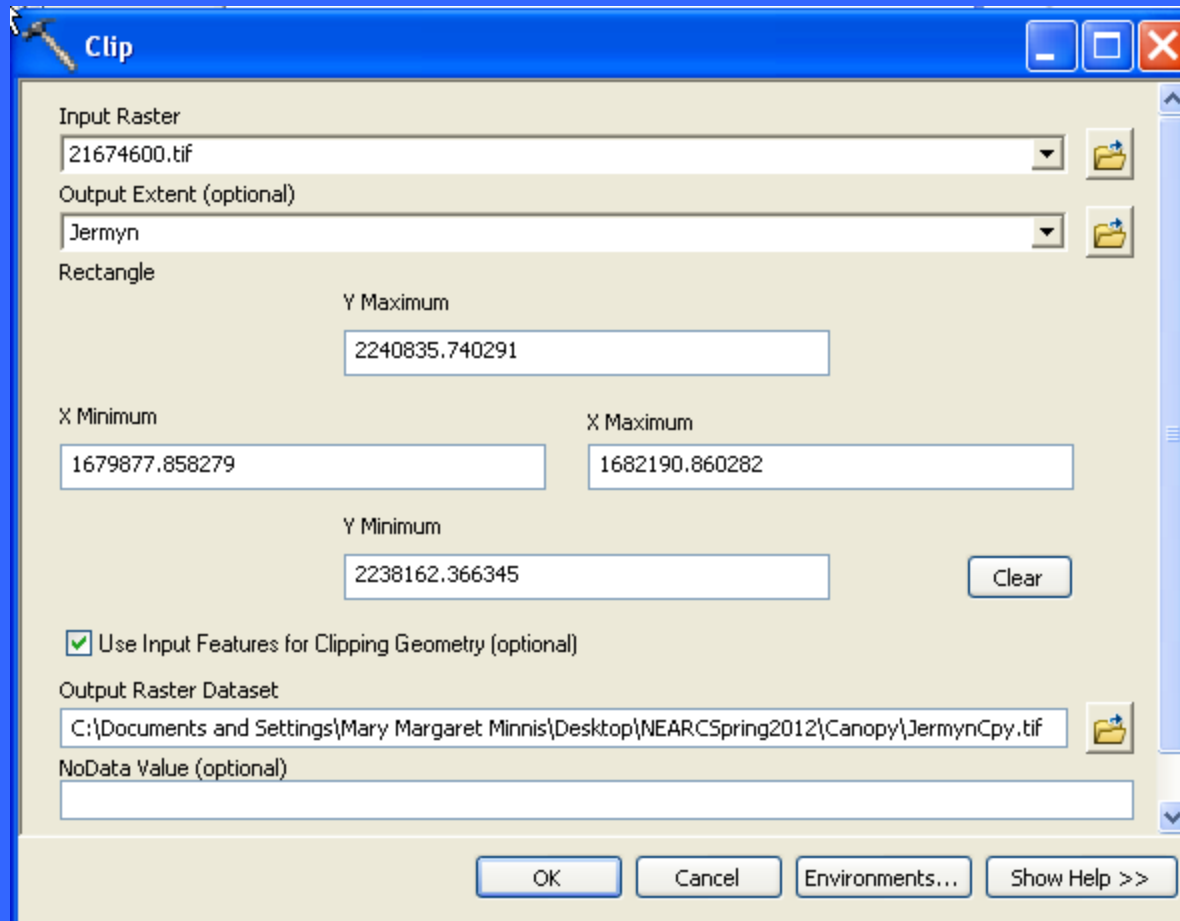


In ArcGIS 10, clip all three datasets to the area of interest.

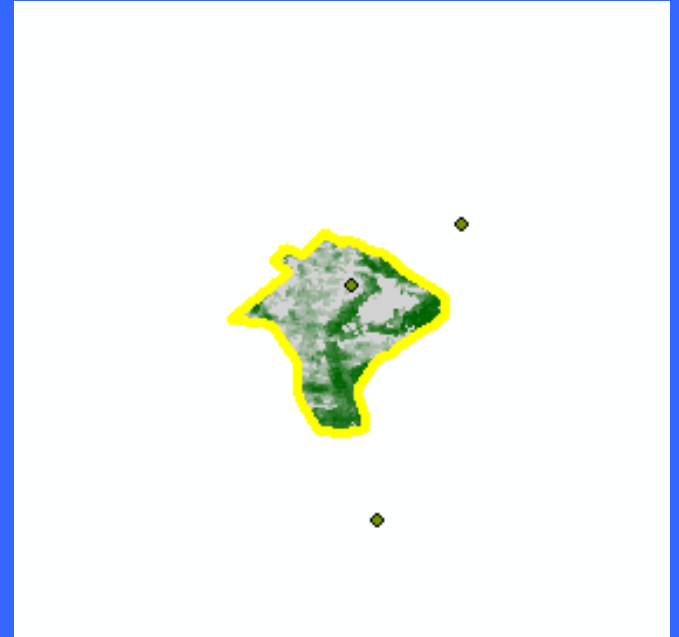
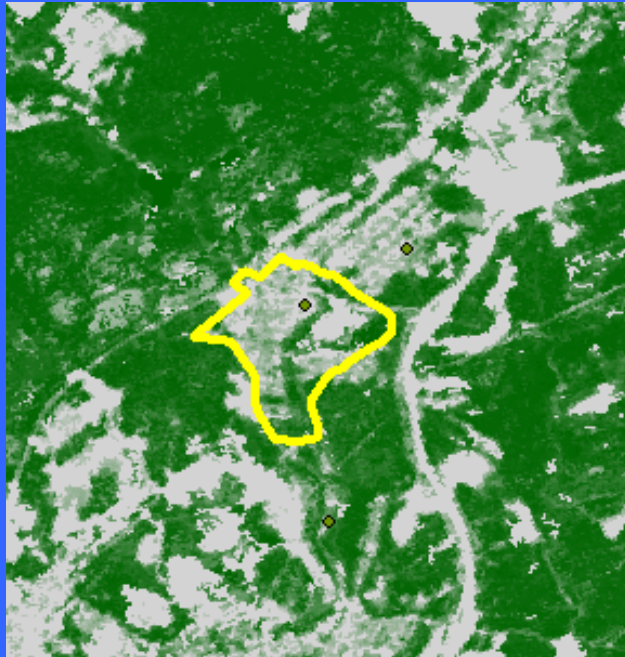


If a user does not have GIS capability, they can use tools within Vue to isolate the area of interest.

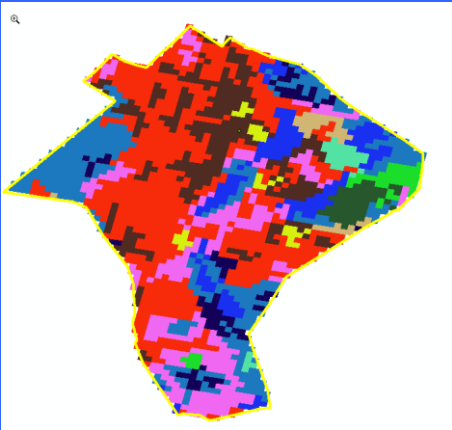
If you love using Spatial Analyst, that works. There are instructions on how to use Spatial Analyst in the manual.



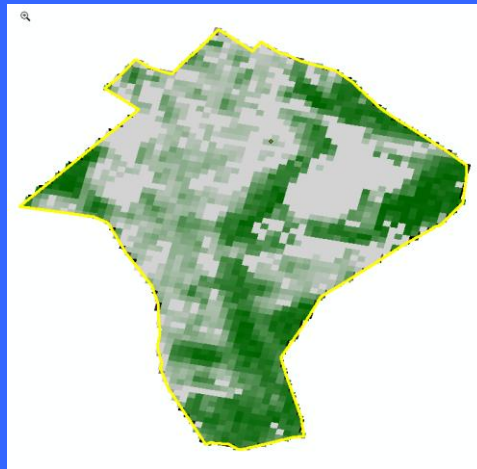
Make sure to name the output data with a tif extension. A TFW world file will be created at the same time.



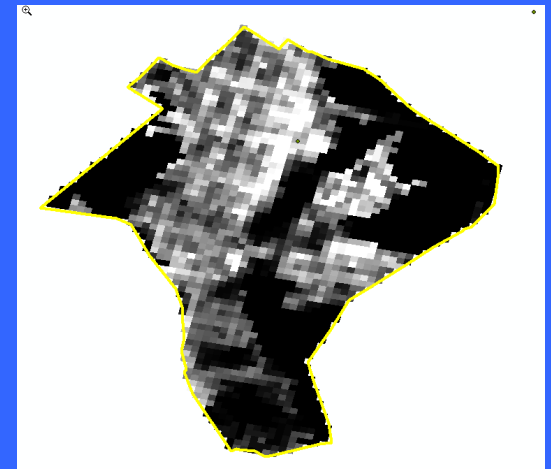
Why not work with Jermyn, PA, my home town?



Land Cover



Canopy



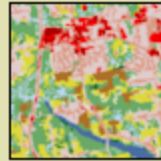
Impervious Cover

Browse for NLCD Imagery

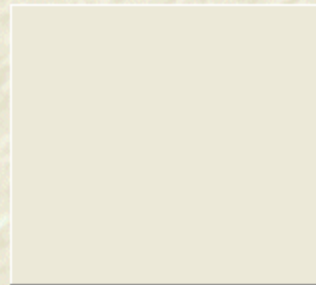


Browse for an NLCD LAND COVER image

Example of
NLCD 2001
LAND COVER

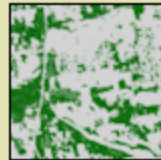


*note: imagery
clipped in GIS
software may
exhibit a
grayscale
palette*

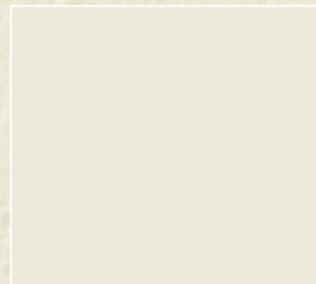


Browse for an NLCD TREE CANOPY image

Example of
NLCD 2001
TREE CANOPY

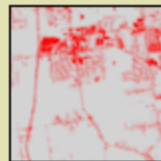


*note: imagery
clipped in GIS
software may
exhibit a
grayscale
palette*

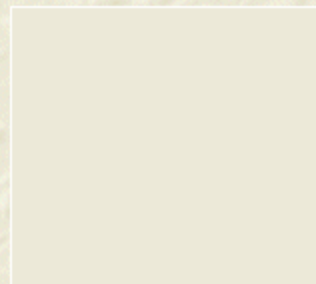


Browse for an NLCD IMPERVIOUS COVER image

Example of
NLCD 2001
IMPERVIOUS
COVER



*note: imagery
clipped in GIS
software may
exhibit a
grayscale
palette*



Choose a State for Default Pollution Removal Values
or use values from an existing i-Tree Eco project:

☐ Check to manually define an AREA OF INTEREST on UNCLIPPED NLCD imagery.
note: feature should not be used on previously clipped imagery.

Help for this Form:

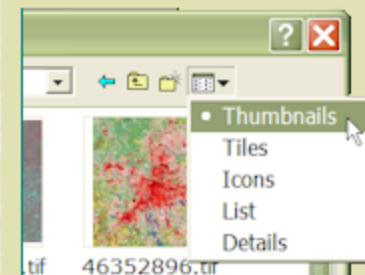
Use this form to load all three of the downloaded and uncompressed (unzipped) NLCD images from www.mrlc.gov. All three images MUST have been downloaded at the same time for exact alignment. Otherwise, calculations in this application will be incorrect. Vue CANNOT correct for image alignment problems.

(For Help downloading imagery, click the NLCD Download Help button below.)

If one is working with CLIPPED versions of the three images, the color palettes may have changed. Vue will attempt to apply the standard NLCD colors to each image.

»OK starts the image statistics calculations and launches i-Tree Vue.
»Cancel exits i-Tree Vue.

TIP: In the File Open Dialog window, switch to Thumbnail View in order to help discern each of the three NLCD images:



NLCD Download Help

i-Tree Vue Manual

Explore Sample Imagery

Cancel

OK

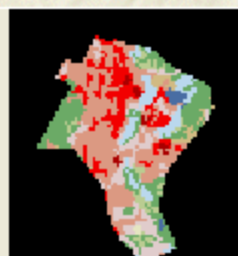


Browse for an NLCD LAND COVER image

Example of
NLCD 2001
LAND COVER



*note: imagery
clipped in GIS
software may
exhibit a
grayscale
palette*



C:\Documents and Settings\Mary Margaret
Minnis\Desktop\NEARCSpring2012\LandCover\LandCvrJmn.tif

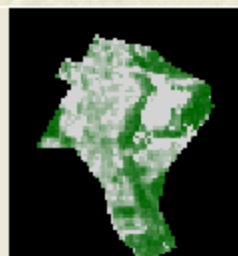


Browse for an NLCD TREE CANOPY image

Example of
NLCD 2001
TREE CANOPY



*note: imagery
clipped in GIS
software may
exhibit a
grayscale
palette*



C:\Documents and Settings\Mary Margaret
Minnis\Desktop\NEARCSpring2012\Canopy\LndCvrJ.tif

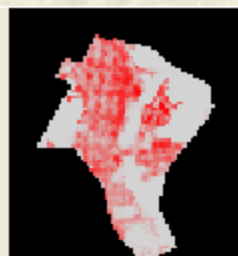


Browse for an NLCD IMPERVIOUS COVER image

Example of
NLCD 2001
IMPERVIOUS
COVER



*note: imagery
clipped in GIS
software may
exhibit a
grayscale
palette*



C:\Documents and Settings\Mary Margaret
Minnis\Desktop\NEARCSpring2012\Impervious\ImpJer.tif

Choose a State for Default Pollution Removal Values
or use values from an existing i-Tree Eco project:

PA - PENNSYLVANIA

☐ Check to manually define an AREA OF INTEREST on UNCLIPPED NLCD imagery.
note: feature should not be used on previously clipped imagery.

Help for this Form:

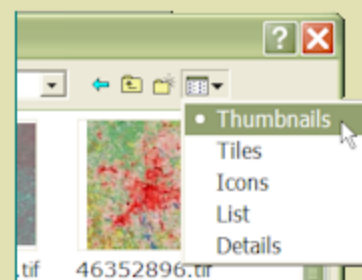
Use this form to load all three of the downloaded and uncompressed (unzipped) NLCD images from www.mrlc.gov. All three images MUST have been downloaded at the same time for exact alignment. Otherwise, calculations in this application will be incorrect. Vue CANNOT correct for image alignment problems.

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NLCD Download Help

i-Tree Vue Manual

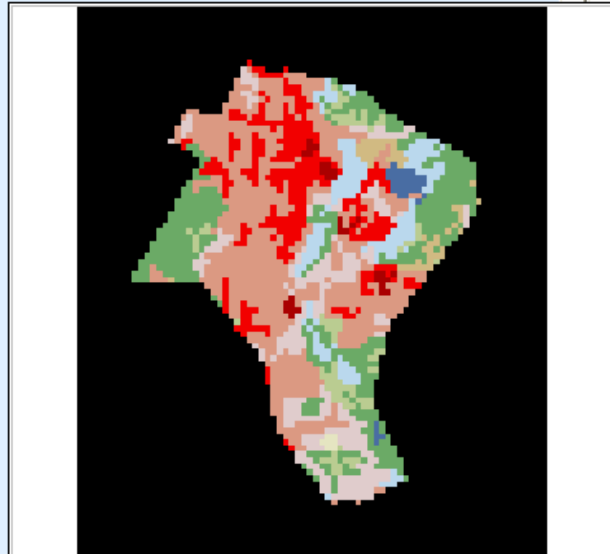
Explore Sample Imagery

Cancel

OK

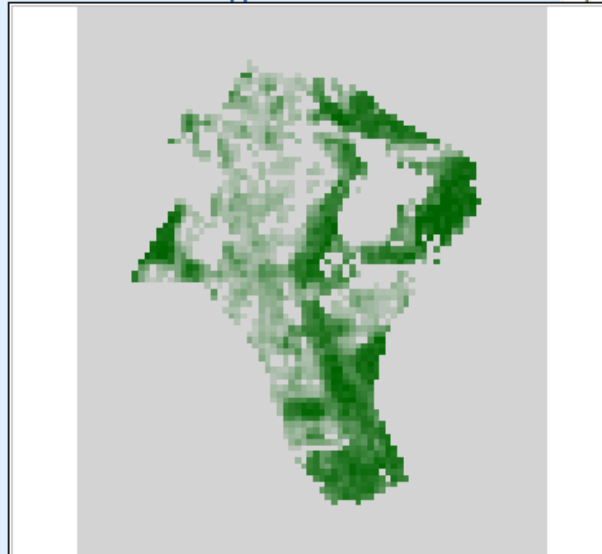


NLCD Land Cover



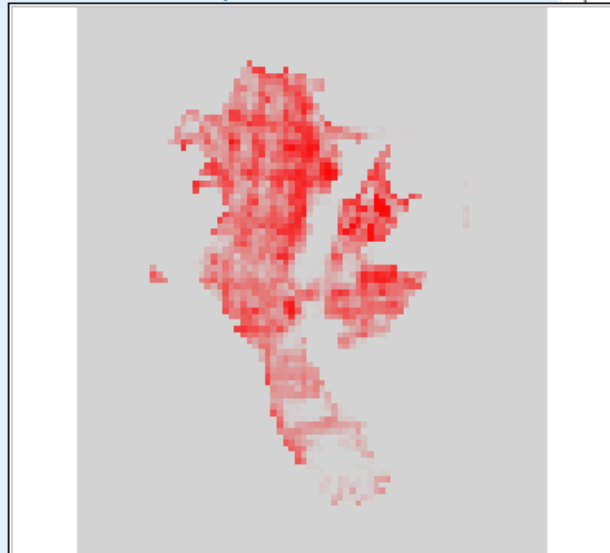
C:\Documents and Settings\Mary Margaret Minnis\Desktop\NEARCSpring201.

NLCD Percent Tree Canopy



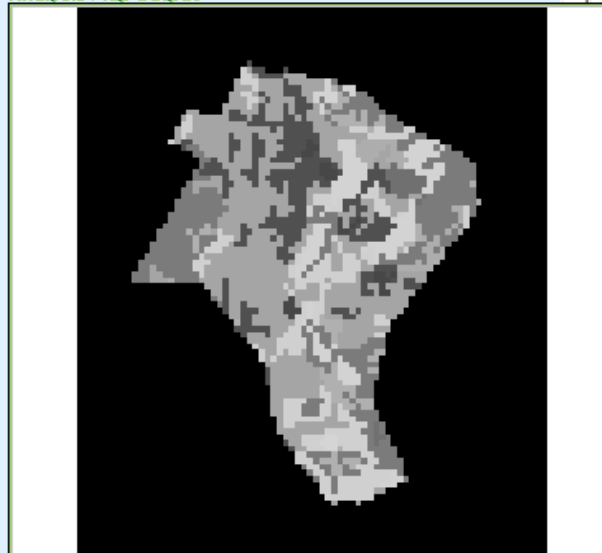
C:\Documents and Settings\Mary Margaret Minnis\Desktop\NEARCSpring201.

NLCD Percent Urban Impervious Cover



C:\Documents and Settings\Mary Margaret Minnis\Desktop\NEARCSpring201. Output Not Saved Yet.

Analysis Map Output



NLCD Statistics

NLCD Image Area:
493.3 acres

Tree Canopy (TC):
185.3 acres
38.1 %

Impervious Cover (IC):
114.0 acres
23.5%

Developed (all):
309.4 acres
62.7 %
TC: 25.1% IC: 36.9%

Forest (all):
135.0 acres
27.4 %
TC: 63.4% IC: 0%

**Wetlands (all
- wet1 & 2 tabs):**
40.0 acres
8.1 %
TC: 54.3% IC: 0%

Agriculture (all):
0.0 acres
0 %
TC: 0% IC: 0%

Miscellaneous (all):
1.6 acres
0.3 %
TC: 15.3% IC: 0%

Water:
7.3 acres
1.5 %

General

Developed

Forest

Wet 1

Wet 2

Agri

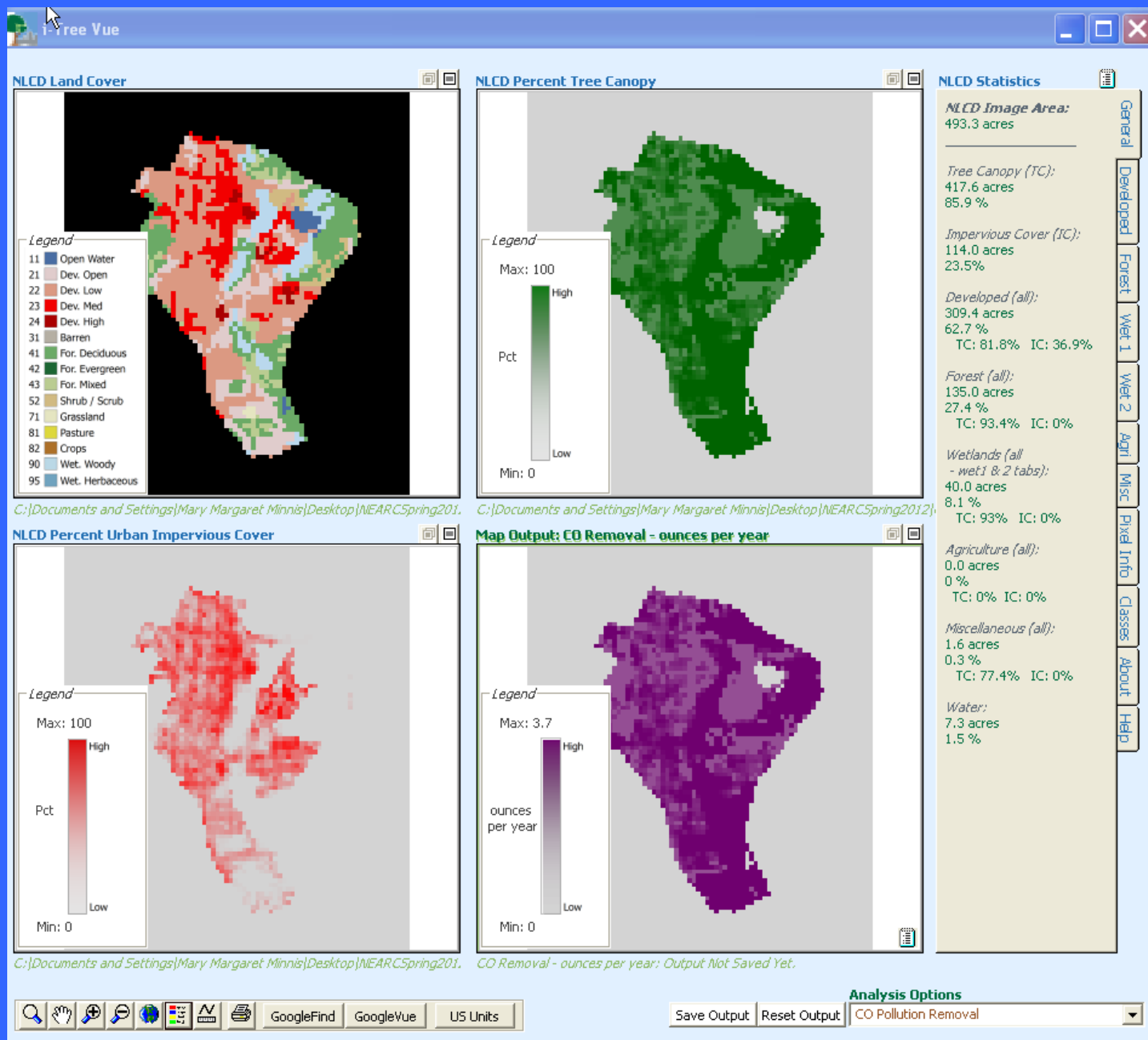
Misc

Pixel Info

Classes


About

NLCD Adjustment: Tree Canopy
 NLCD Adjustment: Impervious Cover
 Carbon Storage
 Carbon Sequestration
 CO Removal
 NO₂ Pollution Removal
 O₃ Pollution Removal
 SO₂ Pollution Removal
 PM₁₀ Pollution Removal
 Tree Available Green Space
 Tree Canopy Green Space
 Tree Canopy % Change: Region
 Tree Canopy % Change: Developed, All
 Tree Canopy % Change: Developed Classes
 Tree Canopy % Change: General Classes



Vue 5.0 will be out this summer and this is the new options page:

Analysis Options



i-Tree Vue offers the following Analysis Options.
Click on one below to learn more about it in the Help at right.

Carbon Removal

☐ Total Carbon Storage

☐ Annual Carbon Sequestration

Pollution Removal

☐ Carbon Monoxide (CO)

☐ Nitrogen Dioxide (NO2)

☐ Ozone (O3)

☐ Sulfur Dioxide (SO2)

☐ Particulate Matter, 10 microns (PM10)

NLCD Cover Adjustments

☐ Tree Canopy

☐ Impervious Cover

☐ Land Cover

Existing Urban Forest Structure

☐ Available Green Space

☐ Canopy Green Space

**Canopy Scenario Modeling:
percent gain or loss**

☒ 1) Across the Entire Region

☐ 2) Broken down by the 5 General NLCD Classes

☐ 3) Across the aggregate of All Developed NLCD Areas

☐ 4) Broken down by the 4 Developed NLCD Sub-Classes

Help for this Form:

Tree canopy % change analyses:
The first window that appears for each of the tree canopy modeling reports allows you to enter different levels of canopy cover and to adjust per-acre values and monetary values.

In the window, enter a new value for canopy cover. Then, if you wish to edit the default per acre or monetary values for any of the ecosystem services, check the box next to each service. The appropriate fields will appear and can be edited.

There are four canopy cover modeling reports that allow you to explore the effects of increasing or decreasing canopy cover:

- 1) The Region report adjusts canopy cover evenly across the study area.
- 2) The Developed, All report allows you to increase(or decrease) canopy cover equally across developed areas while leaving canopy levels in other land cover types as they are.
- 3) The Developed, Classes report allows you to target canopy cover changes to developed areas of different intensities, considering for example that a very dense urban core will have a lower canopy cover target than suburban areas.
- 4) The General Classes report allows you to target canopy cover changes across broad land cover categories.

Cancel

OK

Even now, you can “Manually define an Area of Interest” on the image load screen to use Google to clip your AOI. Good for non-GIS users.

This is Washington, DC mall area:

Google Maps - Internet Connection Required

1) Draw AOI

Start Over

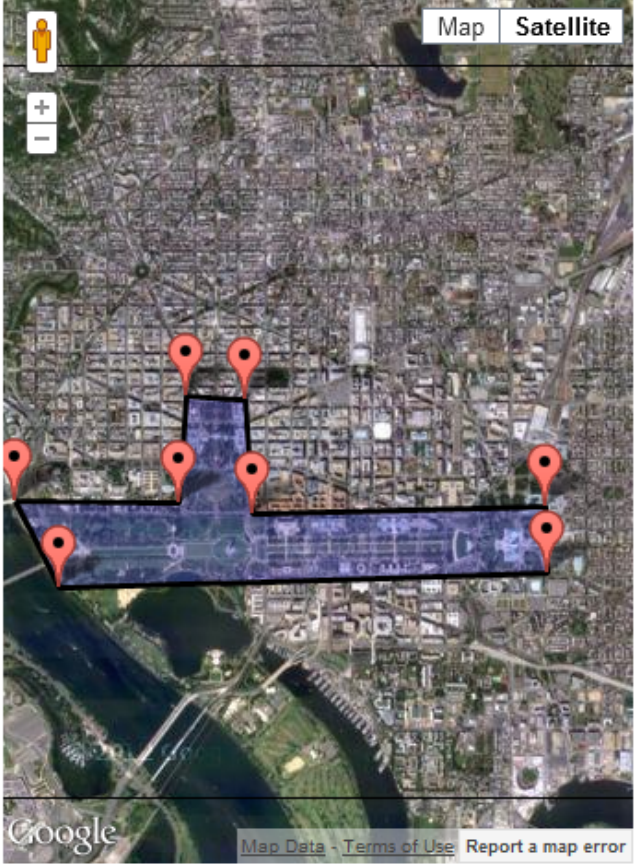
NLCD Footprint

Map

Satellite

+

-



Google

Map Data - Terms of Use Report a map error

Drag markers to move; Click markers to delete

38.88989

Area of polygon:

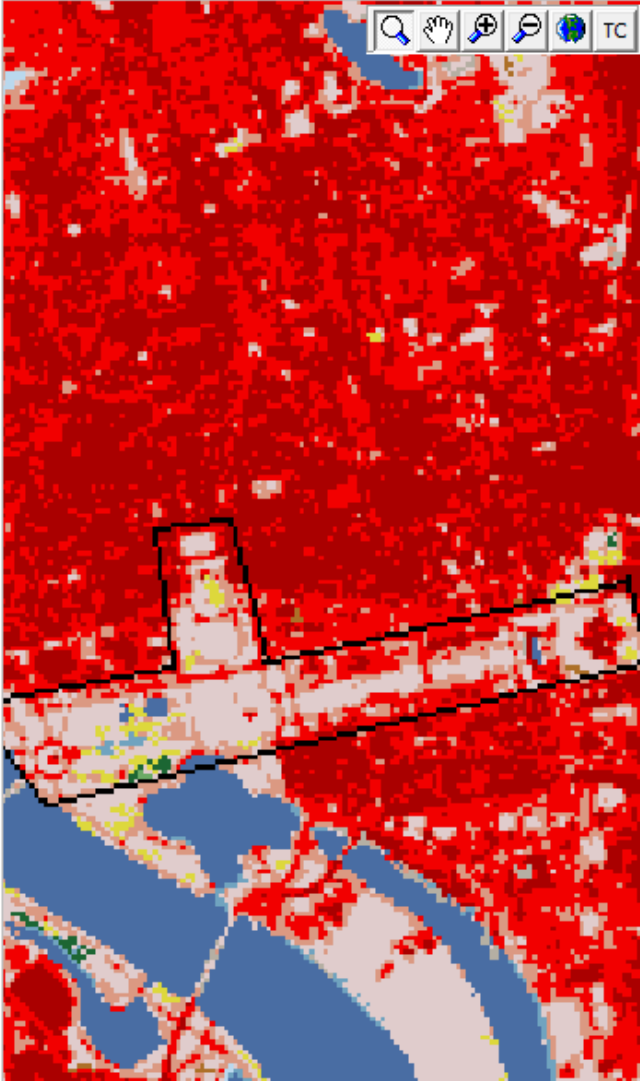
Click the RESET button at right to start completely over.

-77.02159

2.891 km² 1.116 mi²

NLCD Imagery - Land Cover

TC



2) Draw AOI on NLCD

3) AutoClip

4) TouchUp Eraser

5) Save

Reset

Help for this Form:

Use these tools to define an AOI (Area of Interest) to examine with i-Tree Vue.

Zoom/Pan the Google Maps to the AOI:

- Use + and - buttons to zoom.
- Click-and-drag the map to pan.

Verify that the downloaded NLCD imagery footprint sufficiently covers your AOI.

Draw a polygon for the AOI boundary right on to the Google Maps:

- 1) Use the "Draw AOI" tool and single-click around your AOI edges.
 - If you make a mistake:
 - Drag markers to move or
 - Click markers to delete.
 - Click "Start Over" to begin again.
 - While drawing, pan/zoom as needed.
- 2) Transfer your drawn AOI from Google Maps to NLCD Imagery by clicking the "Draw AOI on NLCD" button.
- 3) On the NLCD images, zoom/pan to the drawn AOI. Toggle through NLCD images with the "TC" tool. If acceptable, try the "Auto Clip" button.
- 4) Use the "Touch Up Eraser" tool to erase NLCD areas missed by Auto Clip.
- 5) You must click SAVE to create COPIES of clipped imagery for use in i-Tree Vue.

The "Reset" button clears the AOI from all images. If needed, redraw your AOI with an eye towards areas where you might need to use the Touch Up Eraser.

»OK launches i-Tree Vue.

»Cancel returns to Image Browsing.

Cancel

OK

NLCD images are made of 30 meter pixels; draw boundary lines well to the OUTSIDE of desired AOI to include edge pixels.

Use features on the Satellite/Hybrid View like roads, rivers, fence lines and where

The Reports

Carbon storage: estimates the total carbon (and carbon dioxide equivalents) stored in the total urban forest.

Carbon sequestration: estimates the annual carbon (and carbon dioxide equivalents) sequestered each year by the urban forest.

CO pollution removal: estimates the amount of carbon monoxide removed by the urban forest annually.

NO₂ pollution removal: estimates the amount of nitrogen dioxide removed by the urban forest annually.

O₃ pollution removal: estimates the amount of ozone (smog) removed by the urban forest annually.

SO₂ pollution removal: estimates the amount of sulfur dioxide removed by the urban forest annually.

PM₁₀ pollution removal: estimates the amount of small particulate matter removed by the urban forest annually.

Carbon Storage

Entire region.

*(Carbon Storage * Tree Canopy) note: all estimates are rounded*

Date: 5/21/2012 10:54:12 AM



+ Image Area

+ Impervious Cover

- Tree Canopy

185.3 acres

38.1 %

Carbon Storage: 7,523.2 short tons ; \$155,609.4 @ \$20.68 per short tons

CO2 Equivalent Storage: 27,580.2 short tons ; \$155,609.4 @ \$5.64 per short tons

+ NLCD Developed

+ NLCD Forest

+ NLCD Wetlands

+ NLCD Miscellaneous

+ NLCD Water

Carbon Sequestration

Entire region.

*(Carbon Sequestration * Tree Canopy) note: all estimates are rounded*

Date: 5/21/2012 10:53:23 AM



☒ Image Area

☒ Impervious Cover

☒ Tree Canopy

185.3 acres

38.1 %

Carbon Sequestration: 248.0 short tons per year ; \$5,130.0 @ \$20.68 per short tons per year

CO2 Equivalent Sequestration: 909.2 short tons per year ; \$5,130.0 @ \$5.64 per short tons per year

☒ NLCD Developed

☒ NLCD Forest

☒ NLCD Wetlands

☒ NLCD Miscellaneous

☒ NLCD Water

Available Green Space

Across the entire region.

(100 - %Existing Tree Canopy - %Impervious Cover) note: all estimates are rounded

Date: 5/21/2012 11:29:44 AM



+ Image Area

+ Impervious Cover

- Existing Tree Canopy

185.3 acres

38.1 %

Pollution Removal - SO2: 0.9 short tons per year ; \$1,915.5 @ \$2199.92 per short tons per year

- Available Green Space

186.6 acres

Difference: 1.3 acres

38.4 %

Pollution Removal - SO2: 0.9 short tons per year ; \$1,928.5 @ \$2199.92 per short tons per year

Difference: 0.0 short tons per year ; \$13

+ NLCD Developed

+ NLCD Forest

+ NLCD Wetlands

+ NLCD Miscellaneous

Tree Canopy Ecosystem Services Benefits

Executive Summary of Estimates

More than just beauty and shade, trees work for us all every day to clean the air we breathe.

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LAND COVER

	Area		Impervious		Tree Canopy	
	acres	%	acres	%	acres	%
Entire Area	691.6	100	281.7	40.7	87.0	12.6
+ Developed, All Classes	571.1	82.6	278.1	48.7	27.2	4.8
+ Forested, All Classes	63.8	9.2	1.9	3.0	45.8	71.8
+ Wetlands, All Classes	8.9	1.3	0.3	3.0	6.5	73.2
+ Agriculture, All Classes	23.4	3.4	0.7	3.0	2.7	11.5
+ Miscellaneous, All Classes	24.5	3.5	0.7	3.0	4.8	19.5
Water	0.0	0	n/a	n/a	n/a	n/a

CARBON DIOXIDE

	Annual Sequestration		Total Storage	
	carbon stored each year		total accumulated carbon	
	short tons	\$	short tons	\$
Entire Area	426.7	2,407.4	12,943.0	73,025.3
+ Developed, All Classes	133.4	752.6	4,046.0	22,828.0
+ Forested, All Classes	224.7	1,268.0	6,816.9	38,461.2
+ Wetlands, All Classes	31.9	180.2	968.7	5,465.6
+ Agriculture, All Classes	13.2	74.5	400.5	2,259.5
+ Miscellaneous, All Classes	23.4	132.2	710.9	4,011.0

AIR POLLUTION

	TOTAL		CO		NO2		O3		SO2		PM10	
	all pollutants		Carbon	Monoxide	Nitrogen	Dioxide	Ozone		Sulfur	Dioxide	Particulate	Matter 10 microns
	total pounds	total \$	pounds	\$	pounds	\$	pounds	\$	pounds	\$	pounds	\$
Entire Area	6,076.8	22,384.4	86.3	55.1	1,062.1	4,772.3	2,537.7	11,402.6	535.8	589.4	1,854.9	5,565.0
+ Developed, All Classes	1,899.7	6,997.4	27.0	17.2	332.0	1,491.8	793.3	3,564.5	167.5	184.3	579.9	1,739.6
+ Forested, All Classes	3,200.6	11,789.5	45.4	29.0	559.4	2,513.5	1,336.6	6,005.6	282.2	310.4	977.0	2,931.0
+ Wetlands, All Classes	454.8	1,675.3	6.5	4.1	79.5	357.2	189.9	853.4	40.1	44.1	138.8	416.5
+ Agriculture, All Classes	188.1	692.6	2.7	1.7	32.9	147.7	78.5	352.8	16.6	18.2	57.4	172.2
+ Miscellaneous, All Classes	333.7	1,229.5	4.7	3.0	58.3	262.1	139.4	626.3	29.4	32.4	101.9	305.7

Estimates generated with i-Tree Vue for Trees only. For more information, visit www.itreetools.org.

What is this good for?

- Serves as a foot in the door to evaluating the urban forest value
- Fills the need of groups that will never have the time money for the higher-end analyses
- Gets results on little to no budget, with or without GIS software.
- Does not replace the more accurate LiDAR analyses
- Can help justify a more expensive analysis if the benefit can be shown.

i-Tree software suite v 4.0 includes the following urban forest analysis tools and utility programs.

- **i-Tree Eco** provides a broad picture of the entire urban forest. It is designed to use field data from randomly located plots throughout a community along with local hourly air pollution and meteorological data to quantify urban forest structure, environmental effects, and value to communities.
- **i-Tree Streets** focuses on the ecosystem services and structure of a municipality's street tree population. It makes use of a sample or complete inventory to quantify and put a dollar value on the trees' annual environmental and aesthetic benefits, including energy conservation, air quality improvement, carbon dioxide reduction, stormwater control, and property value increases.
- **i-Tree Hydro (Beta)** is designed to model the effects of changes in urban tree cover and impervious surfaces on hourly stream flows and water quality at the watershed level.
- **i-Tree Species Selector** is a free-standing utility designed to help urban foresters select the most appropriate tree species based on environmental function and geographic area.

• **i-Tree Storm** helps you to assess widespread community damage in a simple, credible, and efficient manner immediately after a severe storm. It is adaptable to various community types and sizes and provides information on the time and funds needed to mitigate storm damage.

• **i-Tree Design (beta)** is a simple online tool that provides a platform for assessments of individual trees at the parcel level. This tool links to Google Maps and allows you to see how tree selection, tree size, and placement around your home effects energy use and other benefits. This beta tool is the first stage in development of more sophisticated options that will be available in future versions.

• **i-Tree Canopy** offers a quick and easy way to produce a statistically valid estimate of land cover types (e.g., tree cover) using aerial images available in Google Maps. The data can be used by urban forest managers to estimate tree canopy cover, set canopy goals, and track success; and to estimate inputs for use in i-Tree Hydro and elsewhere where land cover data are needed.

Canopy updates due this summer:

In Canopy, you create your own classification scheme for your area of study. Then, the program generates random points in that area for you to classify according to your system. Real-time statistics and error bars are generated, so if volunteers are doing the analyses, they can see the error bars get smaller as they classify more spots (incentive!).

Users will be able to draw in their own area if they don't have a shapefile.

Users will be able to save their classification schemas for re-use if they want to classify repeated areas like city council districts

Users can load a previously completed i-Tree Canopy survey, export it to KMZ, and then open GE side-by-side with their web browser, bring in the KMZ to GE, use GE's image date slider and go back to each survey point and assess what the canopy was on those older photos. See how the urban forest has or is changing.

Thanks to Mike Binkley at The Davey Institute.

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www.itreetools.org for the programs and the manuals.

