

AN EXCUSE TO HUG A TREE

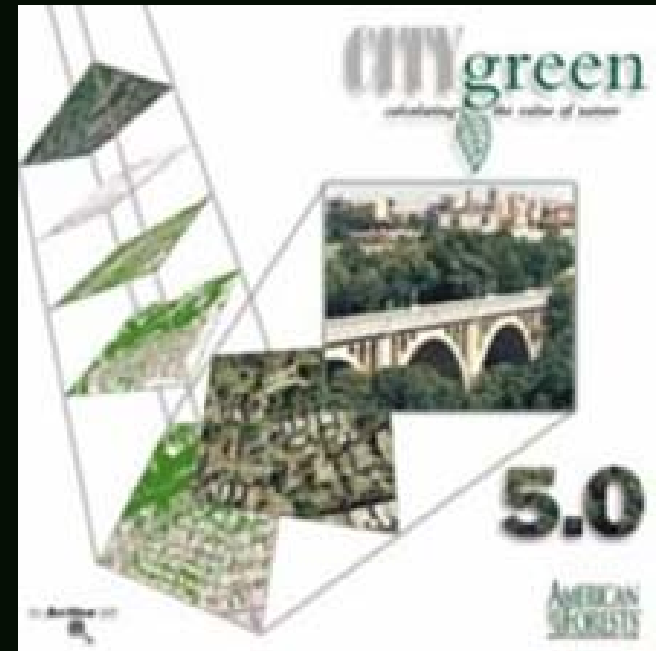
USING CITYGREEN WITH ESRI ARCVIEW

"Trees in the city do more than soothe, they keep the air cooler and cleaner, filter pollutants and slow stormwater runoff and build community. Support greener and cleaner cities." (American Forests website 2005)



The programme called CITYgreen

"CITYgreen is a powerful GIS application for land-use planning and policy-making. The software conducts complex statistical analyses of ecosystem services and creates easy-to-understand maps and reports. CITYgreen calculates dollar benefits based on specific site conditions. CITYgreen uses the most up-to-date scientific research to calculate the dollar value of trees and vegetation.

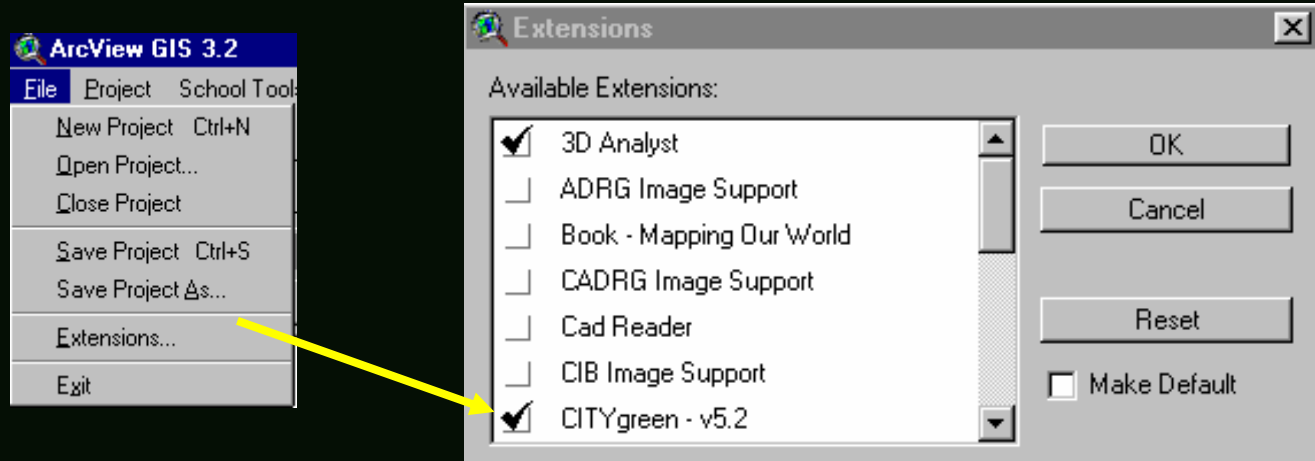


Premise of CITYgreen

In essence the CITYgreen programme has been developed on the premise that "growing our cities" doesn't have to mean building endless tar and cement infrastructure and removing the natural landscape.

"Based on the most up-to-date, peer-reviewed science, CITYgreen allows cities and conservation groups to calculate the economic and environmental benefits provided by trees and other vegetation and models the economic impact of various development and planning scenarios."

CITYgreen is an ESRI ArcView Extension



"CITYgreen has become a very effective way to teach math, science and geography. It also provides a real-world application to introduce GIS (Geographic Information Systems) in the classroom. With CITYgreen, students learn to value the trees in their environment through hands-on activities with the technology."

GIS SKILLS REQUIRED FOR CIYGREEN

If students have undertaken a GIS Skill Development Course they should have most of the GIS skills needed to undertake the programme. In fact CITYgreen is a wonderful summary activity for the students to reinforce the GIS skills they have learnt previously.

As a guide the programme requires students to demonstrate all of the following GIS skills:

- Data importing
- Registering and manipulating images
- Data acquisition
- Theme development and attribute table manipulation
- Data entry
- Digitizing themes
- Thematic maps
- Query processes
- Projection configuration and data configuration.
- Use of Arcpad and GPS
- Hotlinking of Script and images
- Layout

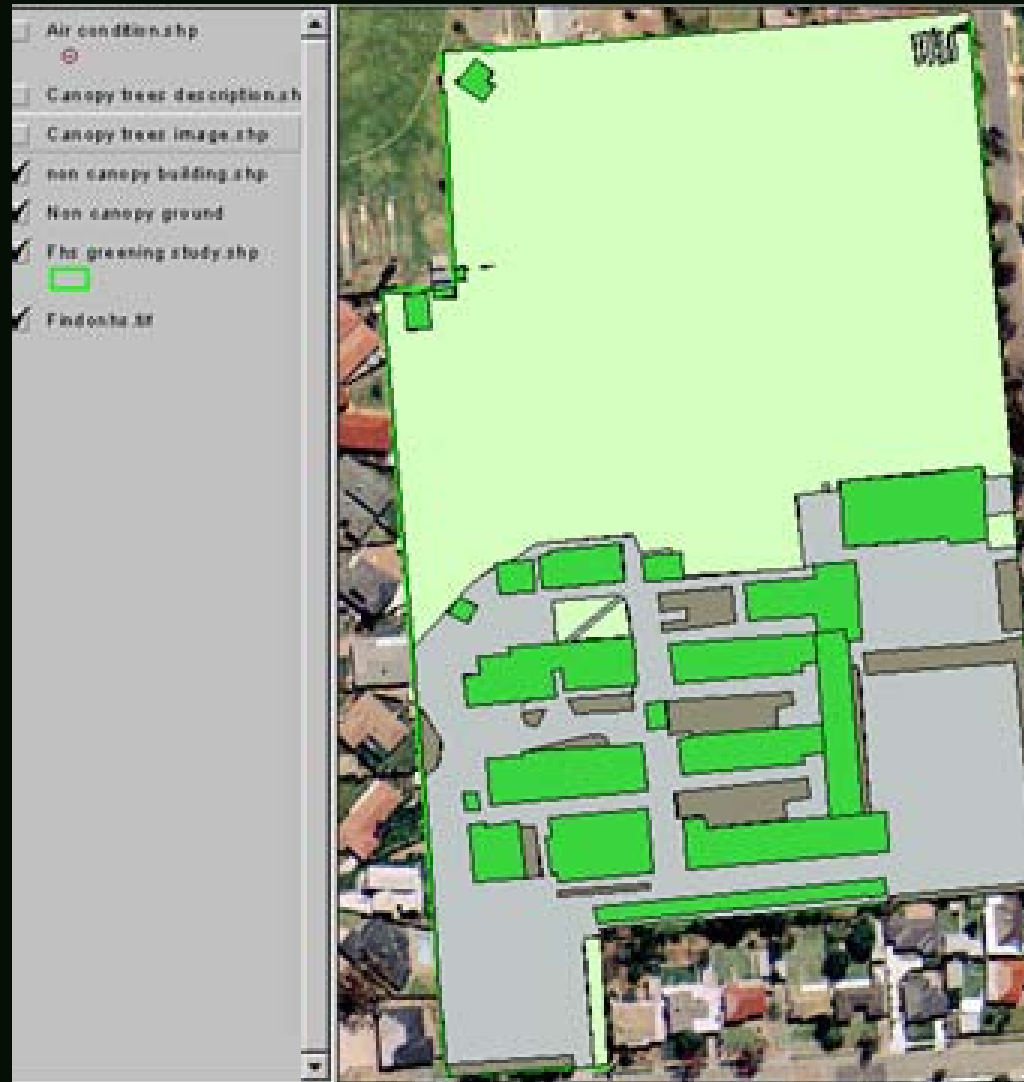


THE FINAL PRODUCT: A SAMPLE

PROJECT



STAGE 1: DIGITISING THE THEMES



STAGE 3

PLOTTING THE TREES AND ENTERING THE DATA

The screenshot displays a GIS application window titled 'View1'. On the left, a layer list shows several files, with 'Canopy trees description.shp' selected and checked. The main map area shows an aerial view of a residential area with green overlays representing buildings and trees. A yellow cursor is positioned over one of the trees. Below the map, a data table titled 'Attributes of Canopy trees description.shp' is visible, containing the following data:

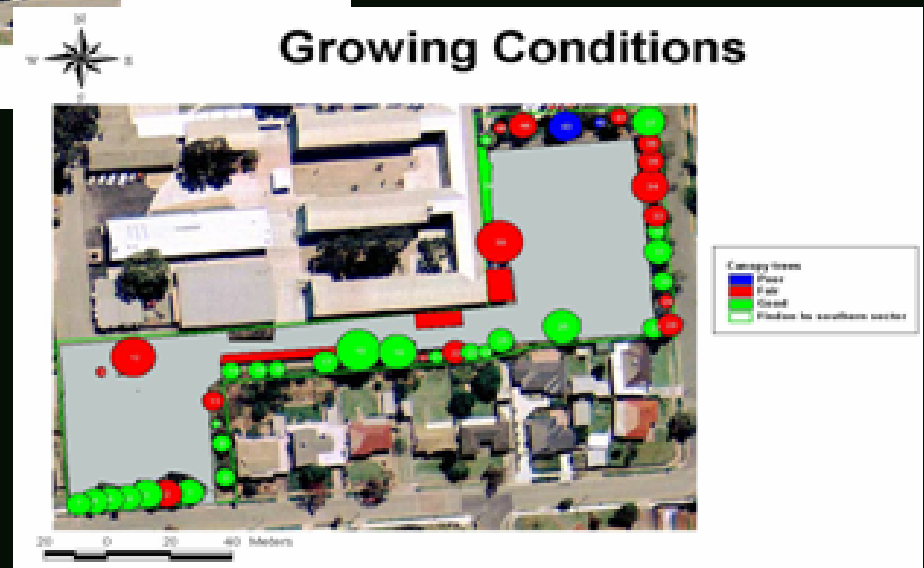
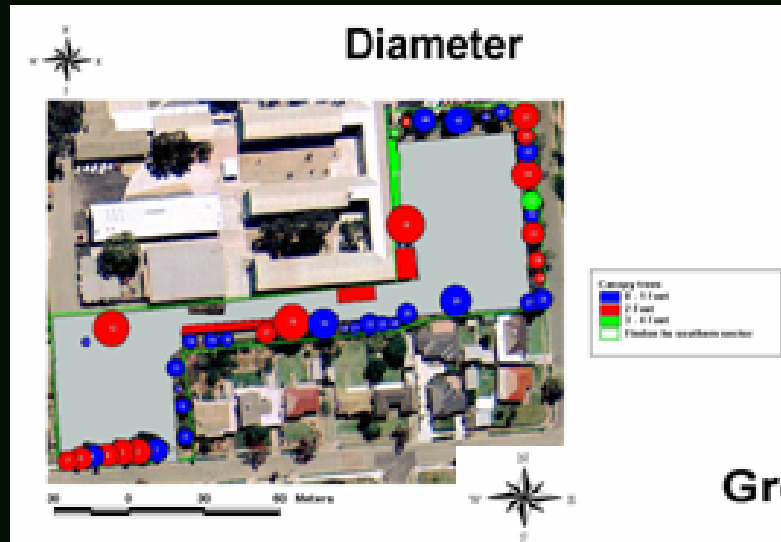
CG ID	Common	Diameter	Ht Class	Health	Grow Cond	Canopy and emerg impact	Leaf type	Tree condition
1	Gum Tree	2	1	2	1	22	4	2
2	Gum Tree	2	2	2	2	22	2	2
3	Gum Tree	2	3	4	2	3	4	2
4	Gum Tree	1	2	4	3	31	3	2
5	Gum Tree	2	2	2	3	7	3	2

STAGE 4

HOTLINKING IMAGES AND DESCRIPTION



STAGE 5: CREATING THEMATIC MAPS FROM DATA



STAGE 6: PERFORMING THE CITYgreen ANALYSIS

The screenshot shows the ArcView GIS interface with the CITYgreen Analysis tool. The 'Report Summary' window is open, displaying the following data for the analysis area 'Findon High School':

Analysis Area	Findon High School	
Total Area:		
0.02	sq. miles	
5.62	sq. km. (hectares)	
13.00	acres	
Landcover Composition:		
04.93% of Findon High School	00.68 acres	- Trees
04.04% of Findon High School	00.56 acres	- Trees: Grass/P
00.21% of Findon High School	00.03 acres	- Impervious Su
02.26% of Findon High School	00.31 acres	- Impervious Su
12.07% of Findon High School	01.68 acres	- Impervious Su
28.24% of Findon High School	03.92 acres	- Impervious Su
05.24% of Findon High School	00.73 acres	- Impervious Su
53.33% of Findon High School	07.40 acres	- Open Space
00.45% of Findon High School	00.06 acres	- Open Space
Ecological Services:		
Carbon Removal Benefits:		
- Age Distribution:	Young	
- Storage Capacity (tons):	40.17	
- Sequestration Rate (tons/year):	0.91	

The interface also shows the 'Study Area' set to 'Findon greening study.shp', 'Use all records' selected, and 'Non canopy ground' selected in the 'View Themes' list. The 'Analysis' section has 'Carbon Storage and Sequestration', 'Air Quality', and 'Stormwater Runoff' checked, with 'Energy' unchecked. The 'Air condition.shp' is selected in the 'Air condition' dropdown.

CITYgreen ANALYSIS

What is the environmental and economic impact of the trees in the study area?

- After the surfaces and trees are digitized, the collected data entered and analysis criteria selected, the CityGreen programme conducts an environmental and economic analysis of the study area.
- For the sample study area, the CityGreen programme provided the following carbon removal and pollutant removal analysis:

Carbon Removal Benefits:

- Age Distribution: Young
- Storage Capacity (tons): 18.33
- Sequestration Rate (tons/year): 0.41

Air Pollution Removal Benefits:

- Air-Quality Reference City: Austin
- Contaminant: Lbs/Year: Dollar Value:
 - - Ozone (O₃), 24.44, \$75.02
 - - Sulphur dioxide (SO₂), 7.44, \$5.60
 - - Nitrogen dioxide (NO₂), 9.73, \$29.87
 - - Removal of particulate matter 10 microns or less (PM₁₀), 15.36, \$31.48
 - - Carbon monoxide (CO), 3.16, \$1.37
- Totals, 60.14 lbs., \$143.34

Stormwater runoff benefits

- if there were no trees the cost to the school to build stormwater mitigation facilities would be \$5,112 if calculated at a building cost of \$10/cu ft.

MORE INFORMATION ON CITYgreen

Available from the American Forests website for US\$200

<http://www.americanforests.org/productsandpubs/citygreen/citygreen5.php>



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LAUNCHING A NEW RESOURCE

GIS IN THE FIELD

CONTENT

- Introduction to using GIS in the classroom.
- The basics of ESRI ArcView GIS.
- Getting started with ArcView GIS.
- Skate park location.
- Pest plant location.
- Bushfire application
- Real Estate application.
- Streetscape application.
- Wasp nest application.
- Environmental management: revegetation.
- Conclusion: Where to next.

