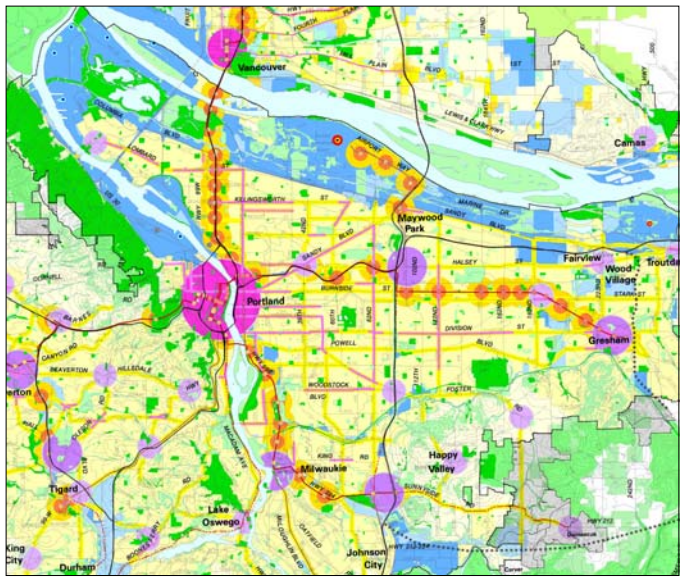
UCGIS/SPACE/SFSU
Summer workshop 2005 – lectures and labs



Richard LeGates

UCGIS Summer Assembly
Vancouver, Wa. 2006

Topics

- Our workshop and the UCGIS Body of Knowledge 2006
- Lab exercises
- Substantive subject matter
- Data sources
- Examples

UCGIS Body of Knowledge 2006
Knowledge Areas

Introduced in our workshop

Analytic method
Conceptual foundations
Cartography and visualization
Design aspects
Data modeling
Data manipulation
Geospatial data

Not introduced

Geocomputation
GI S&T and Society
Organizational and institutional aspects

…But only six days.

SFSU/UCGIS/SPACE Workshop
Lecture/lab topics

- Introduction to ArcGIS operations (lab only)
- Spatial data and its modeling
- Introduction to Vector GIS
- Map symbology
- Introduction to raster GIS
- Vector-based spatial analysis
- Spatial census data

Approach

- Applied topics chosen for interest to students
- Emphasis on fundamental concepts
- Reciprocal relationship between lectures and labs

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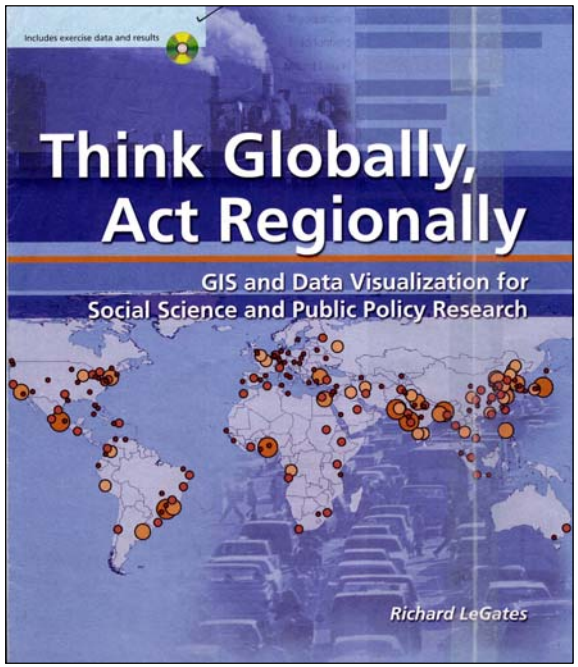
Labs

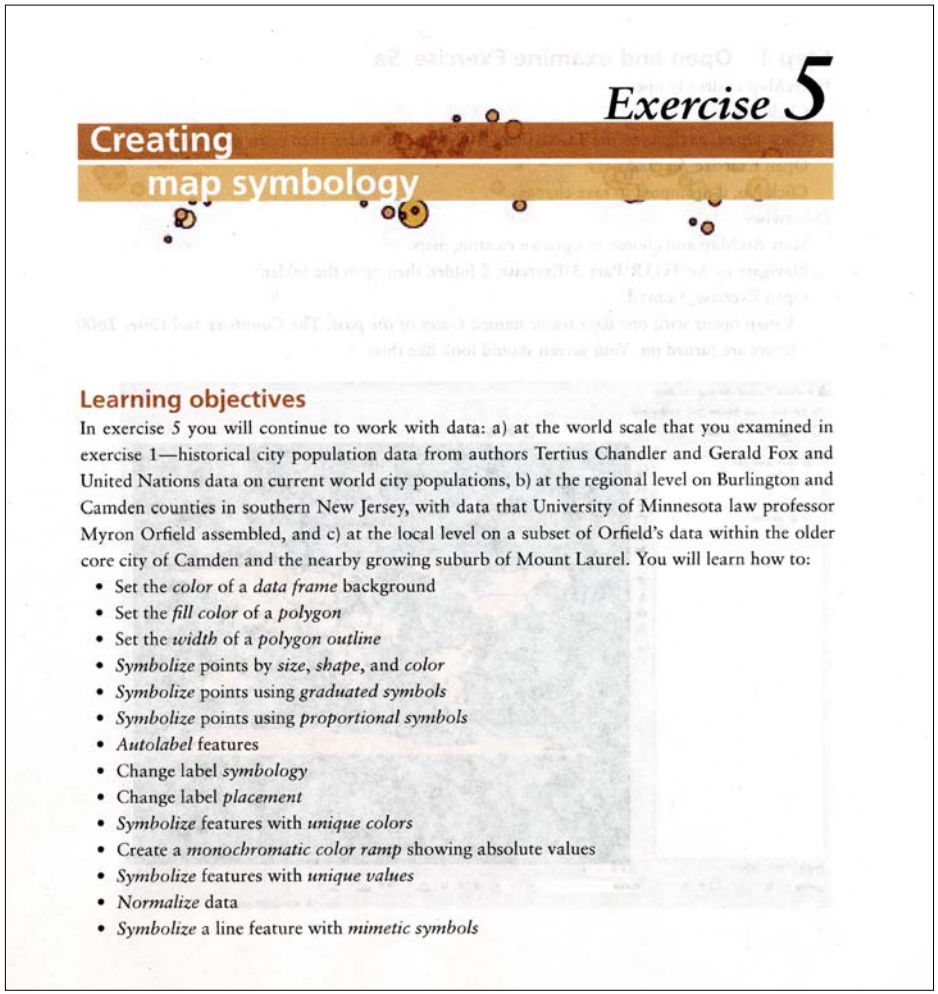
Six of the labs were based on materials in *Think Globally, Act Regionally (ESRI Press, 2005).* These were supplemented by a vector spatial analysis lab and a census lab.



Exercises

Each exercise had

…learning objectives



Exercise 5

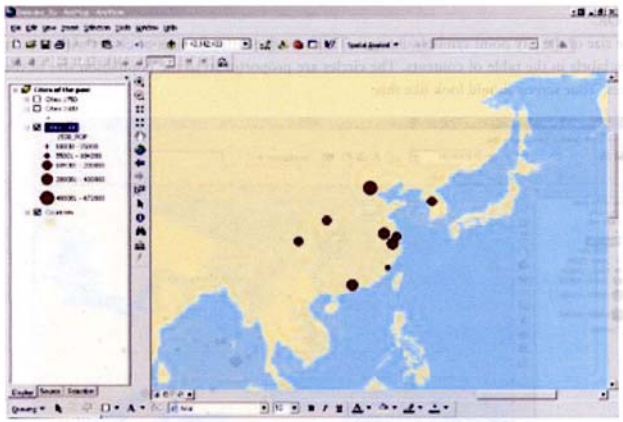
Creating map symbology

Learning objectives

In exercise 5 you will continue to work with data: a) at the world scale that you examined in exercise 1—historical city population data from authors Tertius Chandler and Gerald Fox and United Nations data on current world city populations, b) at the regional level on Burlington and Camden counties in southern New Jersey, with data that University of Minnesota law professor Myron Orfield assembled, and c) at the local level on a subset of Orfield's data within the older core city of Camden and the nearby growing suburb of Mount Laurel. You will learn how to:

- Set the *color* of a *data frame* background
- Set the *fill color* of a *polygon*
- Set the *width* of a *polygon outline*
- *Symbolize* points by *size*, *shape*, and *color*
- *Symbolize* points using *graduated symbols*
- *Symbolize* points using *proportional symbols*
- *Autolabel* features
- Change label *symbology*
- Change label *placement*
- *Symbolize* features with *unique colors*
- Create a *monochromatic color ramp* showing absolute values
- *Symbolize* features with *unique values*
- *Normalize* data
- *Symbolize* a line feature with *mimetic symbols*

…Step-by-step instructions to teach GIS operations



Question 3: How does the population of Paris in 1500 (the largest city in Europe at that time) compare to the population of large cities in China: Peking (Beijing), Hangchow, Nanking, and Canton? Refer to the attribute table to find the populations of these cities.

Step 8 Autolabel the cities

Click the ***View*** pull-down menu.
Click ***Bookmarks***.
Click the ***England*** bookmark.
The map zooms in on England. Only London, England and Edinburgh, Scotland had populations of 18,000 or greater in 1500.
Turn off *Cities 1500* and collapse its legend.
Turn on *Cities 1750*.
Right-click ***Cities 1750***.
Click ***Label Features***.
The names of the cities appear. In autolabeling, the city reads the text from a field in the attribute table. One of the fields is the city's name. ArcMap assigns the name to the point.
Right-click the **Cities 1750** layer and uncheck *Label Features*.
The labels disappear. *Label Features* is a toggle.
Turn the labels back on.
These labels are helpful, but the font is a little small and there are some placement problems.

…and a "Your Turn" section

Your Turn

1. If you are continuing from Exercise_5, navigate to the **TGAR\Part_3\Exercise_5\YourTurn** folder, open it, and open the *YourTurn_5.mxd* file. Click ***No*** when prompted "Save changes to Exercise_5c?"

   Otherwise open ArcMap and navigate to the **TGAR\Part_3\Exercise_5\YourTurn** folder, open it, and open the *YourTurn_5.mxd* file.
2. A map opens showing Burlington and Camden counties with poor symbology and background. You will improve the map symbology.
3. Change the data frame background to white.
4. Click the *Camden County* ***symbol*** and change the symbol *Outline Width* to .40, and *Outline Color* to Gray 60%.
5. Open the *Burlington County* layer properties. Change the symbology to *Features* with a *Single symbol*. Then make the *Fill Color* Sugilite Sky (top row).
6. Turn on the ***Schools*** layer;
7. Change the point symbol color to Mars Red and size to 4 points.
8. Change the *Schools* layer to *Graduated symbol* using the **NAM00** (number of non-Asian minority students in 2000) field. Use the *Identify* tool to identify the community in Burlington County with the highest concentration of non-Asian minority students in schools.

   Question 1: Are non-Asian American students clustered in certain areas of Burlington County? What community in Burlington County had many non-Asian minority students in its schools in 2000?

9. Use the *Camden City* bookmark to zoom into that area.
10. Turn on the labels for *Schools*.
11. Change the labels for *Schools* so the font size is 7 points. Remove the *bold* font weight. Change the label placement to *Prefer Bottom Left, all allowed*. Click the ***Conflict Detection*** tab and change the *Feature Weight* to *High* and add a *Buffer* of .50.
12. Create a *dot density* map based on crimes per 10,000 people (crimeper10) using the *Burlington County* layer and the field **CRIMEPER10**. Make the *Dot Size* 2 and *Dot Value* 100.
13. Repeat the process for *Camden County*.

    Question 2: Are crimes per 10,000 people more densely concentrated in some areas than others?

14. Turn on the *Census blocks* layer showing absolute population data.

    Question 3: Do census blocks with larger populations appear to have more crimes? Does this indicate that you are more likely to be a crime victim if you live in a census block with a large population? What would help you understand if that were true?

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Application areas

- Managing urban growth
  - World urbanization
  - Sprawl and density
  - Traffic congestion
- Balancing the built and natural environment
  - Protecting prime farmland
  - Preserving habitat for endangered species
  - Reducing ozone emissions
- Promoting spatial equity
  - Reducing income, fiscal, and racial inequality

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Data sources

- Provided to workshop participants | TGAR data on CD
- Real world data
- Mixture of public domain and data authorized by copyright holders
- Selected and simplified
- Illustrative sources:
    - Metro (Portland)'s Regional Land Information System data
    - California Air Resources Board ozone emission data
    - Myron Orfield's Metropolitics data
    - UCSB California Gap Analysis data

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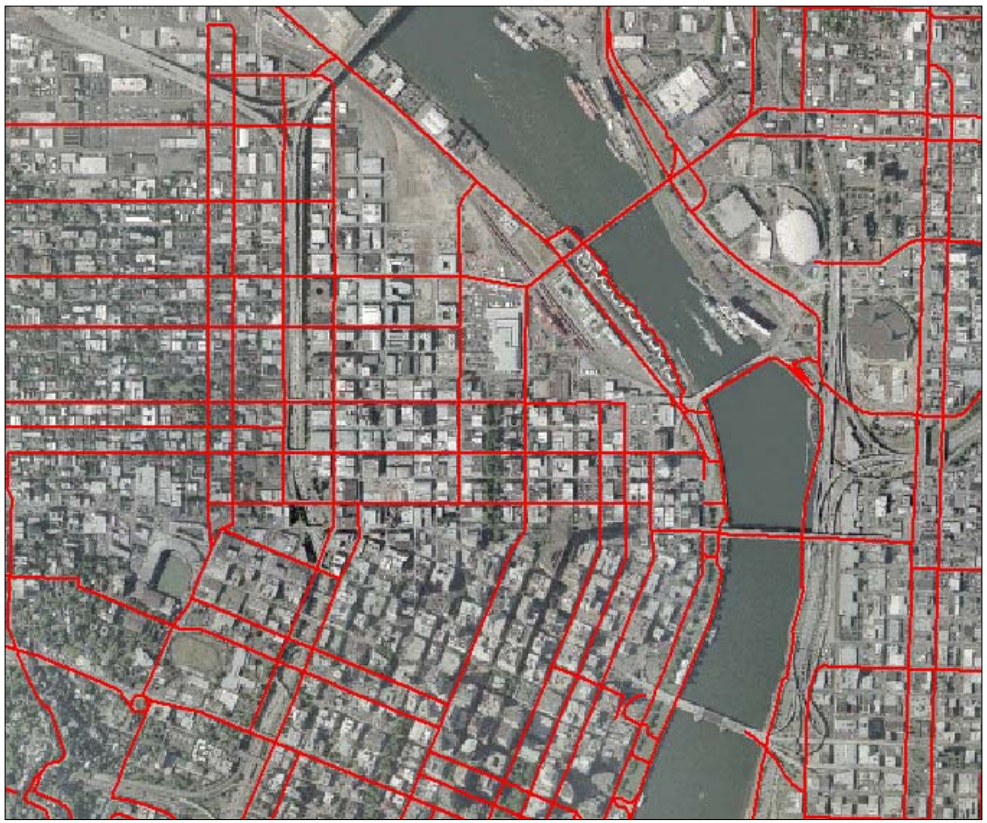
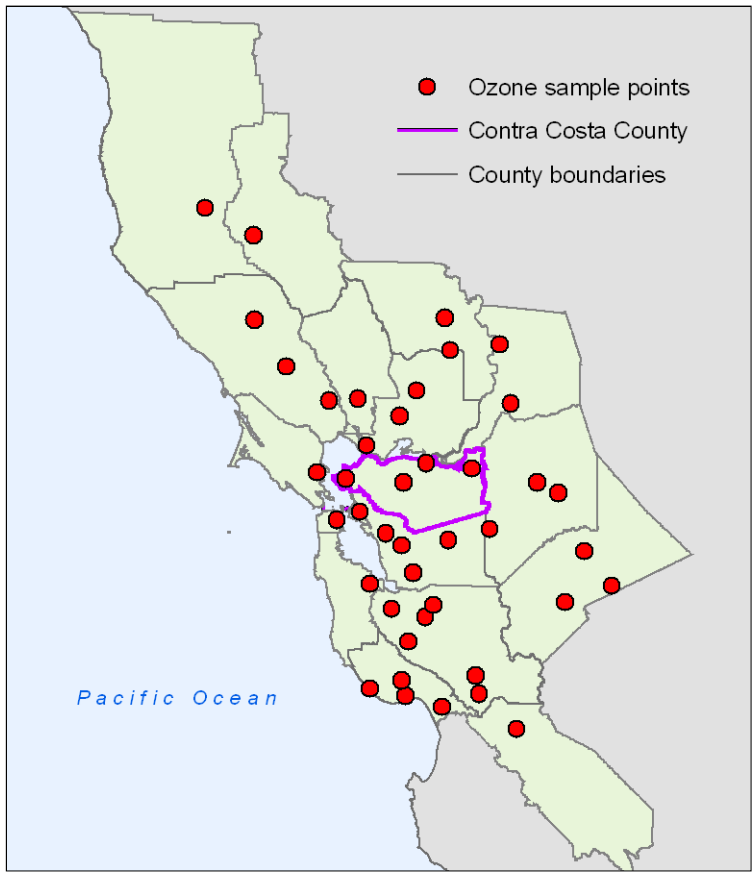
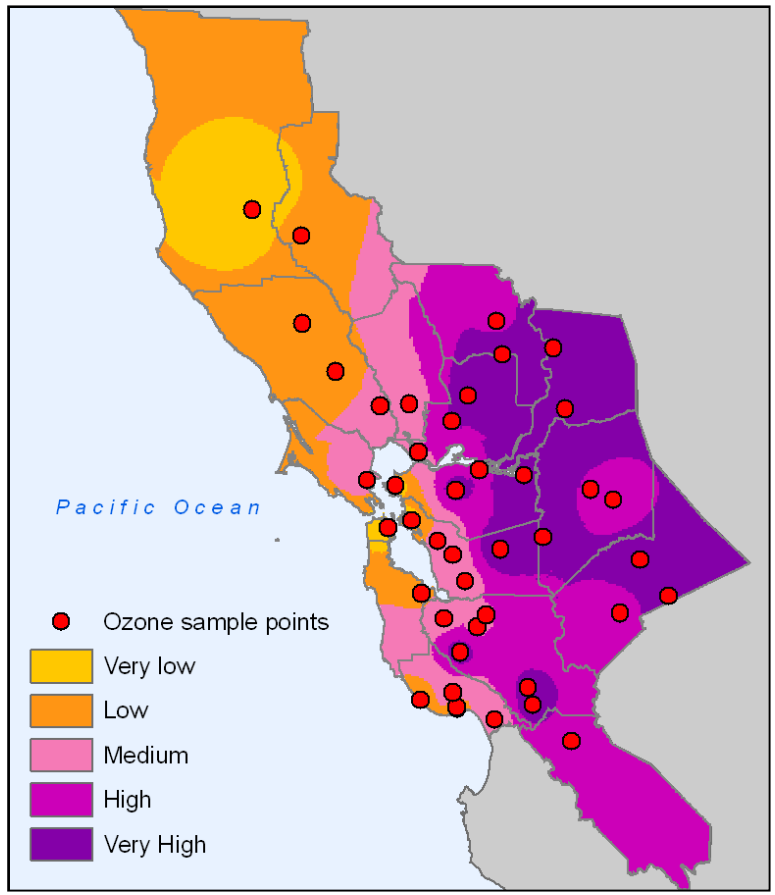
Using Metro data (Portland) to introduce the vector GIS model



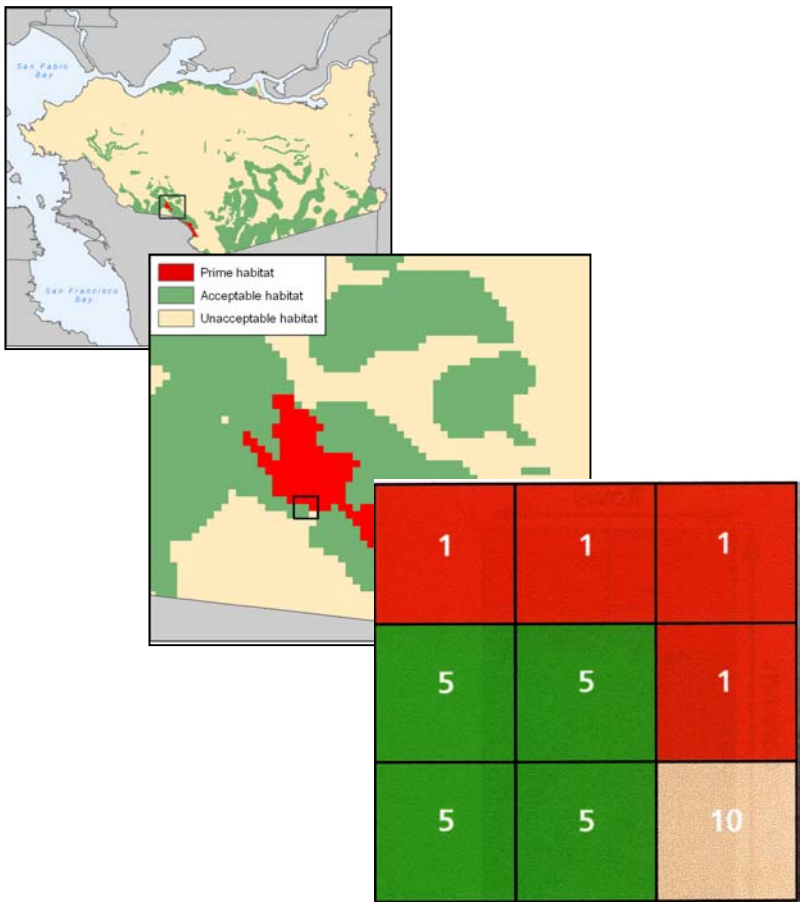
Using California Air Resources Board data to introduce spatial data and its modeling

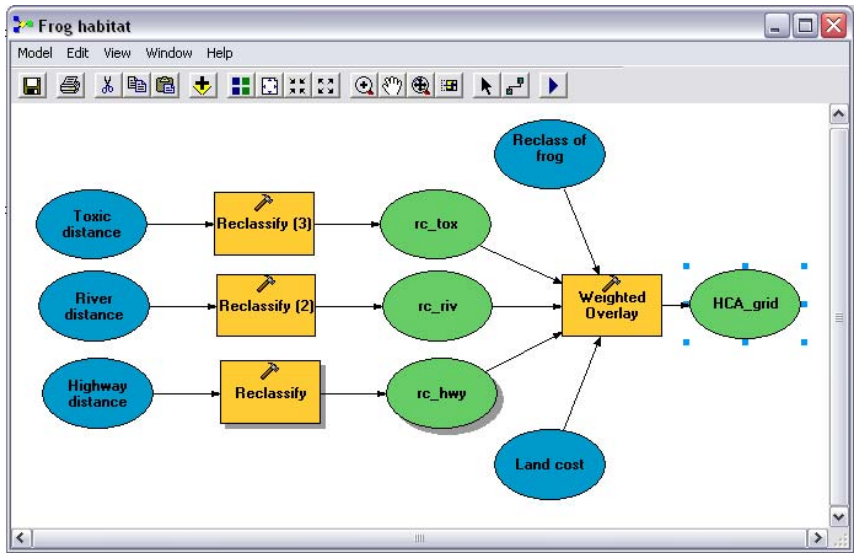


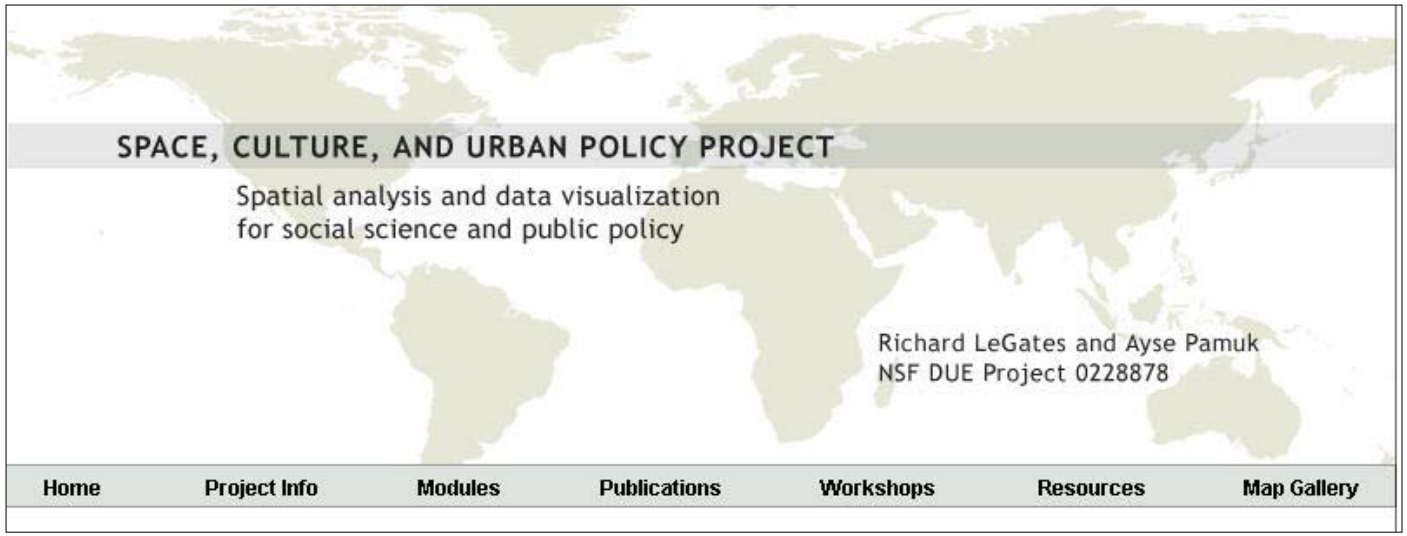


Using Myron Orfield's metropolitics data to teach cartography and visualization

Using CalGAP data to Introduce raster GIS





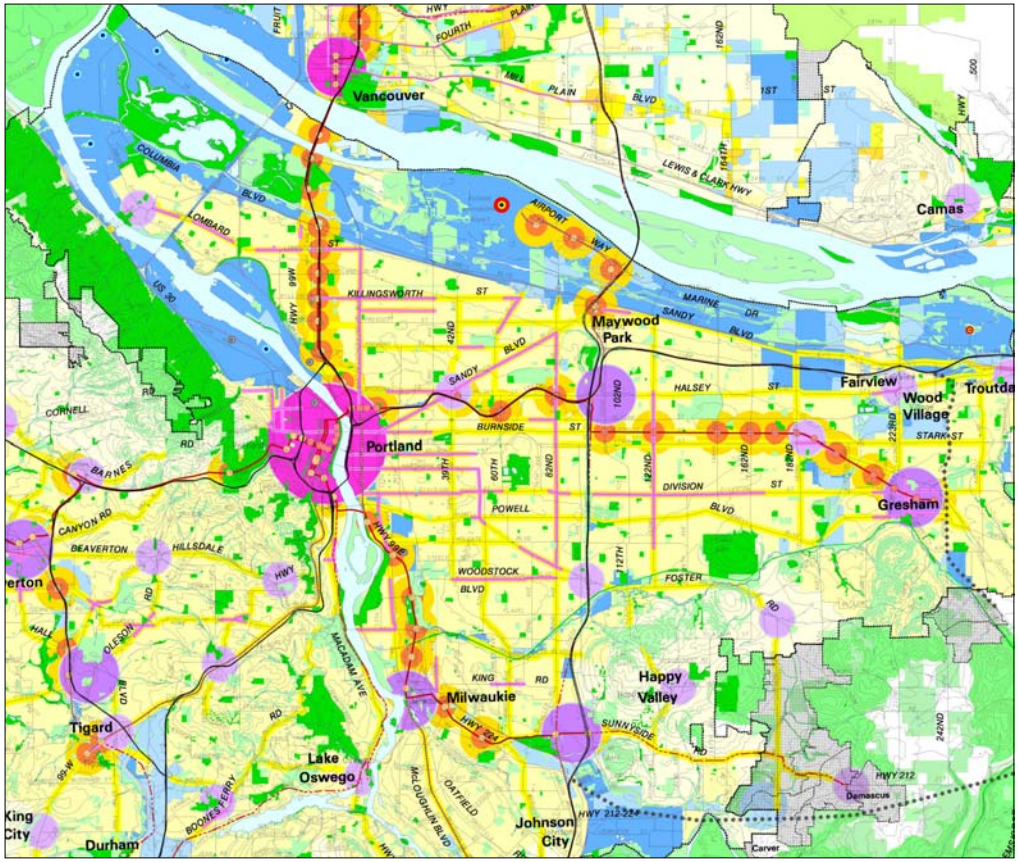


For more information the NSF Project from which core exercises came visit:
http://bss.sfsu.edu/nsfgis/index.htm

For more information on the SFSU Institute on Geographic Information Science visit:
http://gis.sfsu.edu/

For more information on *Think Globally, Act Regionally* visit:
http://bss.sfsu.edu/nsfgis/methods.htm

Thank you



….and GIS & T can change the world