

Trade Area Analysis and Site Selection without Customer Data: Part 1

Recommending a first store using spatial analysis of potential sites

—by Fred L. Miller

Introduction

Problem

Janice Brown and Steven Bent plan to open a new home center in the Minneapolis-St. Paul area. The center, called *Living in the Green Lane*,¹ will offer a variety of environmentally friendly building products, home improvement products, and construction technologies. They have identified their target market as "green consumers," some of whom are motivated by environmental concerns and some of whom are seeking savings in energy costs resulting from green technologies (Schaefer 2007). As these customers generally have higher levels of income, education, and home value than the general population in the United States (Kannan 2007), these factors have been chosen to evaluate the market area and specific sites.

As *Living in the Green Lane's* business geographic information system (GIS) analyst, you are working with Janice and Steven to complete the firm's business plan. This process is nearing completion. The business model is clearly defined, the target customers identified, and their distinctive characteristics profiled. In the environmental scanning process, you have identified concentrations of target customers in the Twin Cities area as well as attractive potential locations within it. You also examined *Living in the Green Lane's* competitive environment by exploring the distribution of shopping centers and competitive home centers relative to the Minneapolis-St. Paul transportation infrastructure.

You will now turn your attention to the final element in the business plan, the selection of a specific location for the company's first store. Janice and Steven are seeking an existing, freestanding retail

¹ The organizations and people in this SpatialLAB are fictional. Any resemblance to actual individuals or organizations is coincidental.

facility of 40,000 to 60,000 square feet. This is a relatively compact size for a home center, but Janice and Steven believe that a smaller store size is consistent with their environmental vision and would serve a smaller but more attractive market area.

Janice and Steven also require ample display and warehousing capabilities and substantial space for parking and outdoor demonstrations. Specifically, they wish to have four or five parking spaces per 1,000 square feet of retail floor space. They plan to convert the facility to a green building with green parking. This would illustrate the benefits of their business concept and create a comparatively modest footprint for a retail site, improving opportunities for replicating the facility in other neighborhoods. These criteria will guide your selection.

Your objective, then, is to recommend a site for the first store and design map documents that support your conclusions and recommendations.

Location

Minneapolis-St. Paul core-based statistical area

Time to complete the lab

Four to six hours

Prerequisites

An understanding of the importance of trade area analysis and site selection in retail management

Access to Esri Business Analyst™ Desktop Premium 10

Data used in this lab

- Demographic and consumer spending data at various levels of geography
- Major highways and streets
- Business listings
- Shopping center listings

Student activity

Your task in *Trade Area Analysis and Site Selection without Customer Data: Part 1* and *Part 2* is to identify the most favorable location for the first store from a list of available properties supplied by a commercial real estate agency. You must match these sites to the criteria established by Janice and Steven and seek the site with the best location for serving targeted customers and competing successfully. You will use the market area creation and reporting functions of business GIS software to accomplish this task in six steps. The first three steps are covered in part 1 and the last three in part 2:

1. Add the list of available properties to your project and geocode the locations to display them on a map. You will then examine the attributes of each location and identify the ones that meet Janice's and Steven's selection criteria.
2. Use customer prospecting and market area functions to compare the locations of available properties with concentrations of attractive customers and analyze the competitive environment of the area.
3. Create equal probability trade areas around competing home centers and create Market Locator Reports for each available potential site to explore the competitive environment of each.
4. Create drive-time polygon trade areas around each available property and create a set of reports for each. You will select reports relevant to the enterprise's target customer profile, as well as consumer expenditure and Tapestry™ Segmentation lifestyle segmentation patterns in the market area of each qualified location.
5. Use the maps and reports you have created to select the site for the first store offering the most attractive combination of proximity to targeted customers within a favorable competitive environment.
6. Use GIS layout capabilities to design map documents for the business plan report that will support your conclusions and recommendations.

At the conclusion of this lab, you may be required to submit written answers to the questions in this exercise or prepare a written project that covers the site selection decision process in *Trade Area Analysis and Site Selection without Customer Data: Part 1* and *Part 2*.

Conventions used in the data

CBSA Core-based statistical area

CY Current-year data

FY Future-year projections, which are five years beyond the current year

HH Household

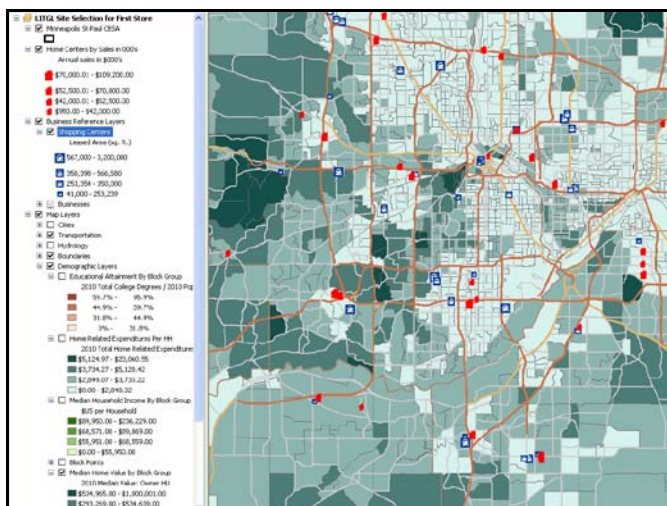
Prepare your workspace

This lab uses the Business Analyst™ Desktop Premium 10 software to perform the analysis. To prepare for it, you should confirm that this software is available on your workstation.

GEOCODE AVAILABLE PROPERTIES LOCATIONS

The process of site selection begins with geocoding the addresses of available qualified properties and locating them on a map.


- 1 If you have not already done so, copy the *LITGL Minneapolis St Paul* project folder to the *C:\My Output Data\Projects* folder on your hard drive.
- 2 Click *Start » Programs » ArcGIS » Business Analyst » BusinessAnalyst.mxd* to run ArcMap, load *Business Analyst Extension*, and then load *Business Analyst Message Center*.
- 3 Click *LITGL Minneapolis St Paul* under *Recent Projects* to select this project and load the default map.
- 4 Click *File* and then *Open*. Navigate to *C:\My Output Data\Projects\LITGL Minneapolis St Paul\CustomData\ChapterFiles\Chapter4\LITGLFirstStore.mxd*.
- 5 Click the map file to open it.



- 6 Click the *List by Source* button  at the top of the *table of contents*.

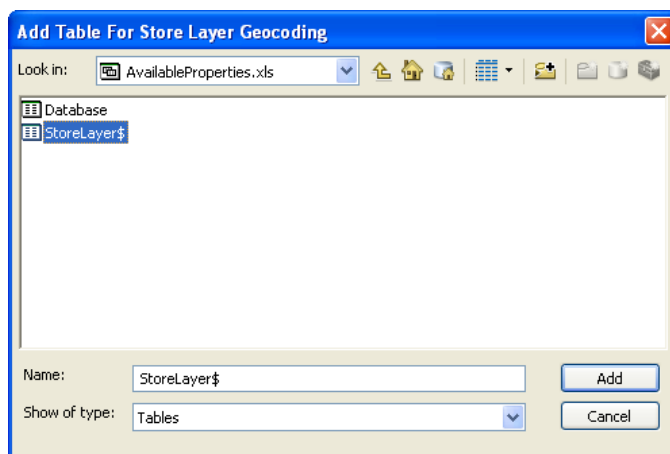
In the *Source* view, the layers are organized by their source files and locations. Note that three of the thematic layers are based on *BGIncEdOwnExp.shp*, a shapefile customized for this

organization and the Twin Cities market area. The fourth, *Median Home Value*, is based on the standard block group dataset. Turn layers on and off to familiarize yourself with the maps. When you are done, turn off the *Home Centers by Sales Volume* and *Shopping Centers* layers.

- 7 Click the *List by Drawing Order* button  at the top of the *table of contents* to return to the original view.

The thematic maps you have created provide the backdrop for the trade area and site selection analysis you will perform in this SpatiaLAB. A commercial real estate agent has provided you with a list of available retail properties in Microsoft Excel format. To integrate them into the project, you will geocode them and adjust their symbolization to reflect Janice's and Steven's site preferences.

- 8 Click the drop-down arrow on the main toolbar and click *Store Setup* to initiate the *Store Setup* wizard.
- 9 In the first window, select *Create New Store* layer and click *Next*. In the resultant window, select *Tabular data* and click *Next*.
- 10 In the resultant window, select *In a file on my computer* and click *Next*.
- 11 Click the *Open File* icon and navigate to *C:\My Output Data\Projects\LITGL Minneapolis St Paul\CustomData\ChapterFiles\Chapter4\AvailableProperties.xls*.
- 12 Double-click this file to view its contents, select the *StoreLayer\$* table, and click *Add*. Click *Next*.



- 13 Click *Next* to view the *Input Fields* window. Review the settings and accept the default values (*Address*, *City*, *State*, and *ZIP*) by clicking *Next*.
- 14 In the resultant window, accept the default *Name* and *ID* field settings by clicking *Next*.

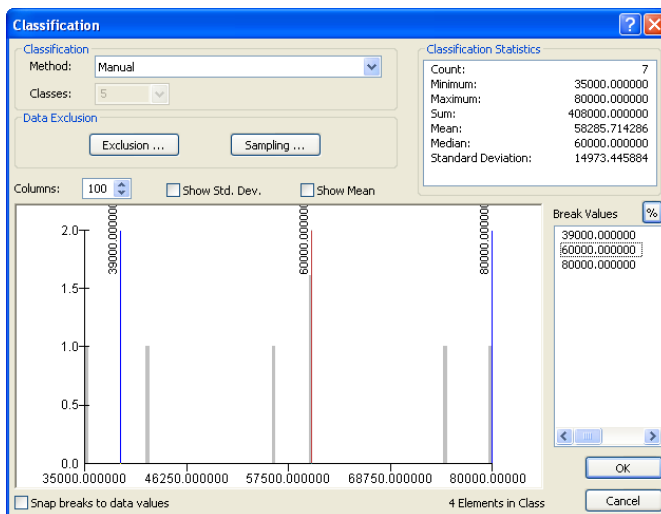
15 In the final window, enter **Available Properties** in the name field. Click *Finish*.

The software geocodes the store addresses in the table, displays them on the map, and adds a layer to the *table of contents* that uses a single symbol to depict the stores.

SYMBOLIZE LOCATIONS BY SIZE

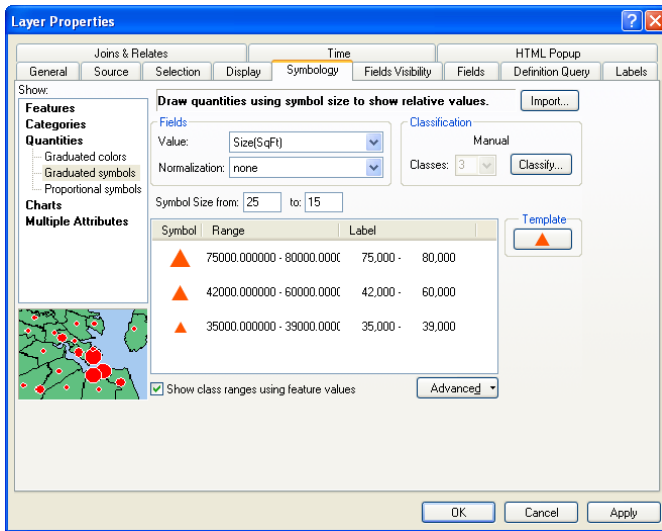
As some of the locations fall outside the ideal size range selected by Janice and Steven, you may wish to symbolize them by size relative to that range. To do so, use the *Symbolize* tab of the *Layer Properties* window.

- 1 Open the *Layer Properties* window for the *Available Properties* layer. Click the *Symbology* tab. Select *Quantities* and then *Graduated* symbols in the *Show* field. Select *Size(SqFt)* in the *Fields Value* field box and none in the *Normalization* box.
- 2 Click *Classify*, select 3 in the *Classes* drop-down box, and select *Manual* in the *Method* drop-down box. Enter **39,000**, **60,000**, and **80,000** as break values. Click *OK*.



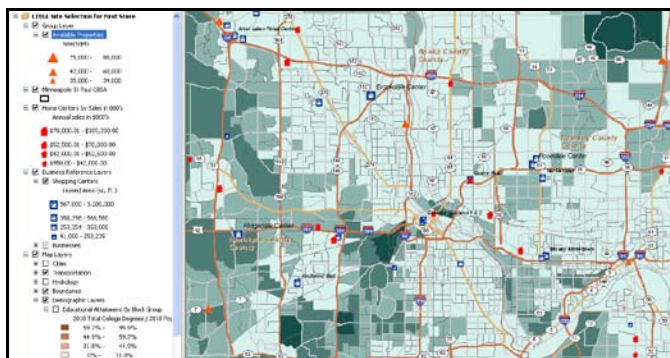
- 3 Click the *Template* button and select *Fire Red* triangles as the symbol.
- 4 Set **25** to **15** as the *Symbol size* range.
- 5 Format the labels to display numbers with no decimals and with thousands separators. If necessary, click *Symbols* and then *Flip Symbols* to move the largest symbol to the top of the legend. If necessary, click *Range*, *Reverse Sorting* to display the highest values at the top of the legend.
- 6 Select the *Show class ranges using feature values* option.

The *Symbology* window should resemble the one below:



7 Click *OK*.

The map and *table of contents* are displayed with these settings. Your map should resemble the one below, though the thematic layer displayed might differ. The available sites are displayed in three size classes. The middle class includes sites within the desired size range, while the upper and lower classes include sites that fall below or exceed that range. These sites will not be eliminated from further consideration, but their size variance will affect the final decision.



8 To preserve your work, save your map file as *LITGLFirstStore2.mxd* to *C:\My Output Data\Projects\LITGL Minneapolis St Paul\CustomData\ChapterFiles\Chapter4*.

Question 1: *How are these sites situated relative to major highways? Are there any sites above or below Janice and Steven's desired range? (This does not eliminate them but will influence the final decision.)*

You will now use customer prospecting and trade area functions to broaden your understanding of these sites.

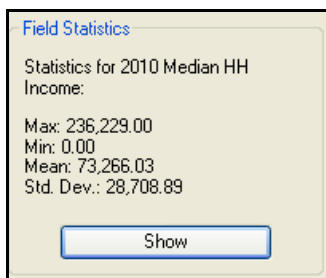
USE CUSTOMER PROSPECTING AND GRIDS TO COMPARE AVAILABLE SITES TO CUSTOMER PROFILE CHARACTERISTICS

Customer prospecting analysis identifies the geographic units in a region that meet criteria established by the user. You will use it to identify the most attractive block groups in the Twin Cities area relative to the characteristics in the green customer profile. Recall that the characteristics of this profile include above-average levels of income, education, homeownership, and home value. Thus, concentrations of households with above-average values on all four of these measures would be quite attractive to Janice and Steven. You will use *Customer Prospecting Analysis* to identify block groups that match this profile.

- 1 Click the drop-down arrow in the toolbar and click *Analysis*.
- 2 Select *Create New Analysis* and click *Next*. Select *Market Analysis* and click *Next*.
- 3 Select *Customer Prospecting* and click *Next*.
- 4 Select *Median Home Value by Block Group* as the level of geography to prospect and click *Next*.
- 5 Select *Use feature from a layer*, select the *Minneapolis St Paul CBSA* layer, and click *Next*.
- 6 Change the entry method to *Enter values manually* and click *Next*.

The next window contains a box listing the attributes available in the layer. You will use this list to designate the four criteria for selecting block groups. Confirm that the *Match all criteria (AND)* option is selected at the top right of the dialog box.

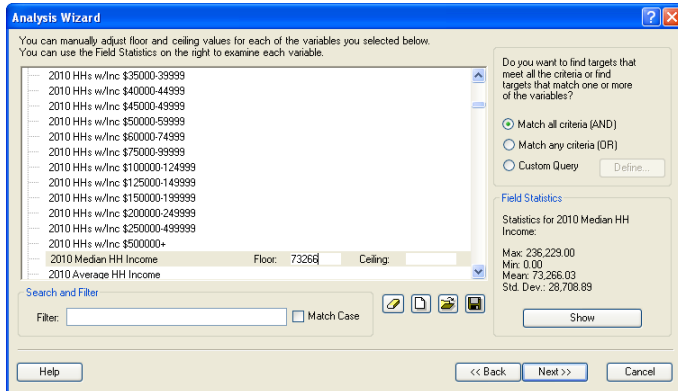
- 7 Click the attribute *CY Median HH Income* in the *CY Household Income* category and click the *Show* button in the *Field Statistics* window at the bottom right to calculate and display descriptive statistics for this attribute.



The mean value in the graphic above is 73,266, though it might vary depending on the block groups included in the current extent. Be sure you understand what this value represents. It is the mean of the values for each block group, and those values are medians. Thus, it is not accurate to say the mean household income is \$73,266. Rather, this number is the mean of median block group values. You wish to select block groups with values at or above that figure.

- 8 Double-click the *CY Median HH Income* attribute and enter the value you just calculated into the *Floor* box.

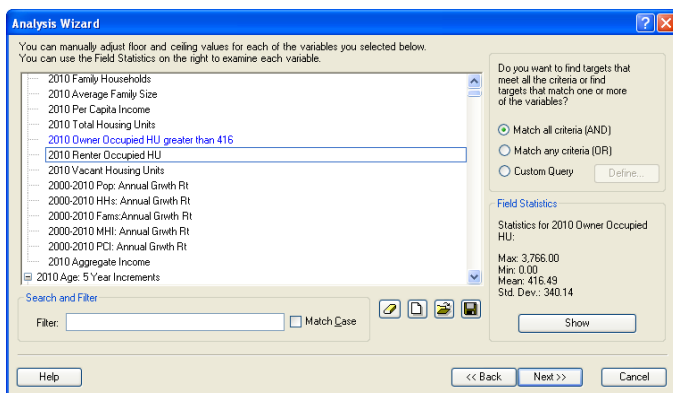
The *Analysis Wizard* window should look like this:



- 9 Repeat this procedure to select the attribute *CY Median Value: Owner HU* (median home value) in the *CY Home Value* category, calculate its *mean*, and enter this value (**191,727**) as the *Floor* criterion.
- 10 Repeat this for the attribute *CY Pop 25+ by Educ: Bach Deg* in the *CY Pop 25+ by Educ Attainment* category (242). Repeat again for the attribute *CY Owner Occupied HU* in the *2009 Demographic Overview* category (416).

You may use the Filter field below the attribute list to find attributes more quickly. To do so, type part of the attribute name, and the list of available attributes will shrink to display those that match the filter.

The *Analysis Wizard* window should resemble the one below. When applied to the data layer, it will select those block groups that meet all four of these criteria.

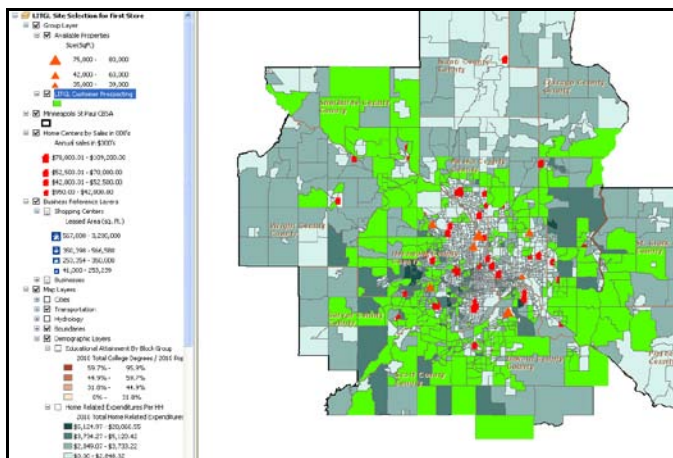


- 11 Click *Next*. Enter **LITGL Customer Prospecting** in the name box. Click *Finish*.

The software applies the selection criteria you designated; identifies the block groups that meet all four criteria; creates a layer containing these features; adds it to the *table of contents*; and

displays it on the map, which should resemble the one below. You may use this map to assess the distribution of *Available Properties* relative to these concentrations of attractive customers visually.


Question 2: *How many available properties are located near concentrations of attractive customers? Where are these sites?*

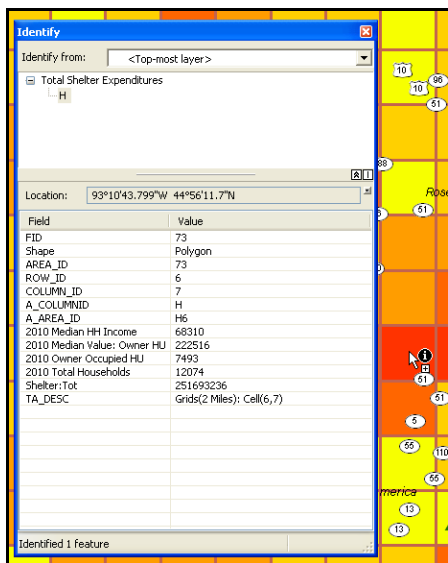


USE GRID TRADE AREA FUNCTION

You also wish to compare the locations of these sites to home-related expenditures by household across the study area. To do so, you will use the *Grid Trade Area* function.

- 1 Turn off the *LITGL Customer Prospecting* and *Home Centers by Sales Volume* layers. Right-click the *Available Properties* layer and click *Zoom to Layer* to zoom the map to an extent that includes the seven available sites.
- 2 Click the drop-down arrow in the toolbar and click *Analysis*. Select *Create New Analysis* and click *Next*. Select *Market Analysis* and click *Next*. Select *Find Hot Spots (Grids)* and click *Next*. Select *Use Current Extent* and click *Next*. Enter **2 miles** as the grid size and distance and click *Next*.
- 3 On the *Select Layer* dialog box, select *Standard Business Analyst Data*. In the *Symbolization* field box, select *Shelter: Tot*, which you will find in the *Expenditures* data about a quarter of the way down the attribute list. Click *Next*.
- 4 In the resultant window, add four additional relevant attributes (*CY Total Households*, *CY Owner Occupied HUs*, *CY Median HH Income*, and *CY Med Value Owner HU*) to the *Selected variables* list.

- 7 You may view the values of individual cells in the grid by selecting the *Identify* tool  on the *Tools* toolbar and clicking within the boundaries of the target cell. This allows you to view the values of all the attributes you specified for each grid. Use this tool to view the attributes in the vicinity of each store and compare them to the cells with the highest levels of home-related expenditures (i.e., those with the darkest red color).



Question 3: How are the available properties situated relative to the hottest areas of the grid map?

- 8 When you are finished, close the *Identify* window and click the *Select Elements* tool  to turn off the *Total Shelter Expenditures Grid* layer.

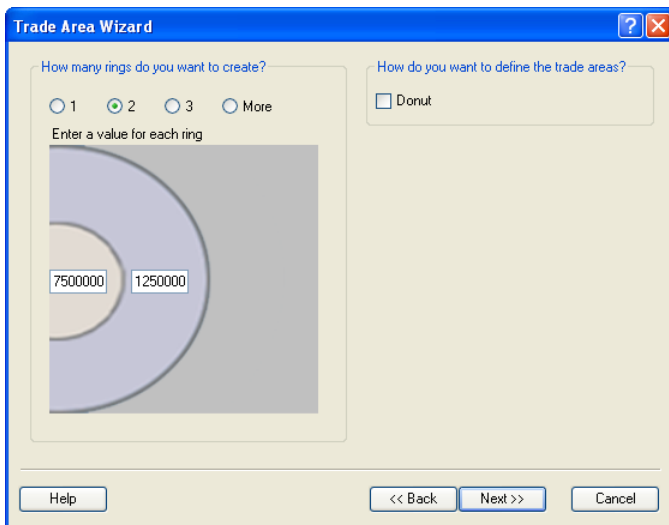
CREATE THRESHOLD RING TRADE AREAS FOR AVAILABLE SITES

While the heat map approach displays the distribution of consumer attributes across the area of interest, threshold rings display similar information for specific locations. You will use this function to explore the distribution of expenditure data relative to the available properties. Threshold rings display the geographic concentration of a designated attribute around a specific location. Commonly designated attributes include market size measures such as households; population; or, in this case, consumer expenditures. Thus, threshold rings can answer questions such as, How large must a store's trade area be to include 50,000 households? 75,000 people? \$20,000,000 in relevant product purchases? Further, by creating multiple rings at various levels of these attributes, you can assess the resultant concentration at several relevant thresholds. You will use it to assess the concentration of total shelter expenditures around each of the available sites.

Based on their cost, revenue, and market share projections, Janice and Steven believe that the first *Living in the Green Lane* store must serve a market with at least \$75,000,000 to \$125,000,000 in total shelter expenditures. (While this category of expenditures is broader than *Living in the Green Lane's* product lines, it does include them all and is a good indicator of overall consumer spending

on shelter.) You will use these values to create threshold rings around available properties. You will then examine these trade areas relative to each other and to competing home centers.

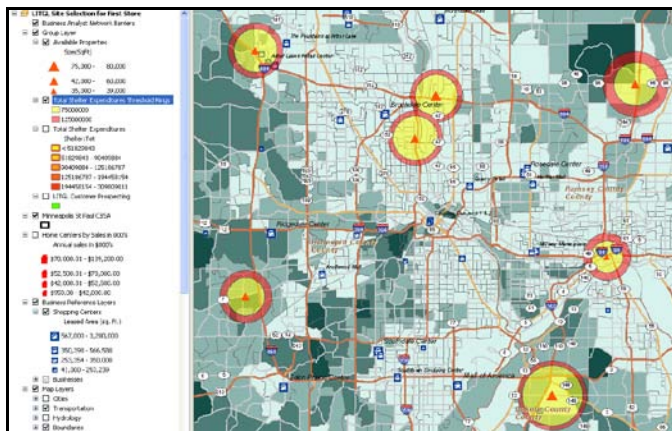
- 1 Confirm that the grid and customer prospecting layers are turned off. Open the *Layer Properties* window of the *Available Properties* layer and, if necessary, change the color of its symbol to bright red or orange, and then close the window.
- 2 Right-click this layer and click *Zoom to Layer*.
- 3 Click the drop-down arrow on the toolbar and click *Trade Area*. Select *Create New Trade Areas* and click *Next*.
- 4 Select *Threshold Areas* and click *Next*.
- 5 Select *Available Properties* as the store layer and *ID* as the ID field.
- 6 Select the *All Stores* option and click *Next*.
- 7 In the resultant window, select *Median Home Value by Block Group* for *Threshold layer* and *Shelter: Tot* as the field to aggregate and click *Next*.
- 8 Select the *Use Standard Threshold Rings* option and then click *Next*.
- 9 In the resultant window, select 2 as the number of rings you wish to create and enter **75,000,000** as the value for the inner ring and **125,000,000** as the value for the outer. The window should resemble the one below. Click *Next*.



- 10 Enter **Total Shelter Expenditures Threshold Rings** as the *Trade Area name*. Confirm that the *Create Reports* option is not selected. Click *Finish*.

In a process that might take several minutes, the software performs the necessary calculations; creates the resultant threshold rings; adds them to the *table of contents*; and displays them on the map, which should resemble the one below.

The major roadways may not be visible due to scale dependency. If that is the case, turn on the Major Highways (Regional) layer in the Streets and Highways group layer in the table of contents. You should also turn on the Shopping Centers and Home Centers by Sales Volume layers to match the map below.



- 11 Compare the rings of the available properties. The smaller the rings, the more compact the concentration of home-related expenditures around the location. Compare the locations to those of competing home centers and shopping centers as well. Shopping centers generally attract retail traffic, while home centers are Living in the Green Lane's most direct competitors.

Question 4: Which locations have the most dispersed threshold rings? The most compact?

The *Customer Prospecting*, *Grid*, and *Threshold Rings* functions of the business GIS software allow you to compare available sites to customer characteristics. The *Threshold Rings* approach also provides useful competitive comparisons. To explore the competitive environment more fully, you will create *Huff Equal Probability Trade Areas* around existing home centers.


USE HUFF EQUAL PROBABILITY TRADE AREAS AND LOCATOR REPORTS TO COMPARE THE COMPETITIVE ENVIRONMENTS OF AVAILABLE SITES

Two trade area models—*Equal Competition (Thiessen)* polygons and *Huff Equal Probability Trade Areas*—are particularly useful for exploring a company's competitive landscape. The *Equal Competition* model creates polygons around each store. The boundaries of each polygon are composed of points equidistant from that store and its nearest competitor. Thus, if linear distance were the only decision factor for consumers, each store would attract the consumers within its polygon.

The *Huff Equal Probability Trade Areas* approach is similar but allows users to include factors other than linear distance in estimating the probability that consumers will shop at a given store. Janice and Steven believe that store sales volume as measured in annual sales is as important as linear

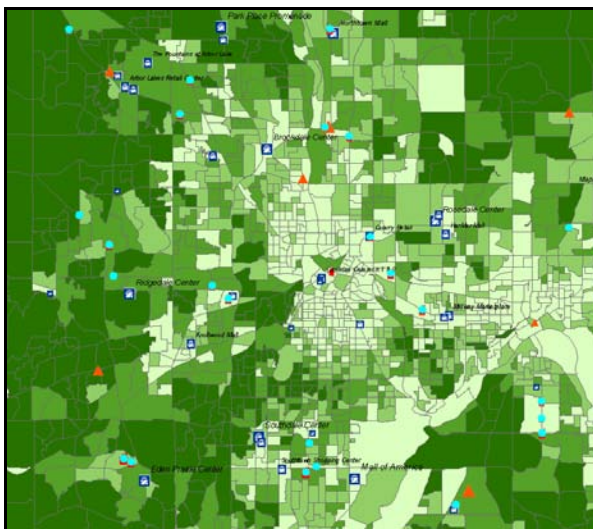
distance when consumers choose between competing home centers. For this reason, you will use the *Huff Equal Probability Trade Areas* approach to create trade areas around selected competing home centers based on both linear distance and sales. The result will be trade areas around each store in which consumers are more likely to shop at that store than at competing stores. Boundaries between polygons represent areas where consumers are equally likely to shop at either store; hence, the name of this approach. You will select stores for the analysis based on sales volume and proximity to available properties.

- 1 Right-click the *Home Centers by Sales in 000's* layer, click *Selection*, and then click *Make This the Only Selectable Layer*. This allows you to select the specific home centers you wish to include in the Huff analysis.

- 2 On the *Tools* toolbar, click the button for the *Select Features* tool . Press the *SHIFT* key and then click and drag the cursor to form a rectangle around a large home center near one of the available properties. The feature is highlighted to indicate its selected status. With the *SHIFT* key pressed, repeat this process for another home center. Note that it is added to the selection while the first one is also retained. (If you perform this task without the *SHIFT* key, the second selection would replace the first.)

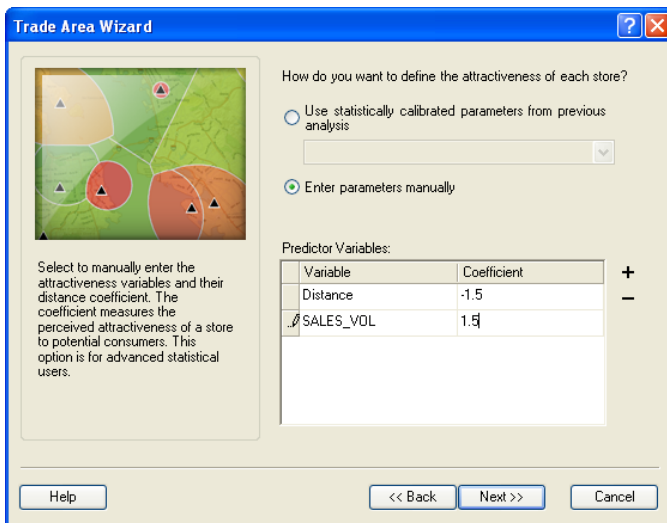
Repeat this process to select the home centers that you believe will pose the greatest competitive challenge to the available properties you are evaluating. This should include large home centers conveniently located on major roads. You should select about 15–20 home centers. Your screen will resemble the one below, though your selection may vary.

In this layer, the labels for the Detailed Regional Highways layer are turned off. If these labels obscure your screen, you may turn them off on the Labels tab of the Layer Properties window for this layer.



- 3 Click the drop-down arrow on the toolbar and click *Trade Area*.
- 4 Select *Create New Trade Area* and click *Next*.

- 5 Select the *Huff Equal Probability* method and click *Next*.
- 6 Select *Home Centers by Sales in 000's* as the store layer and *LOCNUM* as the ID field.
- 7 Select the *Selected Stores* option and click *Next*.
- 8 In the resultant window, select the *Enter parameters manually* option and click the plus sign (+) button to the right of the window to add a new parameter. Select *SALES_VOL* as the additional variable and enter a coefficient of **1.5**.



The window should resemble the one above. Consider the entries for a moment. The coefficient for distance is negative, indicating an inverse relationship with store attractiveness. That is, the farther a store is from a consumer, the less attractive it is. The coefficient for *SALES_VOL* is positive, indicating a direct relationship. The higher a store's sales volume, the more attractive it is to consumers. The relative importance of these factors is expressed in the magnitude of the values. You have set them as equal, but you could easily adjust the values should you deem distance to be more important than sales volume, or vice versa. In addition, you could include more factors with variable weights in the analysis. This analysis requires only the two you have entered.

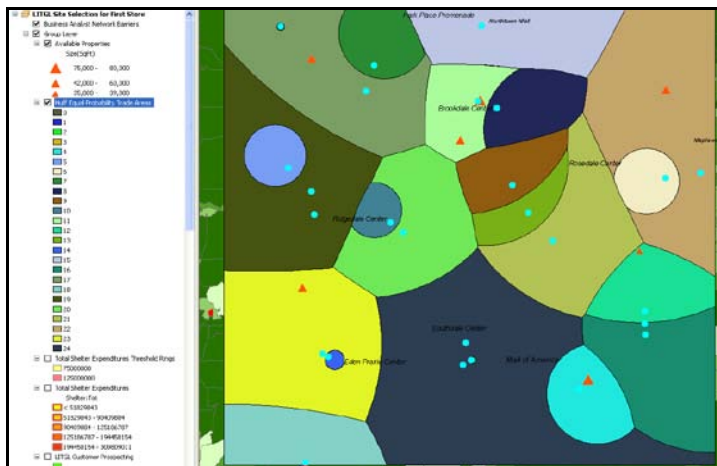
CALCULATE EXERCISE TRADE AREA BOUNDARIES

- 1 Click *Next*.
- 2 Enter ***Huff Equal Probability Trade Areas*** as the *Trade Area* name.
- 3 Confirm that the *Create reports* option is not selected.

- 4 Click *Finish*. If you receive a warning message, click *OK*.


The software calculates the boundaries of the trade areas and displays them on a map resembling the one below. Each polygon represents the customers most likely to shop at the home center it surrounds based on the location of that facility and its sales volume. Notice that the largest polygons are on the periphery of the study area, where no home centers are located. These areas appear to present opportunities for new competitors. However, comparison of this map with the grid and consumer profiling maps you created earlier indicates that this is not the case.

If necessary, move the *Available Properties* layers to a position above the *Huff Equal Probability Trade Areas* layer so they will be displayed over this layer. Examine the location of sites in the *Available Properties* layer relative to this map. Generally, locations near the boundaries of trade areas in the *Equal Probability* map or those between competitors in a single market area indicate favorable opportunities, while those in the central regions of polygons near competitors indicate highly competitive environments. Note that several available properties are favorably located.

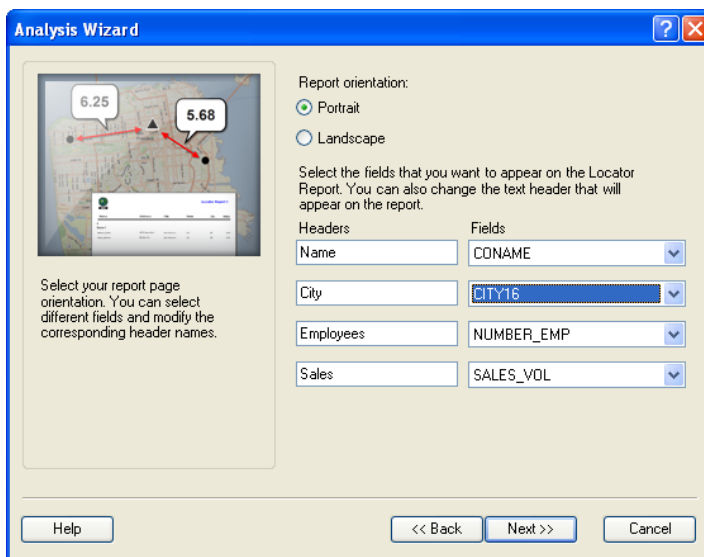


While this map portrays the competitive environment visually, you wish to learn more about the home centers competing with each available site as well as the shopping centers that attract customers to their vicinity. You will design *Business Locator Reports* to do so.

PERFORM PROXIMITY ANALYSIS

- 1 Click the *Select Elements* button  on the *Tools* toolbar to turn off the *Select Features* tool.
- 2 Click the drop-down arrow on the toolbar and click *Analysis*. In *Analysis Wizard*, select *Create New Analysis* and then click *Next*. Select *Site Analysis* and then click *Next*. Select *Proximity Analysis (Locator Report)* and then click *Next*.

- 3 In the resultant window, select *Available Properties* as the store layer, *ID* as the ID field, and *Name* as the name field. Select *All Sites*. Click *Next*.
- 4 In the resultant window, select *Home Centers by Sales in 000's* as the business points layer, select the *Limit report to closest* option, enter **10** in the left box, and click *Next*.
- 5 In the resultant window, select *Drive Time* as the distance calculation method, confirm that the remaining options are not selected, and then click *Next*.
- 6 In the resultant window, select the *Portrait* option and specify the attributes you wish to include in the report by matching your entries to those in the window below. Click *Next*.



- 7 In the resultant window, enter **Home Centers Locator Report** as the *Analysis name*, select the *Create Reports* option, and then click *Next*.
- 8 Enter **Home Centers Locator Report** in the *Report name* box and **Competing Home Centers by Site** in the *Report title* box, select *View Report*, and then click *Finish*.

The business GIS software identifies the competitors within a 10-mile linear distance of each available site and generates the report based on your settings. For each site, the report identifies competitors within 10 miles and displays the number of employees, sales in thousands of dollars, and direction and distance in drive time for each.

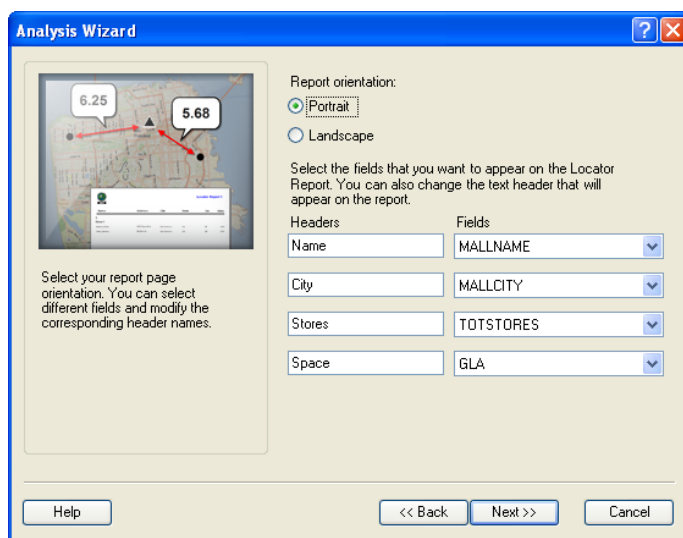
The report should resemble the one below:

Name	City	Employees	Sales	Dir.	Minutes
1 Garrison Bldg					
MENARDS	OAKDALE	0	45000	NE	10.39
HOME DEPOT	MINNEAPOLIS	140	45000	NW	11.05
SAFE HOMES MINNESOTA	MINNEAPOLIS	0	5250	NW	11.27
HOME DEPOT	ST PAUL	115	46250	SW	11.66
MENARDS	WEST ST PAUL	150	52500	SE	5.52
MENARDS	ST PAUL	200	70000	NW	6.38
LOWE'S	WEST ST PAUL	0	2450	SE	6.43

Review the drive-time numbers for competing home centers for each site. For reasons discussed below, you will define *Living in the Green Lane's* potential market area with 3- and 6-minute drive-time polygons. If competing home centers have similar trade areas, those with drive-time values of 10 minutes or less will overlap the trade area of the available site to some extent.

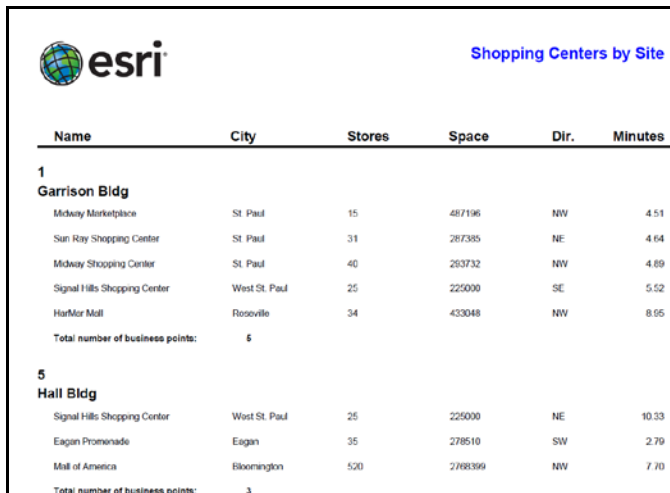
Shopping centers also affect the competitive environment of each site by drawing retail traffic to the area. Thus, you wish to determine how many shopping centers lie within the 6-minute trade areas of each available site. You will design a *Locator Report* for this purpose as well.

- Minimize the *Locator Report* window for later use. Repeat steps 1 to 8 above with these changes. In step 4, designate *Shopping Centers* as the business points layer and change the distance from **10** miles to **6**. In step 6, select the *Portrait* option and match your settings to those in the window below:



- In step 7, enter ***Shopping Centers Locator Report*** as the *Analysis* name, select *Create Reports*, and then click *Next*. In step 8, enter ***Shopping Centers Locator Report*** in the *Report name* box and ***Shopping Centers by Site*** in the *Report title* box, select the *View Report* box, and then click *Finish*.

The resultant report should resemble the one below:



Name	City	Stores	Space	Dir.	Minutes
1					
Garrison Bldg					
Midway Marketplace	St. Paul	15	487196	NW	4.51
Sun Ray Shopping Center	St. Paul	31	287385	NE	4.64
Midway Shopping Center	St. Paul	40	263732	NW	4.89
Signal Hills Shopping Center	West St. Paul	25	225000	SE	5.52
HatMor Mall	Roseville	34	433048	NW	8.55
Total number of business points:		5			
5					
Hall Bldg					
Signal Hills Shopping Center	West St. Paul	25	225000	NE	10.33
Eagan Promenade	Eagan	35	278510	SW	2.79
Mall of America	Bloomington	520	2788399	NW	7.70
Total number of business points:		3			

Review the *Locator Reports* and the *Huff Equal Probability Trade Areas* layer you have created. In the next chapter, you will use them to assess the competitive environment of each of the available sites.

- 11 Minimize the *Locator Report* window for later use. Turn off the *Huff Equal Probability Trade Areas* layer.

Question 5: How many competing home centers does each location have within a 10-minute drive time of the site? How many shopping centers does each location have within a 6-minute drive time of the site?

- 12 Save your map file.

This completes the tasks in this SpatialLAB. Beginning with a simple Microsoft Excel table of available locations, you have geocoded and mapped those locations, used trade area tools to learn more about them, and generated *Business Locator Reports* to gain insight into their competitive situation. In the *Trade Area Analysis and Site Selection without Customer Data: Part 2* SpatialLAB, you will build on this analysis by integrating this information with data on specific trade areas to select the best site and design map documents to support your decision.

Submit your work

Submit answers to the following questions:

Question 1: How are these sites situated relative to major highways? Are there any sites above or below Janice and Steven's desired range? (This does not eliminate them but will influence the final decision.)

Question 2: *How many available properties are located near concentrations of attractive customers? Where are these sites?*

Question 3: *How are the available properties situated relative to the hottest areas of the grid map?*

Question 4: *Which locations have the most dispersed threshold rings? The most compact?*

Question 5: *How many competing home centers does each location have within a 10-minute drive time of the site? How many shopping centers does each location have within a 6-minute drive time of the site?*

Credits

Data

Data displayed in screen captures of Business Analyst is courtesy of Esri; the US Census Bureau; Infogroup; the Bureau of Labor Statistics; Applied Geographic Solutions, Inc.; Directory of Major Malls, Inc.; GfK Mediamark Research & Intelligence, LLC (GfK MRI); and Market Planning Solutions, Inc.

Instructor resources

Contextual information

This SpatialLAB is written for business students in an integrated business GIS course at the undergraduate or graduate level. It may be used to replace the exercises in chapter 4 of *Getting to Know ESRI Business Analyst* in labs with Business Analyst Desktop Premium 10 installed. The emphasis is on using spatial analysis in the site selection process for a startup entrepreneurial firm wishing to open its first retail location. Thus, this lab would also be used as a stand-alone exercise in retailing or retail management courses or in conjunction with the *Trade Area Analysis and Site Selection without Customer Data: Part 2* SpatialLAB for a more comprehensive site selection project.

This lab demonstrates how to geocode and map available sites for a retail location and how to assess the relative attractiveness of those sites. The maps and reports in this lab also support the final site selection decision, which is completed in the *Trade Area Analysis and Site Selection without Customer Data: Part 2* SpatialLAB.

Upon completion of the lab, students may be required to submit answers to several questions based on their observation of the maps and reports they have created. Alternatively, students may be required to submit a project report covering both part 1 and part 2 of the *Trade Area Analysis and Site Selection without Customer Data* project.

Analysis and visualization tools

Business Analyst Desktop Premium 10 and the *LITGL Minneapolis St Paul* project file are required to complete this exercise.

Data information

All the data for this exercise is provided by Business Analyst Desktop software.

Data sources

Esri® Business Analyst data

Answer key

Question 1: *How are these sites situated relative to major highways? Are there any sites above or below Janice and Steven's desired range? (This does not eliminate them but will influence the final decision.)*

All the sites are favorably located relative to major highways. Two of the sites are above the 60,000-square-foot upper threshold of Janice and Steven's desired range, and one is below the 40,000-square-foot lower threshold.

Question 2: *How many available properties are located near concentrations of attractive customers? Where are these sites?*

No available site is located completely within the attractive areas identified by the Customer Prospecting tool. However, four of them are immediately adjacent to such areas. These are located in the southeast, northeast, northwest, and southwest corners of the market area. The two sites in the center of the area and the one in the east are not near attractive areas identified by the Customer Prospecting tool.

Question 3: *How are the available properties situated relative to the hottest areas of the grid map?*

They lie outside it, as the highest volume grids for the Shelter: Tot attribute are in the low central part of the grid map. This raises the question of whether the level of sales in this category can sustain Living in the Green Lane's first store. The Threshold Ring tool addresses this question.

Question 4: *Which locations have the most dispersed threshold rings? The most compact?*

The most dispersed locations are the two in the northeast and southeast, which display noticeably different patterns of internal distribution between the two threshold rings. The most compact rings are those of the location in the eastern part of the map, between the two just mentioned. The other four are roughly equal in size and appear sufficiently compact to support a store.

Question 5: *How many competing home centers does each location have within a 10-minute drive time of the site? How many shopping centers does each location have within a 6-minute drive time of the site?*

Garrison has eight home centers within a 10-minute drive time and four shopping centers within a 6-minute drive time.

Hall has six home centers within a 10-minute drive time and one shopping center within a 6-minute drive time.

Reynolds has two home centers within a 10-minute drive time and no shopping centers within a 6-minute drive time.

Steiers has six home centers within a 10-minute drive time and four shopping centers within a 6-minute drive time.

Carter has five home centers within a 10-minute drive time and no shopping centers within a 6-minute drive time.

Tucker has seven home centers within a 10-minute drive time and one shopping center within a 6-minute drive time.

Mayer has six home centers within a 10-minute drive time and one shopping center within a 6-minute drive time.

Additional notes

1. While it is designed as a stand-alone exercise, this lab builds conceptually and logically on the tasks performed in SpatiaLABs 1–3 in the Business Analyst series. The tasks performed in these labs are those mentioned in the introduction. It is not necessary for students to complete them to understand this lab, but they would develop a richer understanding of those procedures if they do so.
2. Although this lab is integrated with the *Trade Area Analysis and Site Selection without Customer Data: Part 2* SpatiaLAB to create a complete project, it is not necessary for students to complete that lab to work with this one. Should you wish to use this lab as a stand-alone exercise, you should choose the reporting option of having students submit answers to the lab's questions, as they will not have sufficient information to complete the full project report.
3. The *Store Setup* process involves geocoding the real estate listings provided by an agency. This is the first geocoding task in this SpatiaLAB series, so it is a good opportunity to emphasize to students the value of this seemingly simple task. In this context, it allows them to relate the location of these potential store sites to the environmental factors covered in earlier labs. In later labs, they will geocode customer records to facilitate the processes of spatial overlay, customer profile, segment targeting, and market expansion analyses.
4. *Customer Prospecting* and *Grid Maps* have functions similar to those of the *Smart Map* tool students used in previous labs to identify concentrations of attractive customers. Each of these tools may be customized to the marketing objectives and target markets of firms in different industries or with different competitive strategies. Encourage students to explore these tools by adjusting the attributes and threshold settings. This will help them appreciate the power of these tools and their potential contribution to other class tasks or client projects.
5. The *Threshold Ring* approach to market area definition is the first of two you will use in the site selection process. It is based on consumer expenditure data, while the other approach is based on drive times. Encourage students to consider the type of information each conveys about the market areas.
6. This is the first use of the *Huff Model* in the Business Analyst SpatiaLAB series. Students will use it again when they seek out retail expansion opportunities in the Minneapolis-St. Paul area. In this application, students are instructed to use retail sales volume as a factor weighted equally with distance in consumer store selection. Sales are assumed to be directly related with choice, while distance is inversely related. Encourage students to question this assumption, run the model with a different factor or different weights, and observe the impact on the resultant map.
7. Instead of a project report consisting of answers to lab questions, you may wish to have students complete a more comprehensive report covering both *Trade Area Analysis and Site Selection without Customer Data: Part 1* and *Part 2*. If so, you may wish to use the following structure and guidelines for that report. Feel free to adjust this format to your preferences or class requirements.

Report format

Each of your reports should be about six to eight pages in length and should follow this format:

- I. Introduction**—A summary of the circumstances addressed by the research project
- II. Problem statement**—A statement of the problem addressed by the project
- III. Data information**—A statement of the sources and dates of all data used in the analysis
- IV. Analytical methods**—A description of the analytic procedures used and how they will help solve the problem
- V. Research results**(the largest section of the project)—To include
 - A. Presentation of the results of the analysis
 - B. Exhibits such as the required maps, charts, and tables and any others you wish to include to clarify your report
- VI. Conclusions and recommendations**—Recommended response to the problem based on the results of the analysis

Business GIS references

Business Analyst Resource Center.

<http://resources.esri.com/businessAnalyst/>

BusinessGeoInfo newsletter.

<http://www.esri.com/industries/business/community/newsletter.html>

Directions Magazine (Articles on business applications of GIS).

<http://www.directionsmag.com/>

Dramowicz, Ela. 2005. "Retail Trade Analysis Using the Huff Model." *Directions* Magazine. June 29.

Esri Business GIS site—Resources for business applications of GIS.

<http://www.esri.com/industries/business/index.html>

Esri. 2010. *Esri Demographic Update Methodology: 2010–2015*, an Esri white paper.

<http://www.esri.com/library/whitepapers/pdfs/demographic-update-methodology-2010.pdf>

Esri. 2010. *Esri Trend Analysis: 2010–2015*, an Esri white paper.

<http://www.esri.com/library/whitepapers/pdfs/trend-analysis-2010-2015.pdf>

Esri. 2005. *South Bend Small Business Development Center: Identifies the best sites—quickly and accurately.*

<http://www.esri.com/library/casestudies/southbend.pdf>

GIScafe newsletter—Electronic GIS newsletter (Business applications of GIS).

<http://www.giscafe.com/>

Huff, David. 1964. "Defining and Estimating a Trading Area." *Journal of Marketing*, July, 28(3): 34–38.

Huff, David, and Richard Batsell. 1977. "Delimiting the Areal Extent of a Market Area." *Journal of Marketing Research*, November, 14(4), 581–585.

Kannan, Shyam. 2007. "Unveiling the Green Homebuyer." *Urban Land*, June: 106–09.

Maantay, Juliana, and John Ziegler. 2006. *GIS for the Urban Environment*. Redlands, CA: Esri Press.

Maguire, David, Victoria Kouyoumjian, and Ross Smith. 2008. *The Business Benefits of GIS: An ROI approach*. Redlands, CA: Esri Press.

Miller, Fred L. 2010. *Getting to Know ESRI Business Analyst*. Redlands, CA: Esri Press.

Miller, Fred L. 2007. *GIS Tutorial for Marketing*. Redlands, CA: Esri Press.

Pick, James. 2008. *Geo-Business: GIS in the digital organization*. New York: Wiley.

Pick, James. 2005. *Geographic Information Systems in Business*. Hershey, PA: Idea Group Publishing.

Pillar, Matt. 2010. "PETCO Improves Location Selection: Case study." *Integrated Solutions for Retailers*.

<http://www.esri.com/library/articles/petco-case-study.pdf>

Pyke, Chris. 2010. GIS Assists Green Building (podcast).

http://www.esri.com/news/podcasts/podcast.html#user_pyke

Richardson, Karen. 2008. "Culver's Turns to GIS for Successful Franchising." *Esri ArcWatch*, November.

<http://www.esri.com/news/arcwatch/1108/feature.html>

Roderick, Brent. 2009. "Discover Retail Opportunities with Esri's Retail Marketplace Data." *ArcWatch*, August.

<http://www.esri.com/news/arcwatch/0809/retail-marketplace-data.html>

Romeo, Jim. 2005. "Target Marketing with GIS." *Geospatial Solutions*, May: 3–5.

<http://www.tetrad.com/pub/documents/geospatial.pdf>

Schaefer, Paul. 2007. "New Study: Americans Reach Environmental Turning Point, Companies Need to Catch Up." *Environmental News Network*, August 22.

<http://www.enn.com/business/article/22186>

Thompson, Simon. 2011. The Geography of Retail Operations (podcast).

http://www.esri.com/news/podcasts/podcast.html#staff_thompson_operations

Thompson, Simon. 2010. Why GIS Is Important to Retailers (podcast).

http://www.esri.com/news/podcasts/podcast.html#staff_s-thompson-3