GIS in Marketing: Using Library GIS Resources for Retailing Management

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This paper discusses experiences of university library staff using GIS, working with upper level undergraduate Marketing students in a Retailing Management course to complete a semester project locating a new retail establishment. Census 2000 data is used to locate concentrations of target market populations. Competitors are geocoded using ArcView and TIGER street files to support the decision-making process. A required map showing competitors and the location of the new establishment is produced for the final presentation and paper.

Introduction

This paper describes the development of marketing class projects, presently Retailing Management, over a six year time period, to the present day situation. Two permanent staff and one student assistant from Research Data Services, a unit of The University of North Carolina at Charlotte's J. Murrey Atkins Library's Information Commons, work with Marketing students on projects locating a retail establishment. The students have a specific assignment—to create a new retail venture. The students are the management team of a retail store, and are responsible for the development of a strategic plan. While they can choose any city in the country, the great majority of students choose to use either the home county of UNC Charlotte (Mecklenburg) or the adjacent close county, Cabarrus. While the most popular type of establishment is a restaurant or bar, often students choose beauty salons, upscale spas, daycares, and clothing stores. More original enterprises have been a brew-thru, paint-ball "arcade", self-defense training/merchandise, an art gallery/glass blowing shop, a go-cart racing track, a pet-friendly café, and a dog gym. Steps involved include identifying the competition, locating the competition on a map, researching demographics, producing a thematic map of demographic variables, finding a feasible location for the retail outlet, and producing a final map showing landmarks, the location, the name of the store, the competition. Map examples are in the Appendix.

The purpose of creating the map for the project is two-fold:

1. To expose Business majors on a limited basis to GIS as an analysis tool. The intent is not to teach students how to use ArcView; it is mentioned in the library instruction session that if any are interested in the concept, the Geography Department offers an elective course "Business Uses of GIS."
2. To try to get the students to think in a spatial context, to be able to compare smaller areas within their target county. What section of the county would be the best location, and is the most ideal area already saturated with that particular kind of business?

As mentioned above, Research Data Services is a unit of the Library's Information Commons. Other units include Reference, Instruction, Presentation Support, and the Information Desk. Research Data Services personnel help staff the Reference Desk, and electronic resources are available on the Information Commons workstations. Research Data Services offices and its' GIS consultation/workroom are located with the Reference offices behind the Reference Desk.

As Census 2000 resources have become freely available on the web, the financial cost of offering the service has decreased substantially since it was initiated in the fall semester, 1997.

Present Process

Resources used at the present time include:

- ArcView 3.2 (University site license)
- American FactFinder for Census 2000 demographics and thematic maps
- Reference USA (an InfoUSA product) to identify the competition
- TIGER street files from the Geography Network
- TGR2SHP to convert the 2002 TIGER files
- Mecklenburg County's POLARIS tax GIS
- Student assistant hours at 10 hours/week

The Head of Research Data Services, who is also the Geography and Earth Sciences Librarian, does a bibliographic instruction session for each section of the class, Retailing Management (MKTG 3212). There are usually two sections, each with 35 students, during the fall and spring semesters, and one section of 35 students during the summer. The class is often only 50 minutes in length.

She has created a web page for the library instruction session and for student and library staff reference throughout the semester. (http://library.uncc.edu/classes/mktg3212) Links to resources and user guides are in the page, as well as a break out of resources to use for the specific sections of the assignment. During the instruction session the assignment is explained, how the Research Data Services staff can assist, and when that assistance is available.

Students in the class are advised to use ReferenceUSA to identify the competition, as most of their interest is in small businesses. Directions are provided on how to download the records from ReferenceUSA for later geocoding in ArcView.

American FactFinder is used to locate geographic areas of their targeted customer base, such as the higher income levels of the county, concentrations of the 18-24 age group, or areas with the most children. Students are encouraged to use the thematic map function of American FactFinder to produce thematic maps for their papers.

There is a web page specifically for signing up for having the map created (http://libnt4.uncc.edu/arcview/worksheet.htm) that emails the information to the Head of RDS or the RDS Computing Consultant, varying depending on staff schedules. Specific appointment times are listed on the web sign-up. During most of the semester, times are set when the student assistant, a Geography major with some GIS training, is working. The permanent RDS staff act as back-up for the student or cover when he isn't available. An hour is allocated to making the map. Sometimes it takes as little as 20 minutes, often it takes close to the hour; a few times up to two hours have been spent on a project. The unofficial record is around four hours. The last two days before the assignment is due, blocks of time are scheduled, such as 10-12, 1-4:30, and the service is on a walk-in basis. The blocks of time are divided among the permanent staff and the student assistant.

Students are advised to identify the area of the county in which they want to locate their business early on in the semester, to sign up for an appointment, have the existing competition they found geocoded, and use that information to determine where to locate their new business. The Library will provide a free black-and white printout of the map (8.5 x 11) for that purpose. RDS saves the projects on the hard drive for the duration of the semester, students may sign up for a second visit to finish up the map, add their new location, make revisions, etc. The final map can be exported to the students' diskette, printed off on a color laser printer, or both. Students do have to pay for the final color copy (80 cents).

The advantage to having students make an appointment is that if they are doing a county outside of the region (for example, Broward County, FL), the streets files from can be downloaded and indexed for geocoding in advance.

"Glitches" in the process

- Evening and weekend coverage: While in library policy all Reference staff are able to assist students with ReferenceUSA and American FactFinder, reality is that some cannot. During daytime hours, RDS staff can be called out to the reference desk to assist users, but they are not available on a regular basis evenings and weekends. One semester a year one of the Retailing Management sections is offered in the evening. During that

semester, arrangements are made for one of the RDS staff to schedule some evening appointments to produce the project maps.

- Procrastination: Many students wait until the week or often day before the assignment is due to write the paper/presentation. A general guideline learned over the years is one-third to one-half of the class will need assistance in the last week. For Retailing Management, the presentations are scheduled the last week of classes, and the papers are due the day of the presentation. RDS has intentionally limited the number of classes with GIS projects because of the necessity to be able to deal with a number of students in one to two days. It is also because the same staff work with Census data and ICPSR data files, and demand increases at the end of the semester in those areas, also.

- TIGER address ranges/Geocoding. The TIGER files, while they have many, many uses, are funded to support the decennial census of population and housing. Coverage, especially address ranges, is much greater for residential areas than industrial/commercial areas.

- Timeliness:

    - ReferenceUSA is based on local telephone books, as well as some other sources. ReferenceUSA is updated on an annual cycle, so there can be almost a year gap for new entries.
    - The Charlotte metropolitan area is still an area of rapid growth. Areas undergoing development, especially non-residential areas, lag behind on the TIGER files. These areas are also often some of the more desirable areas for new retail ventures.

- Downloading from ReferenceUSA
    - ReferenceUSA limits downloading to 50 records at a time. If students are doing a kind of business that is very prevalent, such as a restaurant, they may have to download two or three files and later combine them into one. Other problems exist when students download records from two or three counties in the same file.

Present Financial outlays

- The serial subscription to ReferenceUSA is the major financial expense involved at the present time. Similar information is available from many of the web yellow pages sites—superpages.com, switchboard.com, anywho.com, yellow.com. However, none have downloading capabilities of ReferenceUSA, and ReferenceUSA does provide some "value added" features, such as an employee size category and estimated annual sales

by category. Students who want to use the web yellow pages sites are given directions for creating an Excel file of data which the RDS staff can use to geocode. Only one has been successful entirely on his own, but RDS staff have helped several others do so, or in frustration on the last day, done the inputting themselves. A major effort has been put forth to extend the use of ReferenceUSA to other disciplines, especially those that have a class that studies a neighborhood. Geography uses ReferenceUSA with some classes, such as the "Business Uses of GIS" class. The Head of RDS does several library instruction sessions a year with Community Health Nursing students, who study a particular neighborhood. They can use ReferenceUSA to help assess the quality of life in the neighborhood—how many churches are there, are there any good grocery stores nearby, what types of businesses are in the area—pawnshops, convenience stores, etc.? One of the Social Sciences Librarians works with some Social Work classes on a similar project.

- TGR2SHP conversion software is purchased from GIS Tools to convert more recently-released TIGER files than are available from the Geography Network.
- The University has a rather large Geography and Earth Sciences Department, with a very strong GIS program. ArcView 3.2 is available to the library as part of the University's ESRI site license.
- Student assistant hours for approximately 10 hours per week during the fall and spring semesters.

Observations

Using a student assistant, particularly a Geography major with some GIS training, works quite well. Due to the fact that students with extensive experience can find higher-paying employment elsewhere, the Library has hired students just enrolled in their first GIS class. However, the interest and aptitude has been there, and they have picked up the tasks easily.

Over the last six years, the technological skills of the students enrolled in the Marketing classes has increased. Students are given the option of paying for a color printout, or saving the final map to a floppy as a jpeg file. It quickly became obvious the staff needed to explain how to insert a jpeg into a Word document, the number of students who returned saying "the file won't open," was discouraging. Skill levels of both business students and Reference staff who can explain the problem to the students have both increased. In other areas, students are learning to produce a map on their own, using the "Map It" function of some of the yellow pages services, or ReferenceUSA, then modifying that map using PhotoShop or other editing software.

There has been some success with students being able to transfer at least the concept of showing business locations on a map to other classes. Several appointments (or walk-ins the last days) a semester are students who had previously been in the retailing class and who now want to make a similar map for another class presentation. Most can be accommodated—a few, such as mapping gasoline station locations in Dublin, Ireland was beyond the library staff's capabilities.

History

In 1994, the administration of the J. Murrey Atkins Library, University of North Carolina at Charlotte, decided to disband the Documents Unit of the library, transferring responsibilities and staff to other departments of the Library. That action took place in December, 1996. Processing, and the majority of the support staff, was transferred to Technical Services. Reference responsibilities were transferred to Reference, with the subject specialists taking on responsibility for their respective areas. One former documents librarian moved to Special Collections along with the local documents collection. The former head of the unit and the Computing Consultant from Documents formed a new area within the Information Commons called Research Data Services, with responsibilities of working with machine-readable data—managing the ICPSR membership, the responsibilities as an Academic Affiliate of the North Carolina State Data Center, and developing GIS services. At the same time the now former documents librarian picked up the responsibilities as Geography and Earth Sciences Liaison, and started getting referrals of "what is where," questions. The staff of the documents unit had worked with Marketing students gathering demographic information, so the head of Research Data Services contacted two Marketing professors with the proposal. One taught two sections of Retailing Management, the other taught two sections of Marketing Concepts, the introductory marketing class. Retailing Management obviously locates a retail venture; Marketing Concepts students had a broader choice of "business," including the services or wholesale industries.

First Year (1997/98)

The locating a retail store projects with library involvement were started the Fall Semester, 1997 with two sections of Retailing Management and two sections of Marketing Concepts.

Beforehand:

- The J. Murrey Atkins Library purchased a Library License to ArcView
- A workstation and a color ink jet printer were purchased.
- The library sent the RDS Computing Consultant to ArcView training
- The following additional resources were purchased:

- Wessex Pro/Filer 1996, Estimates and Projections, 1997, 2002, 2007.
- Wessex US Boundaries
- Wessex Zip+4
- Wessex US Streets
- American Business Disk
- CensusCD version 1.1 was purchased in the middle of the academic year

Records were downloaded from American Business Disk over the summer of 1997, creating a Mecklenburg County database in Microsoft Access searchable by zip code. A user guide for American Business Disk was written; staff training sessions for Reference were held. Library instruction sessions were scheduled, and a sign-up sheet was posted on the door of Research Data Service's temporary offices. Using the various Wessex products in the same projection, it was possible to create maps of streets with geocoded businesses overlaying thematic maps showing demographic concepts, such as median household income by census tract. Note: RDS was in a temporary location on the second floor of a building undergoing major renovations; Reference, where American Business Disk was located, was on the first floor.

Lessons learned the first year:

- Students couldn't find the temporary RDS offices in a back corner on the second floor;
- Everybody waits until the last minute (4 sections at 35 students per section was overwhelming);
- Many addresses didn't geocode due to missing streets in the Wessex files; (Mecklenburg County is still undergoing substantial development);
- The staff was making too many decisions for the students;
- It was anticipated that many students would select restaurant on which to do a project; the staff was totally taken by surprise by the number of students selecting beauty salons.
- Creating the Access database from American Business Disk took too much staff time; it could not be kept up to date.
- Paying for color maps was a major problem—an "order" slip was created, it was carried down to the floor below to the circulation desk, paid at $1 per copy, and the receipt was carried back to the RDS office to pick up the map. In addition, students wanted better quality than what the library was providing.
- Students had the option of saving the map to a disk as a .jpg file. However, many didn't have disks, and weren't expert enough with Word to insert a .jpg file.

Second Year (1998/99)

Based on the experiences the first year, the following adjustments were made:

- During the summer of 1998, the RDS staff spent a great deal of time updating a copy of the Mecklenburg County Streets file downloaded from the Wessex CD, drawing in streets and adding address ranges. In December, 1998, a copy of the Mecklenburg County (NC) streets file was obtained from the Mecklenburg County Data Processing Department. A field had to be added for jurisdiction to accurately geocode.
- TGR2SHP conversion software was purchased from GIS Tools to convert streets files from TIGER 98 (and later) for the rest of the country.
- A five-user license GeoLytics' CensusCD+Maps was purchased and loaded on the workstations in Reference—demographic profiles could be created directly by the students, and students could create their own thematic maps.
- The sign-up sheet was located at the Reference Desk.

Problems were exacerbated with color printing, as the maps created on CensusCD+Maps couldn't be printed in color from the public workstations. Ability to assist with CensusCD+Maps varied tremendously among Reference Librarians. Students were assigned to work in groups of two to three to developing team interaction skills, which also reduced the number of projects. However, problems still existed at the end of the semester.

In succeeding years enhancements continued to take place:

In 1999/2000

- The RDS Computing Consultant developed a web-based sign-up form, replacing the paper sign-up sheet.
- Public printing was contracted out to a commercial vendor; aggressive lobbying took place to obtain a public color laser printer.
- Building renovation had reached the point that Research Data Services and Reference were contiguous on the first floor.
- The University site license for ArcView covered library access.

In 2000/2001

- A public color laser printer was added to service, allowing students to print CensusCD+Maps maps directly from the public workstations, at a reduced price (80 cents). Cost is deducted from a copy card. Final maps can be sent from the RDS workroom workstation to the public laser printer, getting the RDS staff out of handling money.
- Late in the academic year, summary File 1 data from Census 2000 was available on American FactFinder
- ArcView was made available on some library public workstations. Users are almost solely Geography students enrolled in GIS classes.

In 2001/2002

- One instructor stopped teaching Marketing Concepts, so the number of projects was reduced.
- A Geography major student assistant was hired to work with students on the projects. Results were quite positive.
- Late in 2002, state budget cuts froze the reprographics budget, so the existing multiple-page paper handouts were no longer an option. All information was moved to the web. (http://library.uncc.edu/classes/mktg3212)

In 2002/2003

- The availability of the SF3 data on American FactFinder precipitated the decline in use of CensusCD+Maps. Students are given directions on locating demographic profiles and creating a thematic map from American FactFinder.

Conclusions

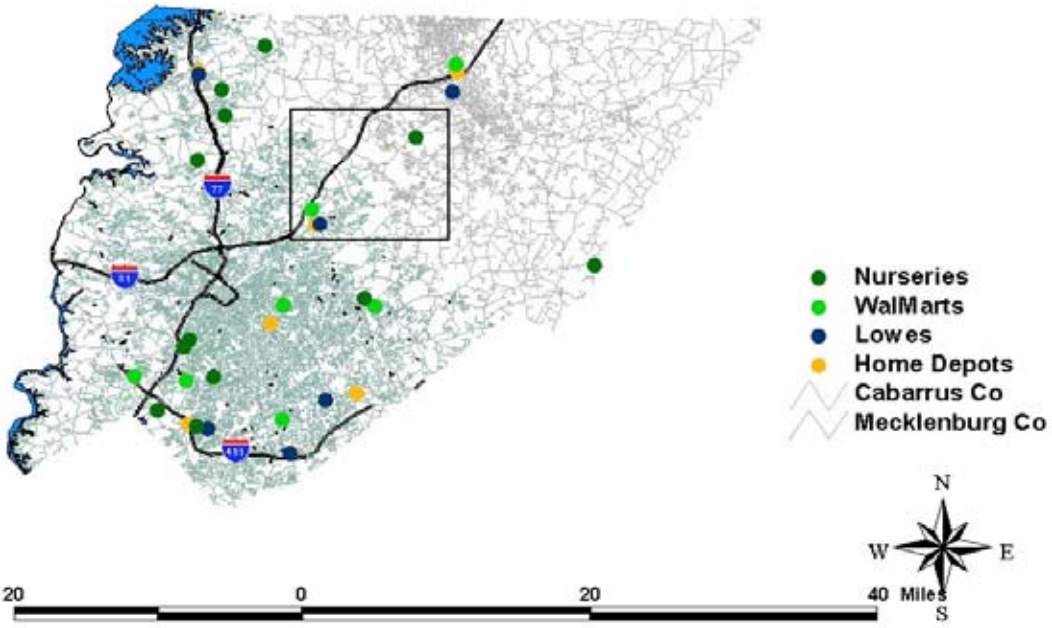
While the present approach of using several separate resources provides a less interconnected project than the original approach, it is more manageable from a library staff standpoint and it places more responsibility on the student than on the library staff.

CensusCD+Maps provides many more user options in producing thematic maps than American FactFinder. Due to the present economic situation, it is very difficult to justify purchasing GeoLytics' Census CD 2000. However, that is a goal for the future.

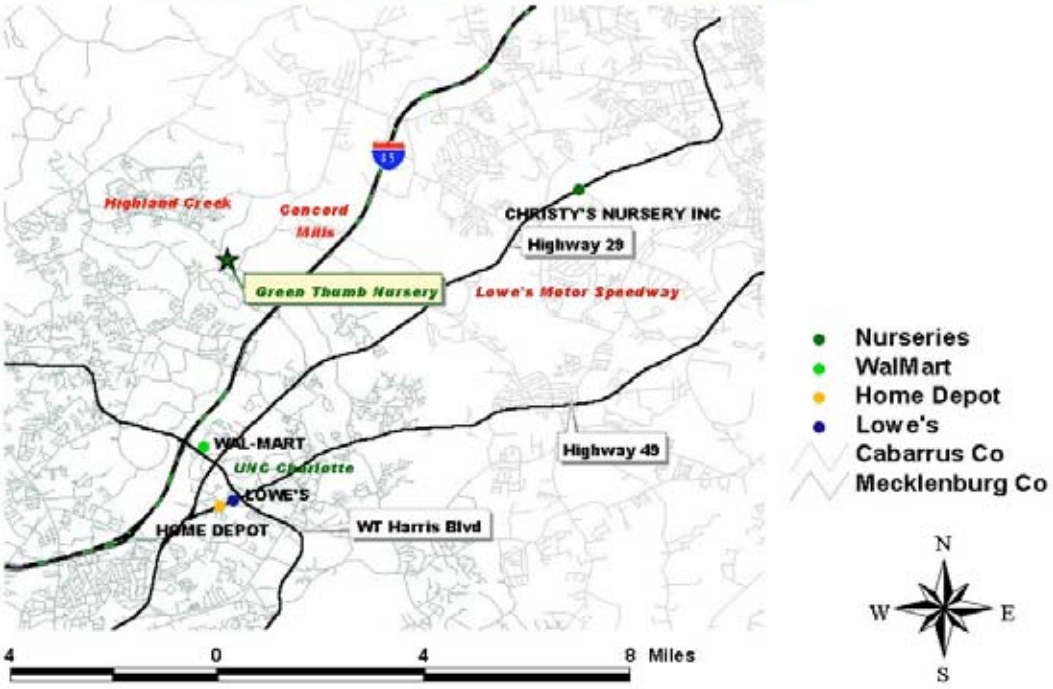
The mapping functions of various services, both for purchase, such as ReferenceUSA, and free on the web, such as from switchboard.com and superpages.com, continue to develop and improve. As students skills improve with editing tools such as Photoshop, in the near future it may not be necessary for library staff to act as intermediaries with software such as ArcView or ArcGIS, but students may be able to create their maps directly from the web.

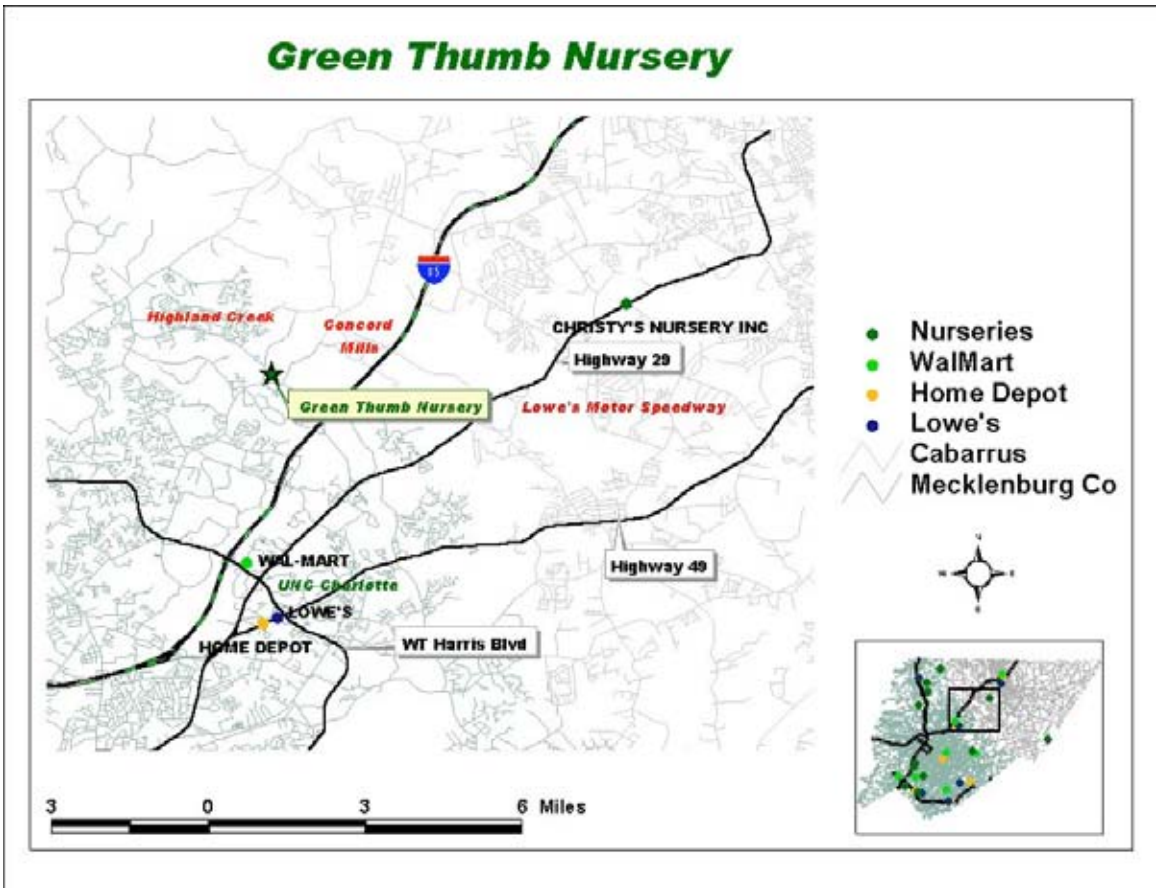
Appendix
Map Example

Garden Centers



Green Thumb Nursery





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ArcView (Geographic Software)
APPOINTMENT WORKSHEET

Dr. Bodkin's web page

Library Web page for MKTG3212.

WALK-IN APPOINTMENTS BEGIN ON
TUESDAY, JULY 1 10AM-12PM, 1-2PM
& THURSDAY, JULY 3, 10AM-12PM

Make sure you have with you:
1. File of competitors downloaded from the Reference USA website in tab-delimited format
2. Location of your new business
3. Name of your new business

1. Enter your Name

2. Phone Number or ========> Email address:

3. Class assignment:
   Retailing Management, Dr. Bodkin

4. First-time or Repeat Appointment:
   - (•) First-time appointment
   - ( ) Already made map...adding locations/names/additional copies, etc.

5. Do you want to make a map of existing competitors and indicate location of your establishment:
   - (•) Yes
   - ( ) No

NOTE: IF YOU WISH TO HAVE A MAP SHOWING YOUR COMPETITION, YOU MUST DOWNLOAD THE FILE OF COMPETITORS BEFOREHAND FROM REFERENCE USA.

THE FILE NEEDS TO BE IN TAB-DELIMITED FORMAT WHEN YOU DOWNLOAD. YOU MUST BRING THIS FILE WITH YOU AT THE TIME OF YOUR APPOINTMENT.
The Reference Desk will provide assistance with the website if you have questions.

6. Select any of the following State/Counties that apply:
   - ☐ Mecklenburg County (Charlotte)
   - ☐ Cabarrus County (Concord, Concord Mills)

Other North Carolina County ---------- Alamance Alexander Allegheny

Other State/County/Country. If none of the above choices apply,
Please describe what components you want in your map in the space above.

7. Enter the type of business in the space provided below.

8. Appointment Date/Time: Walk-Ins- see top of page

9. What do you want to accomplish in your ArcView appointment include the course and description of your assignment ?
   (fill in only if you are NOT in Dr. Bodkin's class)

Press This to Send | Clear Form to Start Over